

COMPETITIVE CONDITIONS IN THE U.S. MARKET FOR ASPARAGUS, BROCCOLI, AND CAULIFLOWER

Report to the President on
Investigation No. 332-253
Under Section 332(g)
of the Tariff Act of 1930
as amended

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UNITED STATES INTERNATIONAL TRADE COMMISSION

COMMISSIONERS

Anne E. Brunsdale, Acting Chairman

Alfred E. Eckes

Seeley G. Lodwick

David B. Rohr

Ronald A. Cass

Don E. Newquist

Kenneth R. Mason
Secretary to the Commission

This report was prepared principally by
Timothy P. McCarty, Antoinette M. James, Alvin Z. Macomber,
Alfred L. Dennis, and Joan M. Gallagher

with assistance from
Hugh M. Arce, Office of Economics
Richard D. Boltuck, Office of Economics
Chand G. Mehta, Office of Investigations
Jerald M. Tepper, Office of Investigations

under the direction of
David L. Ingersoll
Agriculture, Fisheries, and Forest Products Division

Office of Industries
Vern Simpson, Acting Director

Address all communications to
Kenneth R. Mason, Secretary to the Commission
United States International Trade Commission
Washington, DC 20436

PREFACE

On February 18, 1988, following receipt of a request from the United States Trade Representative (USTR), at the direction of the President, 1/ and in accordance with section 332(g) of the Tariff Act of 1930, as amended (19 U.S.C. 1332(g)), the U.S. International Trade Commission instituted investigation No. 332-253, Competitive Conditions in the U.S. Market for Asparagus, Broccoli, and Cauliflower, for the purpose of reporting on the significant competitive, technological, and economic factors affecting the performance of the California and Arizona vegetable industries producing asparagus, broccoli, and cauliflower, in major U.S. markets. Specifically, the Commission was asked to report on--

- (A) Measures of the current competitiveness of the California and Arizona industries in the U.S. market;
- (B) Comparative strengths of California, Arizona, and major foreign competitors in the U.S. market;
- (C) Nature and source of the main competitive problems facing the California and Arizona industries;
- (D) Nature of Federal and State government programs available to growers, processors, or marketers of the specified vegetables in the United States and Mexico;
- (E) Competitive strategies: what steps or actions the respective industries are taking to increase their competitiveness.

The USTR requested that the Commission report the results of its investigation within 12 months of receipt of the request, or by November 16, 1988.

Notice of the investigation was given by posting copies of the notice of investigation at the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the Federal Register (53 F.R. 5474, Feb. 24, 1988). 2/ Notice of the time and place of the public hearing was published in the Federal Register (53 F.R. 10301, Mar. 30, 1988). 3/

In the course of this investigation, the Commission sent questionnaires (following OMB approval) to (1) all known canners of asparagus; (2) all known freezers of asparagus, broccoli, and cauliflower; (3) a sample of growers of asparagus, broccoli, and cauliflower; and (4) a sample of importers/purchasers of asparagus, broccoli, and cauliflower. In addition, information was gathered from various public and private sources, industry meetings, domestic fieldwork, foreign fieldwork in Mexico, and public data gathered in other Commission studies and from other sources.

1/ The request from the USTR is reproduced in App. A.

2/ A copy of the Commission's Notice of Investigation is reproduced in App. B.

3/ A copy of the Notice of Time and Place of Hearing is reproduced in App. C.

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EXECUTIVE SUMMARY

Asparagus, broccoli, and cauliflower (especially broccoli) are some of the most important vegetable crops grown in the United States. In 1987, the production of the subject vegetables for the fresh market had a farm value of about \$448 million. In the same year, the production of these vegetables for processing (principally freezing for broccoli and cauliflower, and canning and freezing for asparagus) amounted to \$118 million. In 1987, U.S. exports of all asparagus, broccoli, and cauliflower totaled \$87 million, and imports amounted to \$95 million.

The U.S. asparagus, broccoli, and cauliflower industry is an instructive case study of U.S. competitiveness. In addition to its size, it has important structural characteristics related to the competitiveness of other food industries. These characteristics include a high degree of concentration in the processing sector, especially by multinational firms; the influence on production and trade from both domestic and foreign government policies and programs; and, the sensitivity of U.S. exports and imports to exchange rates and foreign economic conditions. In addition, the U.S. industry is facing aggressive new competition from producers and exporters abroad that are expanding production for export, taking advantage of low costs of labor and other inputs, and using technology transferred from U.S. sources.

The principal findings of this investigation are as follows: 1/ 2/

1. Current competitiveness of the California and Arizona industries in the U.S. market.

California is currently very competitive in the U.S. market for fresh and frozen asparagus, broccoli, and cauliflower. In 1987, California accounted for about 11 percent of U.S. processed asparagus production, over 75 percent of fresh asparagus and fresh and frozen cauliflower production, and about 90 percent of fresh and frozen broccoli production. Most of these market shares have remained about the same or risen slightly since 1983. In terms of harvested acreage, California accounted for nearly 40 percent of the total for asparagus in 1987, about 77 percent of that for cauliflower, and about 90 percent of that for broccoli; these shares are up slightly from 1983.

1/ Commissioner Eckes, Commissioner Lodwick, and Commissioner Rohr note that additional research should be done concerning Mexican Government programs related to asparagus, broccoli, and cauliflower. In particular, it is still unclear to what extent government-controlled reservoir water is used to irrigate lands on which these vegetables are grown in Mexico. Further, additional information on FERTIMEX, a government-owned company, would show whether it provides growers of these vegetables with fertilizer at prices below the world market. Similarly, further information on the Mexican Government's Pitex program, which allows duty-free importation of machinery and seeds, would show whether it provides a benefit to growers of asparagus, broccoli, and cauliflower. Finally, cost-of-production information in the publications cited in this report should be verified to see if it reflects current market conditions.

2/ Acting Chairman Brunsdale approves the report with the accompanying Additional Views. See Appendix I.

Although Arizona has been experiencing increased production of the subject vegetables, primarily broccoli and cauliflower, it does not currently account for a significant share of domestic production. However, it has accounted for an increasing share of harvested acreage; in 1987, Arizona accounted for about 4 and 10 percent of U.S. broccoli and cauliflower acreage, respectively.

In 1987, total imports accounted for 21 percent of the U.S. consumption of fresh asparagus, 4 percent of fresh broccoli, and 3 percent of fresh cauliflower. In the same year, the ratios of imports to consumption for frozen asparagus, broccoli, and cauliflower were 22, 39, and 43 percent, respectively, and that for canned asparagus was 7 percent. The import penetration ratios for total imports of these items all have risen since 1983, with the exception of fresh cauliflower which fell slightly. In 1987, imports from Mexico, as a share of U.S. consumption, were: fresh asparagus, 17 percent; fresh broccoli, 4 percent; fresh cauliflower, 1 percent; frozen asparagus, 21 percent; frozen broccoli, 33 percent; frozen cauliflower, 41 percent; and, canned asparagus, 4 percent. The import penetration ratios for imports from Mexico of the subject vegetables showed less consistent changes from 1983. While those for all processed products and fresh broccoli rose, that for fresh asparagus declined and that for fresh cauliflower remained steady.

The principal sources of domestic shipments for all of the subject vegetables are California and the Southwest, primarily Arizona and Texas. California and Arizona enjoy highly favorable climatic conditions year-round; however, both States rely extensively on irrigation because of sparse rainfall during the growing season. In contrast, most other producing States face highly seasonal climatic patterns that restrict production to fewer months of the year.

Producers in eastern and southern States are competing more favorably against California in regional markets. Whereas producers in California have the advantages of economies of scale and the ability to supply markets year-round, producers in eastern States have the competitive advantage of lower transportation rates to eastern markets. This competitive advantage has not yet evidenced itself in market share data because consumption in eastern markets is only a fraction of total consumption. Thus, market share increases of eastern States in eastern markets are outweighed by market share increases of California and Arizona in the rest of the country.

There appears to be no significant concentration of a few farms raising asparagus, broccoli, or cauliflower; no producers or small groups of producers are known to account for a significant share of total U.S. production. Most asparagus growers throughout the country are heavily dependent upon returns from raising that crop. However, broccoli and cauliflower growers are generally more diversified into raising and marketing a number of other crops.

The number of U.S. processors (i.e., freezers and canners) of asparagus, broccoli, and cauliflower nationwide is significantly smaller than it was a decade ago; however, processors are still very competitive since there is no single dominant firm in the industry and few of these firms are cooperatives. The importance of U.S.-owned multinationals is growing in the processing of the subject vegetables and their presence is likely to have an impact on the structure of the industry in the future.

2. Comparative strengths of California and Arizona and major foreign competitors in the U.S. market. 1/

The comparative strengths of California and Arizona in the U.S. market include the following characteristics: the ability to diversify into other fresh-market and processed products, established distribution channels, and a reputation for dependable supplies year-round.

Most asparagus, broccoli, and cauliflower growers are diversified into the production of a number of other crops. The crop mix may vary annually; broccoli and cauliflower growers especially may alternate among a larger assortment of items on a more frequent basis. Although asparagus, broccoli, and cauliflower may account for the largest share of freezers' processed production, most freezers are also diversified into a number of other products. This enables both growers and freezers to reduce transportation costs through the use of full-mix loads (i.e., a truck containing a variety of products going to a particular location). In addition, this enables growers and freezers to expand the number of months they are in operation, which spreads costs over a longer period of time.

The marketing of the subject vegetables, in both fresh and processed forms, is facilitated by regularly used brokers, shippers, wholesalers, truckers, etc., established through many transactions conducted over a number of years. Such a system is either unknown or not as readily available to private Mexican producers, limiting their ability to access certain U.S. markets. However, Mexican operations of U.S. multinationals are able to take advantage of such distribution channels, previously established through their U.S. operations.

The bulk of the U.S. production of asparagus, broccoli, and cauliflower occurs in areas that are in close proximity to shippers and processors. Thus, raw product from these areas is readily available for rapid distribution nationwide. In addition, many shippers and processors have access to production in other areas, enabling them to supplement production in the local area. As a result, shippers and processors are able to provide products on a year-round basis, insuring customers of a steady, dependable supply of product.

The comparative strengths of Mexico, the primary foreign competitor, include the following factors: the availability and lower cost of labor, the influence of U.S. multinationals, and a growing season that allows them to enter the market at the beginning of the U.S. season when prices are highest.

Due to the large disparity in wage rates between the United States and Mexico (i.e., hourly U.S. wage rates roughly equivalent to daily Mexican wage rates), the contribution of labor to total production costs is significantly lower in Mexico than it is in the United States. The abundant availability of labor enables Mexican growers to employ sufficient labor for multiple harvests of individual fields. Mexican freezers can conduct more labor-intensive hand-cutting operations than can U.S. freezers (i.e., cutting broccoli florets as opposed to larger, less specialized cuts).

1/ Table A presents an industry and market profile for 1983-87.

Table A
Profile of U.S. asparagus, broccoli, and cauliflower industries and markets, 1983-87

Item	1983	1984	1985	1986	1987	Absolute change, 1987 from 1983	Percentage change, 1987 from 1983
Farm-gate production:							
Asparagus:							
Fresh-market.....thousand dollars..1/	73,800	76,900	91,343	97,941	91,102	17,302	23
Freezing.....thousand dollars..1/	6,256	8,443	13,977	11,895	13,318	7,062	113
Canning.....thousand dollars..1/	27,438	31,120	32,156	27,133	31,284	3,846	14
Broccoli:							
Fresh-market.....thousand dollars..	157,281	168,968	173,053	184,665	183,595	26,314	17
Freezing.....thousand dollars..	52,824	68,916	66,292	55,074	51,321	(1,503)	(3)
Cauliflower:							
Fresh-market.....thousand dollars..	118,464	150,031	145,955	170,020	172,629	54,165	46
Freezing.....thousand dollars..	21,525	24,900	23,178	21,843	22,207	682	3
Production of Frozen:							
Asparagus.....thousand pounds..	13,599	15,099	19,990	18,008	16,725	3,126	23
Broccoli.....thousand pounds..	285,358	365,764	356,806	324,519	312,460	27,102	9
Cauliflower.....thousand pounds..	100,541	102,106	94,617	89,120	77,758	(22,783)	(23)
Harvested acreage:							
Asparagus.....acres..	78,190	89,930	91,450	96,180	99,840	21,650	28
Broccoli.....acres..	91,500	106,500	109,500	119,100	120,000	28,500	31
Cauliflower.....acres..	54,600	60,800	61,200	67,800	66,300	11,700	21
Exports: 2/							
Asparagus:							
Fresh.....thousand dollars..	13,632	17,314	15,661	18,998	28,076	14,444	106
Canned.....thousand dollars..	1,623	2,235	1,641	1,491	1,595	(28)	(2)
Broccoli, fresh.....thousand dollars..	20,982	23,628	25,520	30,400	33,721	12,739	61
Cauliflower, fresh.....thousand dollars..	15,501	18,455	19,495	21,000	23,820	8,319	54
Imports:							
Asparagus:							
Fresh or chilled...thousand dollars..	13,463	7,018	10,514	13,940	16,081	2,618	19
Frozen.....thousand dollars..	625	234	521	1,341	3,402	2,777	444
Canned.....thousand dollars..	2,561	6,452	4,749	4,478	5,217	2,656	104
Broccoli:							
Fresh or chilled...thousand dollars..	116	925	810	1,706	3,790	3,674	3,167
Frozen.....thousand dollars..	10,964	21,288	25,666	34,495	49,701	38,737	353
Cauliflower:							
Fresh or chilled...thousand dollars..	2,227	2,391	2,905	2,134	1,916	(311)	(14)
Frozen.....thousand dollars..	6,973	10,288	11,518	10,753	15,039	8,066	116
Apparent consumption:							
Asparagus:							
Fresh.....thousand pounds..	101,684	96,008	110,975	144,749	137,417	35,733	35
Frozen.....thousand pounds..	14,816	15,628	20,907	20,592	21,499	6,683	45
Canned.....thousand pounds..	60,225	72,969	76,159	77,483	82,916	22,691	38
Broccoli:							
Fresh.....thousand pounds..	475,985	583,261	615,401	741,780	750,181	274,196	58
Frozen.....thousand pounds..	316,075	428,298	429,848	438,178	502,231	186,156	59
Cauliflower:							
Fresh.....thousand pounds..	331,580	431,174	438,487	525,283	532,393	200,813	61
Frozen.....thousand pounds..	120,626	131,941	130,440	125,963	135,271	14,645	12
Trade balance:							
Asparagus, fresh.....thousand dollars..	169	10,296	5,147	5,058	11,995	11,826	6,998
Broccoli, fresh.....thousand dollars..	20,866	22,703	24,710	28,694	29,931	9,065	43
Cauliflower, fresh.....thousand dollars..	13,274	16,064	16,590	18,866	21,904	8,630	65
Imports to consumption ratio:							
Asparagus:							
Fresh.....percent..	13	15	16	16	21	8	3/
Frozen.....percent..	8	3	4	13	22	14	3/
Canned.....percent..	5	9	7	7	7	2	3/
Broccoli:							
Fresh.....percent..	4/	1	1	2	4	4	3/
Frozen.....percent..	11	15	18	27	39	28	3/
Cauliflower:							
Fresh.....percent..	4	3	4	2	3	(1)	3/
Frozen.....percent..	17	23	28	30	43	26	3/

1/ Estimated by the Commission staff.

2/ Data for frozen asparagus, broccoli, and cauliflower exports are not available.

3/ Not meaningful.

4/ Less than 0.5 percent.

Source: Compiled from official statistics of the U.S. Departments of Commerce and Agriculture and the American Frozen Food Institute.

The entrance of U.S. multinationals into the Mexican vegetable industry resulted in the transfer of U.S.-derived technology into the growing and processing sectors. This enabled Mexican products to penetrate U.S. markets and to exploit their labor-cost advantage in specialized product areas. The influence of these multinationals extends beyond their own operations to include the occasional contracting for processed product from independent freezers to supplement their own production.

Due to the nature of the variation in climatic conditions throughout Mexico, growers are able to supply fresh-market product to U.S. markets prior to peak U.S. production times. This enables these growers to take advantage of the higher prices available at such times, increasing their revenues and resulting in depressed prices when U.S. production enters the market. Since processing is more nearly a year-round operation, such price advantages are not as significant for frozen products.

3. Nature and source of the main competitive problems facing the California and Arizona industry.

The main competitive problems facing the California and Arizona asparagus, broccoli, and cauliflower industry include: the penetration of Mexican and other U.S. production into established markets; the higher U.S. labor costs in both growing and processing; the decision of some firms to develop operations in Mexico; changes in consumer demand for processed product; and, the limited availability of irrigation water.

The number of U.S. asparagus, broccoli, and cauliflower processors has dropped significantly in recent years, with a number of firms going out of business. Faced with rising costs of fuel, energy, and labor, along with imports taking an increasing share of consumption, competition among the remaining domestic processors is heightened.

Along with competition from imports, California producers, especially, are faced with increasing water costs and wage rates for dwindling supplies of labor; pressure from nonagricultural users for existing land in production; and, tighter restrictions on pesticide usage. Especially during the past decade, many growers and shippers in California have established contractual arrangements for production or growing areas in other parts of California and Arizona. Although this allows firms to expand their harvest period, growers face many of the same problems in these areas that they face elsewhere in California.

4. Nature of Federal and State Government programs available to growers, processors, or marketers of the subject vegetables in the United States and Mexico.

As a rule, government intervention is less pervasive in horticultural crops than in grains, dairy, or other agricultural sectors. Thus, the effects of government intervention in asparagus, broccoli, and cauliflower are generally either indirect (affecting land development or labor costs) or macroeconomic (affecting exchange rates or foreign debt restructuring).

At the grower level, there are a number of activities supported in part by public funds (Federal and State) that enhance the competitiveness of all U.S. vegetable producers, including producers of asparagus, broccoli, and cauliflower. Most of the plant variety studies, mechanical planting and harvesting development, disease and insect control research, and post-harvest physiology work in the United States regarding vegetables have been conducted at land grant colleges, particularly in California. The production of vegetables is directly affected by Federal and State policies and programs regarding irrigation water. In addition, many States offer a number of State and Federally sponsored agricultural marketing programs for farmers and related agribusiness operations; however, such programs are not targeted specifically at the subject vegetables.

The Federal Government has a number of regulations relating to the growing and processing of all vegetables, including U.S. Department of Agriculture (USDA) grades and standards, Environmental Protection Agency regulations, Food and Drug Administration (FDA) regulations, and Occupational Safety and Health Administration standards. Most of these programs result in increased costs for vegetable growers and processors because of the higher standards that have to be met.

The USDA voluntary guidelines for grading fresh and frozen vegetables include imported produce as well. The FDA is responsible for monitoring pesticide levels on both domestic and imported products. Thus, the impact of U.S. Government programs extends beyond domestic products to products from other countries entering the U.S. market.

Mexico, similarly, has no direct government policies or programs to benefit the production of asparagus, broccoli, or cauliflower. The Government of Mexico prioritizes the use of reservoir irrigation water for the production of basic food crops (i.e., corn, dry beans, rice, sorghum, and barley) over the production of the subject vegetables. Thus, as of now it appears that vegetable growers depend on water from deep wells for their crops. Water, whether pumped from wells or from reservoirs, is subject to taxes and quotas set by the Ministry of Agriculture (MOA). The quota amounts for each vegetable reflect the amount of water consumed by the particular vegetable, as well as the projected rainfall, the height of the local water table, and water levels in local reservoirs. If a grower wants to shift to new crops, he must register the crop with the MOA. Government permits are required for new wells, and industry sources stated that no drilling requests for new wells have been approved in nearly 10 years. However, potential expansion is substantial due to the fact that only about 10 percent of well-irrigation farmland is currently devoted to the production of the subject vegetables.

The Mexican Government can also influence exports and imports by setting the official exchange rate above or below the market rate. In April 1985, Mexico agreed to remove certain export subsidies such as tax rebates and financial subsidies, and the United States agreed not to treat other existing policies as export subsidies.

5. Competitive strategies: the steps or actions the respective industries are taking to increase their competitiveness.

In an effort to remain competitive, growers have relocated to areas with lower water, land, or labor costs, either within the State in which they were originally located or in other States. Along with lowering costs, such moves can also result in better yields because of changes in the growing season or improved soil conditions. Growers have also located additional operations in other areas outside their original location to expand the size of their operations and take advantage of extended growing seasons.

Major processors of asparagus, broccoli, and cauliflower are responding to changes in consumer preferences by producing new products (e.g., mixed vegetables, frozen vegetables in sauces, frozen-like-fresh, and individually quick frozen vegetables). Market promotion is being conducted to encourage consumption of these new products. This processing industry is striving to maintain market share by taking advantage of economies of scale as well as developing improved, cost-cutting technological innovations. For example, large firms have become vertically integrated through mergers, which have permitted expanded market coverage and facilitated product diversification. At the same time, firms have aggressively embraced new products, and new processing and packaging technologies.

Some firms have renovated existing facilities or constructed new warehouses, leading to improved delivery schedules. High energy costs, as well as higher interest rates, have encouraged a trend towards energy-efficient cold storage warehouses and tighter inventory control. Computerized ordering and billing practices have led to a reduction in administrative costs and integration of orders to single, multi-order truck loads, thus reducing shipping costs. To insure food safety, firms are investing in private laboratory testing facilities.

A few U.S. growers and processors have entered into operations in Mexico. Such a move was perceived necessary by these firms in order to remain competitive in the asparagus, broccoli, and cauliflower industry. Other producers have instead contracted for both fresh and frozen Mexican product.

CHAPTER 1. INTRODUCTION

General

The major objectives of this investigation are to identify those competitive factors significantly affecting the California and Arizona asparagus, broccoli, and cauliflower growing and processing industries, and to assess the effects of such factors on the industries. This investigation was instituted on February 18, 1988, following receipt of a request therefor on November 16, 1987, from the United States Trade Representative (USTR), at the direction of the President. The USTR requested that the Commission investigate and report on significant competitive, technological, and economic factors affecting the performance of the California and Arizona vegetable industries producing asparagus, broccoli, and cauliflower. The USTR also requested that the study include the growing, processing, and marketing sectors, and concentrate on the competitive position of supplies of these vegetables from Mexico, California, and Arizona in major U.S. markets. These industries were requested for analysis because of "concerns of the California and Arizona vegetable growing industries regarding the competitive factors affecting their industries, including strong competition from imports." 1/

The U.S. International Trade Commission previously conducted an investigation on asparagus under section 201 of the Trade Act of 1974. 2/ The investigation was instituted on July 22, 1975, upon receipt of a petition by the California Asparagus Growers Association, Inc., Stockton, California, the Washington Asparagus Growers Association, Sunnyside, Washington, and certain unaffiliated asparagus growers.

The Commission, being equally divided, made no determination of whether asparagus, fresh, chilled, or frozen, or otherwise prepared or preserved, was being imported into the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article. Three Commissioners recommended that quantitative limitations on the aggregate amount of asparagus, fresh or chilled, but not frozen, imported into the United States from all foreign countries and entered for consumption were necessary to remedy injury.

On March 10, 1976, the President determined that he would accept the finding of those Commissioners finding in the negative as the finding of the Commission. Accordingly, no import relief was imposed. 3/

The U.S. role in world asparagus, broccoli, and cauliflower trade

In the fresh form, the subject vegetables are perishable commodities and, unlike other fresh or dried vegetables (e.g., potatoes or beans), which can be transported long distances over extended periods of time, these fresh vegetables must be marketed within a few weeks, even under the best conditions.

1/ The request from the USTR is reproduced in app. A.

2/ Asparagus, Report to the President on Investigation No. TA-201-4 Under Sec. 201 of the Trade Act of 1974, USITC Publication 755, January 1976.

3/ Press release No. 4219, Mar. 10, 1976, from the Office of the Special Representative for Trade Negotiations, Executive Office of the President.

Thus, most world trade of these items is limited primarily to trade between neighboring countries (e.g., between Mexico or Canada and the United States, among European Community (EC)-member countries, or between EC-member countries and other nearby countries).

On the other hand, asparagus, broccoli, and cauliflower in frozen form have a shelf life (at the proper temperature) of about 6 months. Thus, international trade of these items occurs on a more global scale. In 1987, for example, the United States exported significant quantities (over 50 million pounds) of miscellaneous frozen vegetables (including frozen asparagus, broccoli, and cauliflower) to such diverse foreign markets as Japan, Bermuda, Canada, Hong Kong, Norway, Australia, the Netherlands Antilles, and Indonesia. During the same year, U.S. imports of frozen asparagus, broccoli, and cauliflower were reported from Guatemala and El Salvador, along with the bulk of such imports from the traditional supplier, Mexico.

Most of the fresh, chilled, or frozen asparagus, broccoli, and cauliflower production in the United States is consumed domestically. Aside from shipments to Canada and Japan, limited amounts of such vegetables have been exported to a number of other countries in recent years. Future prospects for frozen vegetable exports appear good, especially to Pacific-rim countries. In recent years, imports of asparagus, broccoli, and cauliflower, primarily from Mexico, have risen significantly.

Emerging competition

Mexico will continue to be the primary source of foreign competition for asparagus, broccoli, and cauliflower in U.S. markets in the near future, for the following reasons: Mexico uses production, harvesting, and handling technology comparable to that of U.S. producers; efficiently operating distribution channels are available; connections exist between U.S. multinationals that operate both in the United States and through foreign subsidiaries in Mexico; and, additional land for expansion of the production area is available in Mexico. Also, Canada will probably remain an important supplier of fresh or chilled broccoli and cauliflower, especially during those months when U.S. production is greatest outside of California and Arizona and imports from Mexico are lowest. However, a number of other countries, including Guatemala, Chile, El Salvador, Spain, Israel, Belgium, Luxembourg, and the United Kingdom, are becoming increasingly important as suppliers to the U.S. market. Imports from Guatemala and El Salvador are eligible for duty-free treatment under the Generalized System of Preferences and the Caribbean Basin Economic Recovery Act.

Scope of the Investigation

Product coverage

The products covered in this study include a small but important group of agricultural commodities, namely asparagus, broccoli, and cauliflower, whether or not fresh; chilled; frozen; cut, sliced, or reduced in size; or otherwise prepared or preserved. Also included are asparagus, broccoli, and cauliflower

used as ingredients in prepared foods; not included are the prepared foods in which these vegetables are used as ingredients (e.g., soups, frozen dinners, and baked articles).

Asparagus.--Asparagus is the edible shoot (spear) of the asparagus plant, a deep-rooted perennial which, under ideal conditions, may thrive for many years. Depending on the region of the country, however, most commercial asparagus plantings (beds) are replaced after being in production for 6 to 7 years, with the first commercial crop from a new planting not harvested until the third or fourth growing season after germination. The actual number of years that a planting is harvested varies from farm to farm, and from region to region, depending on such factors as climate, cultural practices, quality of the planting, pest problems, and economic returns.

Asparagus spears grow from the plant's root crown; the depth to which the crown is covered with soil determines whether the asparagus can be marketed as green or white. White asparagus is produced by covering the root crown with considerably more soil than for producing green asparagus. Inasmuch as the growing asparagus spear turns green rapidly after emerging from the ground, white asparagus spears must be cut (considerably below the surface of the ground) as soon as the tips of the spears begin to emerge from the ground. In contrast, green asparagus spears are generally cut only after the spears have grown to the desired length (usually 7 to 10 inches) above the ground.

Most of the asparagus produced in the United States is harvested during February to June. Fresh asparagus is perishable; it must be marketed within a few weeks after harvest, even when properly refrigerated. A large part of the U.S. asparagus crop is processed (canned or frozen) for later sale. In recent years, nearly three-fifths of the asparagus grown in the United States has been sold through fresh-market outlets; the remainder has been processed by canning or freezing. Of the amount processed, nearly three-fifths has been canned and the rest frozen. Imported asparagus is grown from the same varieties as those grown in the United States; imported fresh and processed asparagus are usually similar in flavor and appearance to the domestically produced products.

Green asparagus is most frequently served as a cooked vegetable, either plain or with various sauces. It is also used in soups, salads, and as a garnish for other foods. For many uses, processed asparagus is interchangeable with fresh asparagus. White asparagus, whose limited U.S. consumption is mostly supplied by imports, is also frequently served as a cooked vegetable but is probably more often used as a salad vegetable or as a garnish for food dishes.

Broccoli.--Broccoli is the edible head (including green buds and thick, fleshy flower stalks) of the broccoli plant, a biennial plant grown as an annual. Broccoli is considered a cool-season crop, cultivated primarily during the cooler winter months in warmer climates and during the late spring and early fall months in other production areas. The term "broccoli," as generally used in the United States, refers to sprouting broccoli rather than heading broccoli, which is much like cauliflower. Both broccoli and cauliflower are members of the same genus and species of the cabbage family of crops. Although generally resembling cauliflower in growth and appearance, broccoli has less exacting climatic requirements than cauliflower. Broccoli heads are looser than those of cauliflower, green in color, and have longer flower stalks.

Most of the broccoli produced in the United States is planted from October to March and harvested during February to June. Broccoli is usually cut with 8 to 10 inches of stem when the central heads are compact and 3 to 6 inches across. As with most other vegetables, broccoli is perishable and must be refrigerated immediately and marketed within a short time after harvest. In recent years, about two-thirds of the broccoli grown in the United States has been sold through fresh-market outlets; the remainder has been frozen.

Fresh broccoli is an important restaurant salad-bar item, nutritionally rich and low in calories. After boiling, both fresh and frozen broccoli are often used as a vegetable side-dish, or in soups, sauces, or casseroles. For most uses, frozen broccoli is interchangeable with fresh broccoli. Imported broccoli, grown from the same varieties as those grown in the United States, is similar in flavor and appearance to the domestically grown product.

Cauliflower.--Cauliflower, a biennial plant of the cabbage family, is cultivated as an annual for its white, firm but tender head of flower stalks. It is grown in much the same way as broccoli, but is somewhat less tolerant of adverse conditions. For profitable production, cauliflower must have a fertile soil, cool temperatures during the growing season, freedom from frosts when plants are young, adequate soil moisture, and high atmospheric humidity. The planting and harvest seasons for cauliflower in the United States are similar to those for broccoli.

Fresh cauliflower, like broccoli, is nutritionally rich and low in calories and, as such, is an increasingly important restaurant salad-bar item. Both fresh and frozen cauliflower are consumed as a cooked vegetable, alone or in soups, sauces, or casseroles. Imported cauliflower is similar in flavor and appearance to the domestically produced product.

Study time frame

In most instances, the period covered throughout this study, especially with respect to published data, is 1983-87; some of the trade data cover the period 1978-87. Questionnaire data cover the period 1985-87. Preliminary data for 1988, when available, are also presented. The 1983-87 period represents a time during which the domestic vegetable-growing industry is reported to have experienced a decline in production, market share, and profitability, with an accompanying rise in domestic inventories and imports.

Data sources

The investigation of these vegetable products and their markets was carried out through the combined analysis of information from published sources and that obtained through staff interviews with company representatives, Government agency officials, and academic researchers, both in the United States and Mexico, and of data obtained from vegetable growers, processors, and importers through Commission questionnaires. Responses to the Commission's questionnaires accounted for an estimated 20 percent of U.S. fresh-market asparagus production, 10 percent each of U.S. fresh-market broccoli and cauliflower production, 80 percent of U.S. canned asparagus production, 70 percent of U.S. frozen asparagus production, and 90 percent each of U.S. frozen

broccoli and cauliflower production. In addition, Commissioners Eckes, Lodwick, and Rohr did fieldwork in Mexico where they visited growers and processors of the subject vegetables and interviewed government, Embassy, and company officials. To the extent that information sought by the Commission has been the subject of previous government or academic studies, such studies were consulted and appropriately integrated into the present investigation to minimize duplication of effort.

It should be noted that in some instances, data were not sufficient to completely analyze allegations of the state of certain competitive factors faced by the industry. In such cases, this is so stated and the ensuing discussion is limited by the availability of data.

Moreover, not all of the measures described here can be quantified, because sufficient data do not exist, particularly for foreign industries. To the extent possible, however, the Commission has assembled information on supply and demand in U.S. markets for asparagus, broccoli, and cauliflower, and on structural and behavioral characteristics of the U.S. and Mexican producers and processors of these vegetables, and examined them for their possible effects on U.S. industry competitiveness.

The Concept of Competitiveness

In this study competitiveness means the success and strength of the national or regional industry, relative to its rivals. In general, an industry is more competitive the more it is willing to supply to the market under existing demand conditions, holding unchanged the willingness of its competitors to supply the market. For instance, if an industry consists of many price-taking firms producing undifferentiated products, an industry's competitiveness is greater the more it is willing to supply at the prevailing price, other things remaining the same.

The competitiveness of an industry is determined by any factors that affect industry production under given demand conditions. Factors that increase U.S. production or decrease foreign production make the U.S. industry more competitive. Decreases in domestic marginal production costs relative to competitors, at current production levels, result in greater U.S. competitiveness. Relative domestic cost decreases may, in turn, result from depreciation of the dollar, government policies that effectively subsidize U.S. industries or tax foreign industries, or decreases in demand for products that could be produced with the same resources that are used in the industry in question. ^{1/} Both levels of and changes in market share might indicate competitiveness. Similarly, extraordinary profitability suggests incentives for growth that will lead to expanding market share.

^{1/} For a more complete listing of the causes of domestic cost decreases, see A. Michael Spence and Heather A. Hazard, International Competitiveness, Ballinger Publishing Co.: Cambridge, Mass., 1988, pp. xxii-xxiii.

CHAPTER 2. U.S. MARKET SUPPLY

Stages of Processing

Asparagus, broccoli, and cauliflower are marketed both for fresh-market consumption and for processing. Production in some States is intended principally for one market, whereas supplies from other States may be used for both. Vegetables destined for either use must go through multiple stages of preparation between the farm and final consumer.

Asparagus

Asparagus destined for fresh-market sale is usually taken to a packing shed adjacent to the field and graded by spear diameter, tied in bunches, trimmed to a uniform spear length (usually about 9 inches) to remove most of the fibrous butt-end portion, and then packed for shipment, generally in a two-compartment wooden crate containing twelve 2-1/2 pound bunches (30 pounds net weight). In recent years, increased amounts of fresh-market asparagus have been sold packed loose (unbunched) in crates for later sale by the pound.

Asparagus for processing is delivered to the processor in bulk containers. Before the asparagus is processed, it is thoroughly washed, graded for size and defects, trimmed to a uniform length (usually about 7 inches), sometimes cut into 1-inch pieces, and then blanched. Asparagus that is to be canned is put in metal or glass containers, covered with a light brine which may contain other ingredients such as butter, then sealed airtight and pressure-cooked. Before freezing, asparagus is either put into the container in which it will be sold and then frozen, or frozen and put into bulk bins from which it will later be repacked into smaller containers and sold.

Canned and frozen asparagus are marketed in two main styles, "spears" and "cuts and tips," which are spears cut into 1-inch lengths. Most domestic and foreign freezers market only one length of spear, 5 inches. Cannerys commonly market several lengths of spears, ranging from about 5 to 7 inches.

Canned asparagus for the retail market is typically sold in several sizes of metal or glass containers which hold from 4 to 16 ounces (drained weight), whereas that for the institutional market is sold in two sizes of metal containers, one of which holds about 4 pounds of spears and the other holds about 6 1/3 pounds of cuts and tips. Frozen asparagus for the retail market is generally packed in several sizes of cartons, polybags, or boil-in-bag pouches that hold from 8 to 16 ounces; frozen asparagus for the institutional market is usually packed in cartons holding 2 1/2 pounds each. Frozen asparagus is sometimes packed in a butter or cheese sauce; such a product is usually packaged in boil-in-bag pouches. Frozen asparagus is also battered or breaded; however, the amount of product processed this way, as compared with total frozen asparagus, is insignificant.

Broccoli and cauliflower

Broccoli for the fresh market is sold as "heads," in bunches of stems tied together, or loose stems. Cauliflower for the fresh market is sold as whole "heads," often with the covering leaves trimmed off. Fresh broccoli and

cauliflower are increasingly used as standard items in salad bars; some fresh vegetable distributors trim broccoli and cauliflower to "floret" pieces for sale in bulk containers to institutional outlets.

Frozen broccoli is marketed as "spears" (florets with attached stalk), "cuts" (1-inch pieces), and chopped broccoli (pieces smaller than 1 inch). Frozen cauliflower is marketed as pieces of florets. The traditional container for frozen broccoli and cauliflower is the 4-inch by 5-inch paperboard box covered with waxed paper. The usual method of freezing is the wet-pack method in which the blanched vegetable pieces are placed in a container that is sealed and then frozen. Increasingly, more of the vegetables are individually quick frozen (IQF) and then the frozen vegetables are packaged. Plastic polybags of various sizes are commonly used to pack IQF broccoli and cauliflower; this method of freezing and packing allows the consumer to use only the desired amount without having to defrost the entire package.

Frozen food processors attempting to expand their product lines have used frozen broccoli and cauliflower in a wide variety of new products, including product packed in boil-in-bag pouches with a butter or cheese sauce, packed in mixtures (e.g., broccoli/cauliflower or broccoli/cauliflower/carrots), packed with pasta, battered and breaded for sale as hors d'oeuvres, and as ingredients in frozen prepared meals.

Marketing Channels

Fresh asparagus, broccoli, and cauliflower

Fresh vegetables are perishable and must be marketed within a few weeks after harvest. After being packed by the grower, the fresh asparagus, broccoli, or cauliflower is shipped either by the grower or, more often, by commercial shippers, to chain stores or to wholesale produce markets in major U.S. cities. Transportation is usually by truck through contracts with local trucking companies. Shippers must cool (hydrocool, vacuum cool, pressure cool, etc.) these vegetables to quickly remove field heat and keep them fresh during transit; to accomplish this, shippers maintain cold-storage facilities in which they cool the vegetables and store large volumes of product for later distribution. Commercial shippers either purchase fresh vegetables from the growers or, acting as brokers, handle them by consignment. Brokers are often used in the marketing of these fresh vegetables. Wholesale buyers (e.g., chainstores and regional distributors) sell the fresh vegetables to households, retail stores, and institutions (food service sales).

Processed asparagus, broccoli, and cauliflower

Asparagus, broccoli, and cauliflower for processing are generally grown under contract with processors, with the contracts stipulating the varieties to be grown and the harvesting specifications. The harvested vegetables are usually delivered directly from the fields to the processor's plant, primarily by outside-contracted trucks. Frozen asparagus, broccoli, and cauliflower, and canned asparagus can be stored for many months. Nearly all freezers maintain cold-storage facilities at their processing plant, from which they ship directly to buyers; some also maintain or rent storage facilities adjacent to their major marketing areas and ship processed asparagus, broccoli, and

cauliflower directly from these facilities as orders are received. Chainstores and food service outlets account for most of the processors' sales, with distributors, repackers, and food processors (remanufacturers) making up the remainder. Some domestic processors maintain quite extensive sales forces, whereas others sell most of their output through brokers. It is believed that brokers account for the largest share of the sales. A few large multinational firms account for a significant share of the U.S. market for frozen broccoli and cauliflower, with a slightly larger number of independent firms shipping nearly all the remainder. The bulk of the frozen asparagus is processed by a few firms, while canned asparagus is processed by a large number of firms nationwide.

Organization of Production

Asparagus

The nature of the crop cycle (asparagus being a perennial plant) is such that the first productive harvest does not occur until the third or fourth growing season after seed germination; commercial harvests generally continue for another 6 or 7 years. In the United States, according to industry sources, most asparagus growers do not grow broccoli or cauliflower. These growers may, however, raise a number of other crops. In the Delta area of California, for instance, such other crops might include corn, wheat, cotton, and sugar beets, whereas in Washington State, additional crops might include certain fruits. In Michigan, another major producing area, most growers raise only asparagus, but some growers are diversified into other crops including fruits (e.g., apples, cherries, peaches, and plums) and other vegetables such as beans, corn, and squash. However, asparagus is not a crop that vegetable growers could include in an annual crop rotation program or grow as a quick turn-around cash crop.

Asparagus processing (both canning and freezing) is generally done in plants located near the growing areas, by both large multinational firms processing a number of other crops and smaller, family-run operations relying heavily on the processing of asparagus for revenues. In California, however, asparagus for canning is shipped to Washington State, as there have been no asparagus canners in California for a number of years. Most of the California growers' production (over 90 percent) is intended for fresh-market sales. At one time, there was a large asparagus canning industry in California, with a large share of production intended for export markets; this market was lost to foreign competition, principally from Taiwan. ^{1/} ^{2/} A number of vegetable freezers in California are processing frozen asparagus both from California and Washington State. Washington has a viable asparagus canning industry; the bulk of the production (over 80 percent) is intended for processing, both freezing and canning.

^{1/} Prehearing submission in the current investigation by the California Asparagus Growers Association, May 6, 1988.

^{2/} For a discussion of the state of the U.S. asparagus industry during the early 1970's, see Asparagus: Report to the President on Inv. No. TA-201-4 Under Section 201 of the Trade Act of 1974, USITC Publication 755, Washington, D.C., January 1976.

Broccoli and cauliflower

Most broccoli growers also grow cauliflower, as well as a number of other crops, sometimes together in a crop-rotation program and other times as single items for a number of successive crop seasons on the same field. These other crops usually include lettuce and celery, but also might include asparagus, carrots, spinach, onions, tomatoes, strawberries, or melons.

Much of the total volume of frozen broccoli and cauliflower is packed by a handful of firms in California and Washington. In addition, another large volume is accounted for by national and multinational firms with multiple processing facilities, nationwide distribution of name-brand products (including basic and upscale articles), and foreign production affiliates from which imported products are obtained. Although the bulk of frozen broccoli and cauliflower production is accounted for by large-volume producers, limited production is scattered widely throughout the country among a number of small- to medium-size packers.

The number of States producing fresh-market broccoli has grown from four major producers (California, Arizona, Texas, and Oregon) to include such States as Maine, New York, Illinois, Colorado, Virginia, North Carolina, South Carolina, Oklahoma, and Georgia. 1/ Backed by the technical assistance of their respective State Departments of Agriculture and State Extension Service personnel, along with the apparent willingness of more retailers to work with local or regional suppliers, producers in Eastern and Southern States are competing more favorably against California production in regional markets. 2/ However, most of these producers are new to broccoli and cauliflower production and, if profitability falls, are expected to shift production away from these crops. 3/ The private-label share of some frozen vegetables is believed to be increasing.

International Trade

Domestic production and imports of many vegetables and vegetable products have risen in recent years as a result of the growth in consumer demand. The United States has been a net importer of fresh and processed vegetables since 1984. 4/ In 1985, about two-thirds of fruit and vegetable imports were in the fresh or frozen form, whereas over 70 percent of exports were in the fresh form (figure 2-1). This trade deficit has reportedly resulted, in part, from the unfavorable exchange rate of the dollar vis-a-vis the currencies of major U.S. trading partners, along with increased competition from other countries, especially European Community (EC) exports, in other world markets. 5/

1/ Roberta Cook, "California Broccoli and Cauliflower Growers Face Increasing Competition," Situation and Outlook Report--Vegetables and Specialties, U.S. Department of Agriculture, Economic Research Service, TVS-244, February 1988.

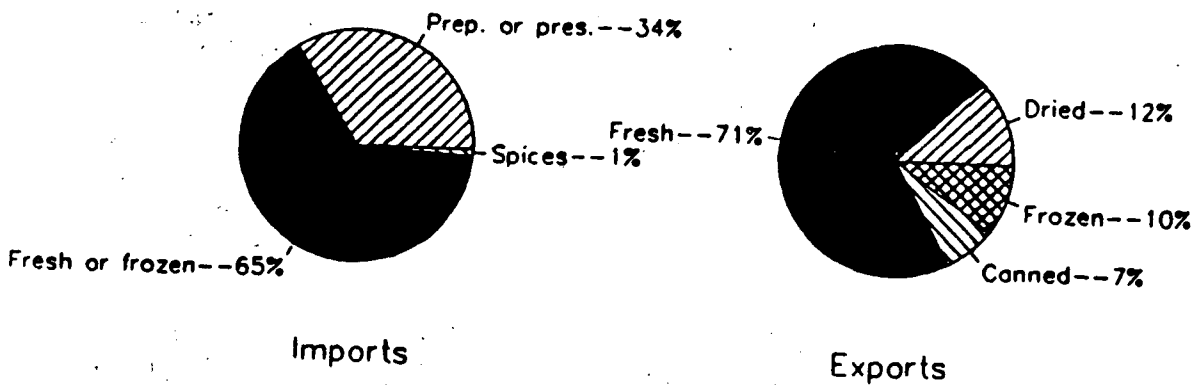
2/ Ibid., p. 9.

3/ Ibid., p. 9.

4/ Katharine C. Buckley, Shannon R. Hamm, Ben Huang, and Glenn Zepp, U.S. Fruit and Vegetable Processing Industries, U.S. Department of Agriculture, Economic Research Service, Staff Report No. AGES 880216, August 1988.

5/ Ibid., p. 9.

Figure 2-1.

Composition of U.S. vegetable and fruit imports and exports, 1985 1/1/ Excludes citrus and other fruit juices.

Source: Katharine C. Buckley, Shannon R. Hamm, Ben Huang, and Glenn Zepp, U.S. Fruit and Vegetable Processing Industries, U.S. Department of Agriculture, Economic Research Service, Staff Report No. AGES 880216, August 1988, p. 63.

Important shifts have occurred in world trade of fresh vegetables, including changes in traditional trading partners and their competitiveness. ^{1/} During 1962-82, world exports of selected fresh vegetables increased at an annual average rate of 19 percent. The share of total exports accounted for by the United States and EC, the more traditional suppliers, fell from 19 to 11 percent and 32 to 10 percent, respectively, throughout this period. At the same time, the export share from the Far East rose from less than 2 percent to nearly 58 percent. ^{2/}

Interregional trading partners among major world exporting regions have remained about the same since the 1960's. In 1982, over 70 percent of total exports from Africa, the Middle and Far East, and non-EC Western European nations were to the EC, and 75 percent of exports from Latin America were to the United States. ^{3/} The United States shipped over half of its total exports to Canada, whereas 40 percent of EC exports were to non-EC Western European nations and an equal amount to Africa.

As previously mentioned, the United States is both a major exporter of asparagus, broccoli, and cauliflower (principally in a fresh form to Canada) and a major import market for these items (mostly frozen and from Mexico). The following tabulation shows the trends in U.S. exports of the subject vegetables during 1983-87 (in millions of pounds):

	<u>Fresh or chilled--</u>			<u>Frozen</u>	<u>Canned</u>
	<u>Asparagus</u>	<u>Broccoli</u>	<u>Cauliflower</u>	<u>Vegetables 1/</u>	<u>Asparagus</u>
1983.....	17	83	51	44	2
1984.....	23	97	64	42	2
1985.....	22	105	68	37	2
1986.....	18	119	78	47	1
1987.....	30	129	89	51	2
Annual average increase (percent) ^{2/} ..	15	12	15	4	-7

^{1/} Covers a variety of frozen vegetables including asparagus, broccoli, and cauliflower.

^{2/} On the basis of unrounded data from tables 2-1 to 2-5.

As these data demonstrate, U.S. exports of these vegetables, excluding canned asparagus, have increased.

^{1/} Ronald W. Ward and Amy Sparks, "World Trade Patterns for Fresh Vegetables," Citrus & Vegetable Magazine, April 1988.

^{2/} Ibid, p. 51.

^{3/} Ibid, p. 52.

U.S. imports of the subject vegetables in all forms have increased in recent years, as shown in the following tabulation (in millions of pounds):

	<u>Asparagus</u>			<u>Broccoli</u>		<u>Cauliflower</u>	
	<u>Fresh</u>	<u>Frozen</u>	<u>Canned</u>	<u>Fresh</u>	<u>Frozen</u>	<u>Fresh</u>	<u>Frozen</u>
1983.....	20	1	3	1/	34	12	21
1984.....	14	1	7	6	65	14	31
1985.....	18	1	5	5	77	16	37
1986.....	24	3	5	17	117	13	38
1987.....	28	5	6	30	195	14	58
Annual average increase (percent) 2/...	9	41	19	374	60	2	29
Imports' share of consumption 1987 (percent).	21	22	7	4	39	3	43

1/ Less than 500,000 pounds.

2/ On the basis of unrounded data from tables 2-6 to 2-12.

The most dramatic increase in U.S. imports was for fresh broccoli, primarily from Mexico. Frozen broccoli imports, also mainly from Mexico, showed the next largest increase.

Asparagus, broccoli, and cauliflower may enter the United States under any of 15 separate statistical product classifications in the Tariff Schedules of the United States Annotated (TSUSA), depending on the date entered or whether the vegetable is whole or cut, or fresh, chilled, frozen, or otherwise prepared or preserved, or contained in a mixture. 1/ In general, for most imports entered in recent years (primarily from Mexico), the applicable rates of duty have been 17.5 percent ad valorem for frozen asparagus, broccoli, and cauliflower, 25 percent for fresh or chilled asparagus and broccoli, and 12.5 percent for fresh or chilled cauliflower.

Role of Governments

There are no U.S. Government programs designed specifically to address production or processing of asparagus, broccoli, and cauliflower. At the grower level, a number of activities supported in part by public funds (Federal and State) influence the competitiveness of U.S. asparagus, broccoli, and cauliflower producers within the context of broader programs. Most of the plant varietal studies, mechanical planting and harvesting development, disease and insect control research, and post-harvest physiology work in the United States regarding these vegetables has been conducted at land grant colleges, particularly in California. A certain part of this work has been funded by

1/ See app. D for a discussion of the product classification for U.S. imports, rates of duty, and Customs treatment relating to asparagus, broccoli, and cauliflower, along with a discussion of tariff treatment under the proposed Harmonized Tariff Schedules (HTS) of the United States and pages excerpted from the TSUSA and HTS that show all duty rates and duty-free status under the Generalized System of Preferences (GSP) or Caribbean Basin Economic Recovery Act (CBERA).

growers themselves. For instance, members of the Grower-Shipper Vegetable Association of Central California are reported to have provided over \$20,000 recently for research work to gain the necessary registration for the use of a certain pesticide on two minor crops (cardoon and raddichio). 1/

The Federal Government has a number of regulations relating to the processing of all foods, including vegetables. Included under these programs would be U.S. Department of Agriculture grades and standards, Environmental Protection Agency regulations, Food and Drug Administration regulations pertaining to product identity, quality, and container fill, and Occupational Safety and Health Administration standards for the overall health and safety of all workers. 2/

The production of the subject vegetables, particularly broccoli and cauliflower, is directly affected by broadly applicable Federal and State policies and programs regarding irrigation water. Although irrigated land only accounted for about 13 percent of total U.S. harvested crop acreage in 1982, over 70 percent of California farms, with an estimated 8.5 million acres, were irrigated. 3/ The bulk of California rainfall occurs during December to March when production is lowest. 4/ In many Western States, an estimated 85 to 90 percent of the available water supply is used for irrigation. Features attributed to irrigated farms, as opposed to nonirrigated ones, include the following: about two and one-half times the investment in lands and buildings; two times the value of machinery and equipment; three times the expenditures for energy; twice the fertilizer use; three times the pesticide use; the employment of five times the number of general laborers and employ seven times the amount of specialized contract labor; greater productivity per acre; and four times the value of crops. 5/

Energy expenses for pumping irrigation water, both from wells and on-farm surface-water supplies, have risen significantly in recent years. Average per acre costs rose 60 percent, from an estimated \$20 in 1979 to \$32 in 1984, with electricity accounting for nearly three-fifths of total pumping-energy usage. 6/

Mexico, similarly, has no government policies or programs to benefit specifically the production of asparagus, broccoli, or cauliflower. However, quasi-Governmental Mexican agencies reportedly provide low-cost fertilizers to

1/ Posthearing brief submitted on behalf of the Grower-Shipper Vegetable Association of Central California, May 31, 1988.

2/ Buckley, et al, U.S. Fruit and Vegetable Processing Industries.

3/ Rajinder S. Bajwa, William M. Crosswhite, and John E. Hostetler, Agricultural Irrigation and Water Supply, U.S. Department of Agriculture, Economic Research Service, Agriculture Information Bulletin No. 532, October 1987.

4/ Paige D. Rausser, "California Vegetables: Water Needs in 1989," Situation and Outlook Report--Vegetables and Specialties, U.S. Department of Agriculture, Economic Research Service, TVS-245, September 1988.

5/ Ibid., pp. 2-5.

6/ Ibid.

these vegetable growers, along with possible irrigation subsidies. ^{1/} In addition, Mexican growers benefit from the transfer of U.S. research and development on production practices, varietal studies, and other items, in some cases through U.S. processors and distributors.

Specific aspects of government's role that relate to asparagus, broccoli, and cauliflower are further discussed in chapters 4 and 5. It should be noted that there are no price-support programs or marketing orders for these vegetables.

^{1/} U.S. Department of Agriculture, Economic Research Service, Agriculture and Trade Analysis Division, Estimates of Producer and Consumer Subsidy Equivalents, Government Intervention in Agriculture, 1982-86, ERS Staff Report No. AGES 880127, April 1988, p. 86.

Table 2-1.

Asparagus, fresh or chilled: U.S. exports of domestic merchandise, by principal markets, 1983-87

Market	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Canada <u>1</u> /.....	12,722	17,709	18,586	10,674	17,653
Japan.....	2,824	3,618	1,950	4,978	6,295
Italy.....	227	125	95	246	1,087
United Kingdom.....	591	564	479	679	1,113
Mexico.....	0	73	613	221	2,249
Switzerland.....	242	239	174	385	822
Hong Kong.....	208	137	305	239	301
Australia.....	34	62	28	25	97
All other.....	94	78	25	151	118
Total <u>2</u> /.....	16,942	22,605	22,255	17,598	29,735
Value (1,000 dollars)					
Canada <u>3</u> /.....	7,600	10,969	11,784	9,755	13,829
Japan.....	4,284	4,951	2,495	7,078	8,929
Italy.....	326	171	129	389	1,447
United Kingdom.....	662	593	559	732	1,220
Mexico.....	-	40	151	221	1,096
Switzerland.....	309	298	216	381	971
Hong Kong.....	285	154	263	284	329
Australia.....	41	67	36	17	93
All other.....	125	71	28	141	162
Total <u>2</u> /.....	13,632	17,314	15,661	18,998	28,076
Unit value (per pound)					
Canada <u>4</u> /.....	\$0.60	\$0.62	\$0.63	\$0.91	\$0.78
Japan.....	1.52	1.37	1.28	1.42	1.42
Italy.....	1.44	1.37	1.36	1.58	1.33
United Kingdom.....	1.12	1.05	1.17	1.08	1.10
Mexico.....	-	.54	.25	1.00	.49
Switzerland.....	1.28	1.25	1.24	.99	1.18
Hong Kong.....	1.37	1.13	.86	1.19	1.09
Australia.....	1.21	1.08	1.28	.67	.95
All other.....	1.33	.91	1.12	.93	1.37
Average <u>2</u> /.....	.80	.77	.70	1.08	.94

1/ Canadian imports from the United States, based on Canadian statistics.

2/ Adjusted to include Canadian import data (which results in larger exports than reported in U.S. export data).

3/ Quantity (from Canadian statistics) times unrounded unit values to Canada (from U.S. statistics).

4/ Unit values of U.S. exports to Canada (from U.S. statistics).

Source: Compiled from official statistics of the U.S. Department of Commerce and official statistics of Statistics Canada, as noted.

Table 2-2.

Broccoli, fresh or chilled: U.S. exports of domestic merchandise, by principal markets, 1983-87

Market	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Canada <u>1</u> /.....	81,655	95,936	104,190	118,642	128,297
Japan.....	1	30	1	31	40
United Kingdom.....	2	32	172	248	151
Hong Kong.....	642	46	0	0	218
Mexico.....	228	389	400	327	122
South Korea.....	2	13	31	27	50
Norway.....	0	0	0	42	9
Bahamas.....	12	4	0	0	12
All other.....	129	253	89	174	3
Total <u>2</u> /.....	82,672	96,703	104,884	119,491	128,902
Value (1,000 dollars)					
Canada <u>3</u> /.....	20,732	23,399	25,276	30,135	33,422
Japan.....	2	6	1	16	97
United Kingdom.....	2	9	48	80	76
Hong Kong.....	130	12	-	-	51
Mexico.....	56	102	107	81	32
South Korea.....	1	13	26	23	30
Norway.....	-	-	-	13	6
Bahamas.....	6	2	-	-	5
All other.....	53	85	62	52	2
Total <u>2</u> /.....	20,982	23,628	25,520	30,400	33,721
Unit value (per pound)					
Canada <u>4</u> /.....	\$0.25	\$0.24	\$0.24	\$0.25	\$0.26
Japan.....	1.17	.21	.89	.50	2.45
United Kingdom.....	1.08	.27	.28	.32	.51
Hong Kong.....	.20	.26	-	-	.23
Mexico.....	.24	.26	.27	.25	.26
South Korea.....	.60	.96	.82	.85	.61
Norway.....	-	-	-	.30	.73
Bahamas.....	.51	.58	-	-	.40
All other <u>2</u> /.....	.41	.34	.70	.30	.80
Average.....	.25	.24	.24	.25	.26

1/ Canadian imports from the United States, based on Canadian statistics.

2/ Adjusted to include Canadian import data (which results in larger exports than reported in U.S. export data).

3/ Quantity (from Canadian statistics) times unrounded unit values to Canada (from U.S. statistics).

4/ Unit values of U.S. exports to Canada (from U.S. statistics).

Source: Compiled from official statistics of the U.S. Department of Commerce and official statistics of Statistics Canada, as noted.

Table 2-3.

Cauliflower, fresh or chilled: U.S. exports of domestic merchandise, by principal markets, 1983-87

Market	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Canada <u>1/</u>	51,172	63,846	68,120	78,093	88,801
United Kingdom.....	0	0	5	126	39
Hong Kong.....	31	0	49	36	55
Kuwait.....	0	0	0	0	30
Saudi Arabia.....	0	0	0	2	17
Netherlands.....	0	0	10	0	38
Bahamas.....	1	1	2	0	15
Mexico.....	99	1	5	112	11
All other.....	65	178	27	71	0
Total <u>2/</u>	51,366	64,026	68,209	78,442	89,006
Value (1,000 dollars)					
Canada <u>3/</u>	15,433	18,381	19,462	20,890	23,728
United Kingdom.....	-	-	2	42	34
Hong Kong.....	8	-	15	18	19
Kuwait.....	-	-	-	-	12
Saudi Arabia.....	-	-	-	3	10
Netherlands.....	-	-	3	-	10
Bahamas.....	1	1	1	-	4
Mexico.....	26	1	2	28	3
All other.....	33	72	10	19	-
Total <u>2/</u>	15,501	18,455	19,495	21,000	23,820
Unit value (per pound)					
Canada <u>4/</u>	\$0.30	\$0.29	\$0.29	\$0.27	\$0.27
United Kingdom.....	-	-	.47	.33	.87
Hong Kong.....	.26	-	.30	.51	.35
Kuwait.....	-	-	-	-	.41
Saudi Arabia.....	-	-	-	1.18	.60
Netherlands.....	-	-	.34	-	.26
Bahamas.....	.66	.82	.65	-	.26
Mexico.....	.26	.86	.53	.25	.26
All other.....	.50	.40	.39	.26	-
Average <u>2/</u>.....	.30	.29	.29	.27	.27

1/ Canadian imports from the United States, based on Canadian statistics.

2/ Adjusted to include Canadian import data (which results in larger exports than reported in U.S. export data).

3/ Quantity (from Canadian statistics) times unrounded unit values to Canada (from U.S. statistics).

4/ Unit values of U.S. exports to Canada (from U.S. statistics).

Source: Compiled from official statistics of the U.S. Department of Commerce and official statistics of Statistics Canada, as noted.

Table 2-4.

Asparagus, canned: U.S. exports of domestic merchandise, by principal markets, 1/ 1983-87

Market	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
United Kingdom.....	560	782	662	565	685
Sweden.....	51	94	69	85	174
Netherlands.....	84	1	114	0	92
Norway.....	29	32	61	32	61
Switzerland.....	92	211	123	191	71
Japan.....	86	56	14	41	54
Iceland.....	35	52	29	43	48
Saudi Arabia <u>2/</u>	648	262	175	53	30
All other.....	781	643	315	389	439
Total.....	2,366	2,133	1,562	1,399	1,654
Value (1,000 dollars)					
United Kingdom.....	466	863	715	640	678
Sweden.....	68	131	72	98	182
Netherlands.....	36	1	139	-	107
Norway.....	40	42	81	44	83
Switzerland.....	117	279	157	245	68
Japan.....	70	42	13	28	55
Iceland.....	34	60	21	46	48
Saudi Arabia <u>2/</u>	251	229	195	38	19
All other.....	541	588	248	280	280
Total.....	1,623	2,235	1,641	1,419	1,595
Unit value (per pound)					
United Kingdom.....	\$0.83	\$1.10	\$1.08	\$1.13	\$0.99
Sweden.....	1.33	1.40	1.04	1.16	1.05
Netherlands.....	.43	1.00	1.22	-	1.16
Norway.....	1.37	1.33	1.34	1.37	1.36
Switzerland.....	1.27	1.32	1.28	1.28	.95
Japan.....	.81	.75	.96	.66	1.02
Iceland.....	.97	1.15	.72	1.06	1.00
Saudi Arabia <u>2/</u>.....	.39	.87	1.11	.71	.63
All other.....	.69	.91	.79	.72	.64
Average.....	.69	1.05	1.05	1.01	.96

1/ In 1987, Taiwan was the 7th largest export market (by value); however, it is likely that these data are not commercial exports of canned asparagus.

2/ In 1987, Saudi Arabia was the 14th ranked export market by value; however, during 1983-86, it was the second largest export market. Other markets, not shown, with a larger value of exports in 1987 were Belgium/Luxembourg (\$44,000), French Pacific Islands (\$43,000), Haiti (\$39,000), and Hong Kong (\$28,000).

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-5.

Vegetables, not specially provided for, frozen: 1/ U.S. exports of domestic merchandise, by principal markets, 1983-87

Market	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Japan.....	22,579	18,350	14,988	25,575	28,969
Bermuda.....	1,160	1,413	3,791	4,960	3,842
Canada.....	5,796	5,267	4,158	3,624	4,953
Hong Kong.....	2,706	3,201	2,153	2,492	2,299
Norway.....	606	460	508	958	1,160
Australia.....	4,165	5,261	2,799	2,048	1,551
Sweden.....	617	544	493	168	772
Netherlands Antilles..	911	854	499	466	1,063
All other.....	5,664	6,463	7,645	6,617	6,268
Total.....	44,204	41,813	37,034	46,908	50,877
Value (1,000 dollars)					
Japan.....	8,013	6,808	6,148	10,054	10,433
Bermuda.....	768	772	1,816	2,159	2,378
Canada.....	2,540	2,649	1,914	1,812	2,321
Hong Kong.....	893	1,005	781	823	839
Norway.....	347	270	331	604	764
Australia.....	1,123	1,352	1,069	926	651
Sweden.....	395	315	294	122	558
Netherlands Antilles..	540	501	354	300	536
All other.....	3,851	4,257	4,137	3,971	3,292
Total.....	18,470	17,909	16,844	20,771	21,772
Unit value (per pound)					
Japan.....	\$0.35	\$0.37	\$0.41	\$0.39	\$0.36
Bermuda.....	.66	.55	.48	.44	.62
Canada.....	.44	.50	.46	.50	.47
Hong Kong.....	.33	.31	.36	.33	.36
Norway.....	.57	.59	.65	.63	.66
Australia.....	.27	.26	.38	.45	.42
Sweden.....	.64	.58	.60	.73	.72
Netherlands Antilles..	.59	.59	.71	.64	.50
All other.....	.68	.66	.54	.60	.53
Average.....	.42	.43	.45	.44	.43

1/ Includes frozen asparagus, frozen broccoli, and frozen cauliflower, as well as a number of other frozen vegetables; not included in these data are exports of frozen carrots, sweet corn, peas, and potatoes.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-6.

Asparagus, fresh or chilled: 1/ U.S. imports for consumption, by principal sources, 1983-87

Source	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Mexico.....	18,697	12,495	15,419	19,059	24,001
Chile.....	1,382	1,465	1,885	2,547	3,065
New Zealand.....	47	291	309	1,609	950
Peru.....	50	0	17	41	178
Australia.....	4	10	144	239	92
Switzerland.....	0	0	0	2	15
Spain.....	2	0	7	13	17
Canada.....	18	0	83	17	9
All other.....	27	52	165	119	25
Total.....	20,226	14,313	18,030	23,647	28,352
Value (1,000 dollars)					
Mexico.....	12,738	6,001	8,561	10,093	12,496
Chile.....	617	739	1,078	1,635	2,369
New Zealand.....	49	200	483	1,718	861
Peru.....	20	-	25	43	175
Australia.....	5	17	189	294	129
Switzerland.....	-	-	-	4	9
Spain.....	1	-	9	26	8
Canada.....	12	-	53	12	7
All other.....	21	62	116	116	26
Total.....	13,463	7,018	10,514	13,940	16,081
Unit value (per pound)					
Mexico.....	\$0.68	\$0.48	\$0.56	\$0.53	\$0.52
Chile.....	.45	.50	.57	.64	.77
New Zealand.....	1.04	.69	1.56	1.07	.91
Peru.....	.41	-	1.48	1.05	.99
Australia.....	1.26	1.64	1.31	1.23	1.40
Switzerland.....	-	-	-	1.83	.63
Spain.....	.39	-	1.18	1.99	.49
Canada.....	.69	-	.64	.67	.82
All other.....	.79	1.20	.70	.97	.92
Average.....	.67	.49	.58	.59	.57

1/ Includes TSUSA items 135.0300, 135.0520, 137.8420, 137.8620, 137.8720, 137.9520, and 137.9720.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-7.

Asparagus, frozen: 1/ U.S. imports for consumption, by principal sources, 1983-87

Source	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Mexico.....	1,206	481	734	2,136	4,575
Spain.....	0	3	136	28	66
Canada.....	0	0	0	88	43
Guatemala.....	10	0	0	70	61
Taiwan.....	0	0	20	132	17
Netherlands.....	0	0	0	0	7
New Zealand.....	0	28	12	5	4
Belgium and Luxembourg.....	0	0	0	0	1
All other.....	0	17	15	125	0
Total.....	1,217	529	917	2,584	4,774
Value (1,000 dollars)					
Mexico.....	617	197	330	1,052	3,227
Spain.....	-	7	148	16	95
Canada.....	-	-	-	55	27
Guatemala.....	7	-	-	16	19
Taiwan.....	-	-	15	144	17
Netherlands.....	-	1	-	-	9
New Zealand.....	-	25	11	7	5
Belgium and Luxembourg.....	-	-	-	-	3
All other.....	-	4	17	51	-
Total.....	625	234	521	1,341	3,402
Unit value (per pound)					
Mexico.....	\$0.51	\$0.41	\$0.45	\$0.49	\$0.71
Spain.....	.51	2.15	1.09	.56	1.44
Canada.....	-	-	-	.63	.62
Guatemala.....	-	-	-	.23	.31
Taiwan.....	.68	-	.74	1.09	1.04
Netherlands.....	-	2.13	-	-	1.30
New Zealand.....	-	.91	.95	1.43	1.23
Belgium and Luxembourg.....	-	3.52	-	-	3.08
All other.....	2.67	.24	1.08	.41	-
Average.....	.51	.44	.57	.52	.71

1/ Includes TSUSA items 135.0540, 138.4040, 138.4240, 138.4540, 138.4640, and 138.5040.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-8.

Asparagus, canned: 1/ U.S. imports for consumption, by principal sources, 1983-87

Source	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Mexico.....	176	916	2,498	1,117	3,317
Taiwan.....	2,522	4,790	2,144	3,099	1,297
Spain.....	119	496	165	299	224
China.....	11	108	104	89	246
Chile.....	0	4	0	68	247
Peru.....	56	14	18	51	150
Hong Kong.....	7	132	89	74	129
Belgium and Luxembourg.....	13	8	41	95	45
All other.....	40	118	47	114	192
Total.....	2,944	6,587	5,251	5,078	5,923
Value (1,000 dollars)					
Mexico.....	103	791	2,184	1,171	2,647
Taiwan.....	2,235	4,831	2,047	2,557	1,502
Spain.....	91	436	188	254	209
China.....	6	103	57	41	183
Chile.....	-	2	-	36	161
Peru.....	49	12	18	38	119
Hong Kong.....	6	136	71	34	112
Belgium and Luxembourg.....	11	12	52	163	56
All other.....	60	129	58	142	184
Total.....	2,561	6,452	4,749	4,478	5,217
Unit value (per pound)					
Mexico.....	\$0.59	\$0.86	\$0.87	\$1.05	\$0.80
Taiwan.....	.89	1.01	.96	.83	1.16
Spain.....	.76	.88	1.14	.85	.93
China.....	.49	.96	.55	.46	.75
Chile.....	-	.50	-	.53	.65
Peru.....	.88	.89	1.02	.75	.80
Hong Kong.....	.89	1.03	.80	.46	.86
Belgium and Luxembourg.....	.79	1.41	1.27	1.72	1.24
All other.....	1.50	1.09	1.24	1.25	.96
Average.....	.87	.98	.90	.88	.88

1/ Includes TSUSA items 141.8150, 141.8840, and 141.9300.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-9.

Broccoli, fresh or chilled: 1/ U.S. imports for consumption, by principal sources, 1983-87

Source	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Mexico.....	294	5,783	4,255	16,305	29,244
Israel.....	0	0	0	43	83
Canada.....	159	141	457	433	173
Guatemala.....	0	30	53	107	76
Mozambique.....	0	0	0	0	8
All other.....	7	10	119	183	0
Total.....	461	5,964	4,885	17,071	29,583
Value (1,000 dollars)					
Mexico.....	75	892	642	1,522	3,698
Israel.....	-	-	-	24	37
Canada.....	39	25	93	72	29
Guatemala.....	-	5	11	15	24
Mozambique.....	-	-	-	-	3
All other.....	2	3	65	73	-
Total.....	116	925	810	1,706	3,790
Unit value (per pound)					
Mexico.....	\$0.26	\$0.15	\$0.15	\$0.09	\$0.13
Israel.....	-	-	-	.57	.44
Canada.....	.24	.18	.20	.17	.17
Guatemala.....	-	.18	.20	.14	.31
Mozambique.....	-	-	-	-	.33
All other.....	.33	.28	.54	.40	-
Average.....	.25	.16	.17	.10	.13

1/ Includes TSUSA items 137.8430, 137.8630, 137.8730, 137.9530, 137.9730, and 138.0520. Item 138.0520 (for cut or reduced in size) also includes fresh cauliflower and okra and therefore somewhat overstates the data for broccoli; during 1983-87, item 138.0520 accounted for from 9 to 51 percent (by quantity) annually of the imports shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-10.

Broccoli, frozen: 1/ U.S. imports for consumption, by principal sources, 1983-87

Source	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Mexico.....	27,747	55,318	63,376	96,837	164,414
Guatemala.....	5,565	10,023	12,666	18,124	27,844
El Salvador.....	0	0	181	1,437	1,289
Canada.....	48	1	44	250	563
Spain.....	33	0	0	0	318
Israel.....	158	0	13	58	161
France.....	0	0	53	94	56
Belgium and Luxembourg.....	0	0	0	0	35
All other.....	0	62	815	350	80
Total.....	33,551	65,404	77,147	117,150	194,818
Value (1,000 dollars)					
Mexico.....	9,111	17,828	21,143	28,007	40,131
Guatemala.....	1,758	3,433	4,102	5,759	8,706
El Salvador.....	-	-	50	480	467
Canada.....	18	-	21	83	177
Spain.....	12	-	-	-	80
Israel.....	66	-	8	32	71
France.....	-	-	13	32	14
Belgium and Luxembourg.....	-	-	-	-	13
All other.....	-	27	330	102	31
Total.....	10,964	21,288	25,666	34,495	49,701
Unit value (per pound)					
Mexico.....	\$0.33	\$0.32	\$0.33	\$0.29	\$0.24
Guatemala.....	.32	.34	.32	.32	.31
El Salvador.....	-	-	.27	.33	.36
Canada.....	.37	.36	.47	.33	.31
Spain.....	.35	-	-	-	.25
Israel.....	.42	-	.56	.55	.44
France.....	-	-	.24	.34	.24
Belgium and Luxembourg.....	-	-	-	-	.36
All other.....	-	.44	.40	.29	.39
Average.....	.33	.33	.33	.29	.26

1/ Includes TSUSA items 138.0535, 138.0540, 138.0545, and 138.0555.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-11.

Cauliflower, fresh or chilled: 1/ U.S. imports for consumption, by principal sources, 1983-87

Source	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Mexico.....	2,035	2,807	2,703	3,725	7,843
Canada.....	10,276	10,369	11,911	7,652	4,818
Belgium and Luxembourg.....	0	35	233	233	290
Guatemala.....	181	130	979	684	270
Spain.....	0	0	290	349	366
Bulgaria.....	0	0	0	0	123
Israel.....	0	33	41	184	38
Chile.....	0	0	0	34	23
All other.....	55	126	139	264	1
Total.....	12,546	13,500	16,296	13,125	13,799
Value (1,000 dollars)					
Mexico.....	376	604	413	386	793
Canada.....	1,746	1,673	1,969	1,256	765
Belgium and Luxembourg.....	-	12	71	68	100
Guatemala.....	81	42	338	167	98
Spain.....	-	-	64	79	91
Bulgaria.....	-	-	-	-	40
Israel.....	-	9	19	75	13
Chile.....	-	-	-	7	7
All other.....	23	50	31	96	3
Total.....	2,227	2,391	2,905	2,134	1,916
Unit value (per pound)					
Mexico.....	\$0.18	\$0.22	\$0.15	\$0.10	\$0.10
Canada.....	.17	.16	.17	.16	.16
Belgium and Luxembourg.....	0	.35	.31	.29	.34
Guatemala.....	.45	.32	.34	.24	.36
Spain.....	-	-	.22	.23	.25
Bulgaria.....	-	-	-	-	.33
Israel.....	-	.29	.47	.40	.34
Chile.....	-	-	-	.19	.28
All other.....	.43	.40	.22	.36	2.39
Average.....	.18	.18	.18	.16	.14

1/ Includes TSUSA items 135.5000 and 135.5100. The data include whole frozen cauliflower, if any, but not fresh cut or reduced in size cauliflower entered under TSUSA item 138.0520 (for cauliflower, broccoli, and okra).

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-12.

Cauliflower, frozen: 1/ U.S. imports for consumption, by principal sources, 1983-87

Source	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Mexico.....	17,571	27,559	32,869	34,347	55,877
Guatemala.....	3,238	3,110	2,835	2,159	1,614
Spain.....	0	0	486	832	558
United Kingdom.....	0	23	380	56	173
Canada.....	276	132	74	220	106
Belgium and Luxembourg.....	0	0	124	91	51
Israel.....	0	0	26	23	35
Colombia.....	0	0	0	0	42
All other.....	0	10	28	115	0
Total.....	21,085	30,835	36,823	37,843	58,513
Value (1,000 dollars)					
Mexico.....	5,689	9,132	10,477	9,881	14,275
Guatemala.....	1,166	1,101	785	555	481
Spain.....	-	-	98	188	147
United Kingdom.....	-	6	88	12	39
Canada.....	118	43	25	58	34
Belgium and Luxembourg.....	-	-	26	20	20
Israel.....	-	-	9	8	16
Colombia.....	-	-	-	-	14
All other.....	-	5	10	31	-
Total.....	6,973	10,288	11,518	10,753	15,039
Unit value (per pound)					
Mexico.....	\$0.32	\$0.33	\$0.32	\$0.29	\$0.26
Guatemala.....	.36	.35	.28	.26	.30
Spain.....	-	-	.20	.23	.26
United Kingdom.....	-	.25	.23	.22	.23
Canada.....	.43	.33	.33	.26	.32
Belgium and Luxembourg.....	-	-	.21	.22	.39
Israel.....	-	-	.36	.37	.47
Colombia.....	-	-	-	-	.34
All other.....	-	.53	.35	.27	-
Average.....	.33	.33	.31	.28	.26

1/ Includes TSUSA item 138.0560.

Source: Compiled from official statistics of the U.S. Department of Commerce.

CHAPTER 3. U.S. MARKET DEMAND

Consumption

Consumption of asparagus, broccoli, and cauliflower in the United States has grown rapidly in recent years, fueled by a growing health consciousness among consumers (and the promotion of these vegetables as health foods), the increased use of microwave ovens to prepare convenience frozen foods, and the increased popularity of salad bars at restaurants, fast-food outlets, and supermarkets. During 1978-87, per capita utilization (consumption) of selected fresh-market vegetables rose at an average of 1 percent annually; consumption of fresh asparagus, broccoli, and cauliflower, however, rose at average annual rates of 10, 12, and 16 percent, respectively (table 3-1).

During 1983-87, apparent U.S. consumption of fresh asparagus, broccoli, and cauliflower increased at average annual rates of 11, 12, and 12 percent, respectively, as shown in the following tabulation (in millions of pounds):

<u>Year</u>	<u>Asparagus</u>	<u>Broccoli</u>	<u>Cauliflower</u>
1983.....	102	476	332
1984.....	96	583	431
1985.....	111	615	438
1986.....	145	742	525
1987.....	137	750	532
Annual average			
increase (percent) <u>1/</u> .	11	12	12

1/ On the basis of unrounded data from tables 3-2 to 3-4.

Consumption of fresh broccoli and cauliflower rose steadily throughout the period; consumption of fresh asparagus declined slightly in 1984 before rising again through 1987.

Apparent U.S. consumption of processed asparagus, broccoli, and cauliflower increased at average annual rates of 8, 10, and 12 percent, respectively, during 1983-87, as shown in the following tabulation (in millions of pounds):

<u>Year</u>	<u>Asparagus</u>		<u>Broccoli</u>	<u>Cauliflower</u>
	<u>Canned</u>	<u>Frozen</u>	<u>Frozen</u>	<u>Frozen</u>
1983.....	60	15	316	121
1984.....	73	16	428	132
1985.....	76	21	430	130
1986.....	77	21	438	126
1987.....	83	21	502	135
Annual average				
increase (percent) <u>1/</u> .	8	10	12	3

1/ On the basis of unrounded data from tables 3-5 to 3-8.

Consumption of these processed vegetables generally rose over the period; however, consumption of frozen cauliflower declined from 1984 to 1986 before rising again in 1987.

Definition of the Market

For the purpose of defining the U.S. market for asparagus, broccoli, and cauliflower, the demand side of the market is broken down into its major component parts: final and intermediate consumers. The behavior of final (retail) consumers is the source of the final demand for these products, and that of intermediate consumers (processors and distributors) is the source of the demand for intermediate products. Final consumers are also the source of the derived demand for intermediate products. Examples of derived demand are the demand for fresh vegetables for freezing and the demand for frozen vegetables for further processing or packaging.

Final consumers and products

The final consumers in the U.S. market for asparagus, broccoli, and cauliflower fall into two major groups, retail and institutional. Retail consumers are primarily households purchasing fresh, frozen, canned, or otherwise prepared or preserved vegetables at supermarkets. Households purchasing fresh vegetables at roadside stands or farmers' markets are also considered retail consumers; prices at these outlets are sometimes lower than in supermarkets because they are less convenient and there is less intermediary or 'middle man' involvement.

Institutional consumers (i.e., restaurants, schools, hospitals, military, etc.), commonly called "food service" in the trade, usually purchase their fresh or processed vegetables through specialized wholesale distributors, such as fresh produce jobbers (firms that specialize in service and precutting operations) and frozen food distributors that deliver in specially equipped trucks. The increasing popularity of salad bars in cafeterias or other restaurants is partly responsible for the growing demand for fresh vegetables by institutional consumers, along with improved handling and storage techniques and more efficient transportation.

Intermediate consumers and products

The demand for fresh vegetables to be retail-packaged and sold in supermarkets, as well as for fresh or frozen vegetables sold to processors, represents intermediate consumption. Intermediate buyers in both cases are making purchases of vegetables that will be altered in some manner and then resold. Examples of this process include repacker purchases of frozen products in bulk to be repackaged into smaller food-service size packages or retail-size containers of plain or mixed vegetables, and manufacturer purchases of frozen products in bulk to be sauced, breaded, or used as an ingredient in prepared dinners, soups, or other products. Supermarkets and distributors are also considered intermediate consumers; while they do not alter the product, they do provide services such as marketing and distribution that add value to the final product.

Intermediate consumers purchase asparagus, broccoli, and cauliflower either directly from producers or make use of intermediaries to facilitate their transactions. Brokers and sales or commission agents play a major role in such transactions, selling fresh or processed vegetables to supermarkets, wholesale receivers in metropolitan markets, processors, or regional frozen food distributors. Imported vegetables also require the services of specialized brokers or agents. Firms that supply fresh vegetables to intermediate consumers are typically different from those that supply processed vegetables.

The perishability of fresh vegetables heightens the need for brokers' services. Because fresh vegetables are susceptible to spoilage and because there is demand for fresh vegetables in areas in which they are not grown, brokers are needed to quickly match buyers and sellers. According to industry sources, most transactions involving vegetable brokers are through distribution channels established over a number of years. Brokers help farmers find buyers for fresh-market sales that they might not otherwise find, while at the same time they assure supermarkets and other wholesale buyers of a relatively stable year-round fresh-vegetable supply to accommodate their final customers. Brokers of frozen vegetables serve a similar purpose, usually acting as intermediaries between primary freezers and reproducers, retailers, or institutional distributors. Much of the frozen production from Mexican freezers is handled through exclusive sales agents, located at or near the main port of entry of the product from Mexico. ^{1/} Licensed customs brokers, required for clearance of entries through U.S. Customs, also usually act exclusively for one firm in their vegetable accounts, or for only a few Mexican exporters.

Geographic Distribution

Domestic product distribution

In analyzing flows of domestically produced asparagus, broccoli, and cauliflower, published industry data on fresh-vegetable arrivals in major metropolitan areas for 1983-87 were examined. From this data, four representative U.S. wholesale or terminal markets were chosen to compare flows of fresh vegetables from major production areas to different parts of the country. The areas chosen were Atlanta, Georgia; New York, New York-Newark, New Jersey; Chicago, Illinois; and San Francisco-Oakland, California. Monthly arrivals data for the subject vegetables in these metropolitan markets are presented for 1983-87 in tables 3-9 to 3-17. According to U.S. Department of Agriculture (USDA) sources, the arrivals data collected at these four metropolitan markets capture about 40 percent of total product movement in the United States. From these data, one can examine seasonal arrival patterns by origin of supply. Comparable data for processed products are not available.

Transport of asparagus, broccoli, and cauliflower to wholesale markets occurs in a variety of ways. The most common transportation method is by truck. All arrivals during 1983-87 reported in Atlanta and San Francisco-Oakland, for instance, arrived by truck; the bulk of arrivals in New York-Newark and Chicago were also truck shipments. The next most common method is

^{1/} On the basis of Commission staff conversations with sales agents, brokers, and others in Texas, June 1988.

by piggyback truck-trailers on flat-bed railcars, followed by rail shipments in refrigerated railcars. Very few shipments of the subject vegetables arrive at their market destinations by air and none by boat. According to industry sources, there has been a continuous shift from rail to truck since the 1960's, as a result of improvements in truck refrigeration and in road systems.

California and the Southwest, primarily Arizona and Texas, are the principal sources of domestic shipments for all of the subject vegetables. Production of some vegetables in these States is highly seasonal, and so shipments of fresh vegetables to major metropolitan markets are also seasonal. For example, fresh asparagus shipments from California to Atlanta are concentrated in the spring months (table 3-9). In late summer and fall when U.S. production is low, arrivals from Mexico increase in importance. Conversely, arrivals of California broccoli and cauliflower in Atlanta are fairly evenly distributed throughout the year, generating little or no seasonal demand for imports in this market. Similar patterns in sources of vegetable supply and seasonality occur in the other markets examined (tables 3-10 to 3-17).

Imported product distribution

U.S. imports of fresh and processed products from Mexico during 1983-87 are presented by U.S. Customs District entry point in tables 3-18 to 3-24. In most cases, these entry points are not the final destination of the product; however, general information on the distribution from country of origin to final market destinations can be seen in the arrivals data cited previously.

Mexico is the primary source of U.S. imports of asparagus, broccoli, and cauliflower. The principal Customs Districts (San Diego, California; Laredo, Texas; and Nogales, Arizona) ^{1/} for entry of these vegetables during 1983-87 are somewhat indicative of the Mexican production areas, because U.S. entry is likely to occur at those ports nearest the Mexican vegetable-production areas. However, according to industry sources in California and Arizona, there are instances when Mexican goods enter at a more distant port.

The actual ports of entry were examined from the latest available data on imports under plant protection and quarantine inspection programs of the USDA (table 3-25). ^{2/} These data show that nearly all U.S. imports of frozen asparagus, broccoli, and cauliflower entered through the Laredo, Texas, Customs District, principally through the port of Laredo, whereas over one-third of fresh broccoli and cauliflower shipments entered through Arizona/California border ports (mainly Calexico, California and San Luis, Arizona, for fresh broccoli and Nogales, Arizona, for fresh cauliflower), and nearly two-thirds of U.S. fresh-asparagus imports entered through Calexico, California.

^{1/} Most of the subject vegetables entered through the San Diego Customs District pass through the port of Calexico, California. The Laredo District includes the Texas entry ports of Laredo, Hidalgo, Progreso, and Roma, the ports through which these vegetables principally enter. In the Nogales District, most of these vegetables are entered through San Luis and Nogales.

^{2/} These programs do not examine imports from Canada.

Determinants of Demand

General factors

In general, the demand for food is inelastic with respect to changes in income; that is, expenditures on food increase with income, but less than proportionately. So, as income increases, food expenditures decline as a share of total household expenditures. 1/ The same is true for expenditures on vegetables in aggregate. However, demand for fresh vegetables is more income-elastic than demand for processed vegetables. Thus, expenditures on fresh vegetables are likely to increase more than proportionately with income, whereas expenditures on processed vegetables are likely to increase only slightly, or even decline. Part of the explanation for this may be that fresh vegetables are preferred over processed vegetables by many final consumers.

For the subject vegetables, demand for broccoli and cauliflower tends to be income inelastic, as is true for vegetables in aggregate. Asparagus is slightly different because of its perception as an expensive or prestige item. Thus, demand for asparagus would be expected to be more responsive to income changes than the demand for either broccoli or cauliflower because asparagus is purchased more commonly for special occasions along with such other vegetables as artichokes, red or yellow bell peppers, and certain varieties of squash. 2/

The demand for vegetables in aggregate tends to be relatively inelastic with respect to price; the quantity of vegetables demanded decreases less than proportionately with an increase in the price of the vegetables because there are no good substitutes for vegetables as a group. However, the demand for asparagus, broccoli, and cauliflower, individually is expected to be somewhat more elastic with respect to price due to the substitutability between vegetables.

Consumer demand studies

The most important type of consumer in shaping the demand for asparagus, broccoli, and cauliflower is the household, the final consumer of these vegetables. Some important factors relating to household demand are size of household, income, region of the country, season of the year, age group, and degree of urbanization. 3/

1/ James R. Blaylock and David M. Smallwood, U.S. Demand for Food: Household Expenditures, Demographics, and Projections, U.S. Department of Agriculture, Economic Research Service, February 1986.

2/ "Fresh Trends 1988," The Packer.

3/ Changes in demand have arisen with more women in the work force. The increase in the number of working women, along with the rising popularity of microwave ovens, has increased the demand for convenient vegetables such as frozen, precut, microwave-ready vegetables that are easy to prepare. Individual consumer preferences, which depend on health and style concerns that change over time, are also important factors. See, e.g., "Greater Grassroots Effort Bolsters March Frozen Food Promotional Push," Quick Frozen Foods International (QFFI), April 1987, p. 159.

A USDA study of household expenditures on fruits and vegetables ^{1/} grouped fresh asparagus, broccoli, and cauliflower into certain categories for discussion. Broccoli was included in the dark-green-vegetables category, asparagus in light-green vegetables, and cauliflower in the 'other' fresh vegetables category. Frozen and canned vegetables were not further broken out.

USDA researchers first examined the expenditure responsiveness to income for food in general and for vegetables in particular (table 3-26). Per capita expenditures were found to decline with increased income for canned vegetables and for dark-green fresh vegetables. Further, expenditures on dark-green vegetables were much smaller at all income levels than those for either light-green or other vegetables. Contrary to expectations, per capita expenditures on all fresh vegetables fell as incomes increased from the lowest quintile (20 percent) to the third quintile, and did not increase again until the fourth quintile. Only the highest income level (fifth quintile) surpassed the per capita expenditures of the lowest income group for these vegetables.

Weekly per capita expenditures for vegetables, by region, were also examined. Per capita expenditures on almost all vegetable categories were greater in the Northeast than in any other region, although expenditures in the West were very close in many categories (table 3-27). The South represented the second highest expenditure level for canned vegetables.

Weekly expenditures on all vegetables were highest in the winter, followed by spring, fall, and summer, respectively (table 3-28). There were some variations, however, in individual categories. Fresh vegetable expenditures were highest in the spring, for example, and lowest in the summer when most consumers have ready access to fresh vegetables from home gardens or nearby road-side stands (which were not included in the study). Expenditures on frozen and canned vegetables, on the other hand, were highest in the winter, largely because fresh produce from local sources is not available.

Simulated expenditure data by age group showed that expenditures on fresh vegetables increased with age, generally until about age 65, then tapered off (table 3-29). Expenditures on frozen vegetables demonstrated somewhat of a reverse of this pattern, whereas canned vegetable expenditures showed no clear pattern.

According to the USDA study, the degree of urbanization also plays a part in consumers' vegetable purchases. Central city consumers had the highest expenditures on vegetables, followed by suburban and nonmetropolitan areas (table 3-30). This is due in large part to vegetables being grown in nonmetropolitan areas for home use rather than being purchased, a situation most central city dwellers, with limited or no available production areas and a generally unsuitable environment, are not able to overcome.

Another factor associated with the increasing demand for vegetables is the move towards consumption of a healthier diet by U.S. consumers in general. Increased concern about obesity, cholesterol, vitamins, fiber, and other

^{1/} David M. Smallwood and James R. Blaylock, Household Expenditures for Fruits, Vegetables, and Potatoes, U.S. Department of Agriculture, Economic Research Service, May 1984.

nutritional matters has led to increased consumption of vegetables, especially in the fresh form. The increasing popularity of self-service salad bars, especially in grocery stores, also increases the demand for fresh vegetables.

A recent report on consumer spending habits, 1/ based on a survey conducted in September-October 1986, addressed factors influencing vegetable purchases in general, and purchases of asparagus, broccoli, and cauliflower, specifically. This study indicated that 28 percent of the households surveyed were eating more vegetables than in the previous year; of these, 80 percent were doing so because of concern about a balanced diet, 70 percent because of nutrition, 66 percent because of calorie concerns, and 36 percent because they were preparing new items in a microwave. 2/

As an indication of how often the subject vegetables are purchased, 82 percent of the households surveyed had purchased broccoli at least once in the previous year, 81 percent had purchased cauliflower, and 61 percent had purchased asparagus. 3/ Of those vegetables purchased for the first time within the 12 months prior to the survey, asparagus was purchased by 10 percent of the households, cauliflower by 8 percent, and broccoli by 7 percent. 4/ These data suggest that asparagus is still less frequently purchased than broccoli or cauliflower, in keeping with its reputation as a prestige item.

Households were asked the form in which they commonly eat specific vegetables, raw or cooked. Of those reporting consumption of the subject vegetables, 2 percent ate asparagus raw, 15 percent ate broccoli raw, and 32 percent ate cauliflower raw. 5/ Raw vegetables are probably eaten primarily as part of a salad, and in that respect such responses seem low relative to the increased consumption of salads reported in the United States.

Fresh produce can be purchased at various outlets: conventional supermarket, roadside stand, farmer's market, produce specialty store, warehouse/bulk-foods store, or limited assortment/convenience store. Of the households surveyed, 82 percent bought most of their fresh produce at a conventional supermarket. 6/ In view of this information, it appears that the best place to market new types of produce or encourage more overall fresh produce consumption is the conventional supermarket. The recent changes seen in supermarkets with respect to expanded and upgraded produce sections appear to be in response to this purchasing behavior.

Data on purchases at the outlet in which the household shopped most often suggest that new vegetable products (e.g., vegetables precut, precooked, microwave-ready, and in single-serving size) appear to be popular. According to the survey, 27 percent of households have purchased precut vegetables, 18 percent self-service salads, 9 percent fresh vegetable-based entrees, 9 percent microwave-ready fresh vegetables, and 8 percent precooked fresh vegetables. 7/

1/ Fresh Trends 1987, Report 2: Fresh Vegetables/Specialty Vegetables/Herbs and Report 3: Shopping for Fresh Produce: Preferences, Influences and Attitudes, The Packer.

2/ Ibid, Report 2, pp. 7 and 9.

3/ Ibid, Report 2, pp. 39 and 41.

4/ Ibid, Report 2, p. 137.

5/ Ibid, Report 2, pp. 19, 21, and 27.

6/ Ibid, Report 3, pp. 19 and 21.

7/ Ibid, Report 3, p. 75.

In this same survey, households were asked several questions about nutrition, product labeling, methods of preparation, and other items. 1/ At the outlet at which they shop most often, 18 percent of the households have used information on the State, region, or country where the produce was grown, and 15 percent have used information on the nutritional value of fresh produce items. When asked whether produce should be identified by region, 29 percent of the households strongly agreed, and 33 percent agreed somewhat. Of the households surveyed, 24 percent strongly agreed and 34 percent agreed somewhat that the more nutritional information available, the better.

Households were asked to rate the importance of various types of information as either extremely, very, or somewhat important in their purchasing decisions. The following proportions of the households surveyed found these types of information about fresh produce at least somewhat important: brand name, 40 percent; growing region/State/country of origin, 44 percent; calorie content, 57 percent; nutritional value, 89 percent; and, taste/flavor, nearly 100 percent. 2/ Additionally, consumers were asked about the importance of branded and nonbranded items in their purchase decisions, as branding appears to be a growing trend for fresh produce. The following percentages of households rated branded and nonbranded items about the same on these factors: price, 27 percent; quality, 56 percent; appearance, 59 percent; taste/flavor, 60 percent; and storage life, 72 percent. 3/

From these ratings, it appears that flavor and nutritional content of fresh produce are still more important than brand name or geographical origin, but these latter two items may be growing in importance. In general, it seems that consumers are interested in more information about fresh produce.

Producer perceptions of demand

One important aspect of the market for fresh and processed vegetables is the communication of consumer needs to producers. Consumers can tell producers which vegetables, types of processing, methods of packaging, etc., they prefer through the market system simply on the basis of the items they choose to purchase. Producers will also take into account consumer surveys, like the ones just discussed, for indications of future trends.

Some major food processors and distributors have provided information to the Commission staff concerning their perceptions of the products consumers are currently demanding in the market. These perceptions confirm the survey responses previously discussed. The situation, succinctly put, is that "major food manufacturers have come to realize that demographic trends have altered the characteristics of food demand in the United States." 4/

Consumer demand for vegetables is changing as a result of the increased availability and use of the microwave oven, and the presence of more women in the workforce. 5/ Food processors and distributors are "in a new marketplace

1/ Ibid, Report 3, pp. 125, 237, and 239.

2/ Ibid, Report 3, pp. 197, 199, 209, 215, and 221.

3/ Ibid, Report 3, pp. 225, 227, 229, 233, and 235.

4/ Prehearing Memorandum of the Green Giant Division of the Pillsbury Company, May 6, 1988, p. 6.

5/ See "Greater Grassroots Effort," QFFI, April 1987, p.159.

today than [sic] just a few years ago--a marketplace which requires new value-added products, a wide variety of products. In particular, there is a rising demand for fresh vegetables, or vegetables 'frozen like fresh'." 1/ Basically, such food suppliers have seen "a shift in consumer preference for certain vegetable products, including value-added FLF (frozen like fresh) and IQF (individually quick frozen) vegetable products, over other products, including boil-in-bag and bulk food service items." 2/

Major producers of these vegetable products have to respond to changes in consumer preferences by producing these new products. Other producers have indicated that market promotion is important for these new products to ensure that the particular producer can get a share of the new product market.

1/ Ibid, p. 7.

2/ Ibid, p. 14.

Table 3-1.

Per capita utilization 1/ of selected fresh-market vegetables, 1978-87

(In farm-weight pounds)								
Year	Aspar- agus	Broc- coli	Cauli- flower	Carrots	Celery	Lettuce	Toma- toes	Total
1978....	0.3	1.50	0.88	5.58	7.28	25.60	13.22	54.36
1979....	.3	1.60	1.27	6.43	7.42	25.93	12.84	55.79
1980....	.3	1.80	1.34	7.01	7.78	26.75	13.41	58.39
1981....	.3	2.20	1.63	7.14	7.68	25.70	13.20	57.85
1982....	<u>2/</u>	2.20	1.59	7.30	7.78	25.65	13.39	57.91
1983....	<u>2/</u>	2.26	1.69	7.49	7.39	25.60	13.69	58.12
1984....	.4	2.72	2.19	7.95	7.45	26.03	15.26	61.60
1985....	.5	2.88	2.22	7.64	7.41	25.51	15.77	61.93
1986....	.6	3.46	2.76	7.80	7.07	23.21	17.17	62.07
1987 <u>3/</u>	.6	3.60	2.70	8.50	<u>2/</u>	<u>2/</u>	16.80	32.20

1/ Includes production plus imports minus exports, divided by total population.2/ Data not available.3/ Preliminary.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-2.

Asparagus, fresh: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1983-87

Year	Production 1/	Ex-ports 2/	Imports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (1,000 pounds)					
1983.....	<u>3/</u> 88,000	16,942	20,226	<u>3/</u> 91,284	<u>3/</u> 10
1984.....	104,300	22,605	14,313	96,008	15
1985.....	115,200	22,255	18,030	110,975	16
1986.....	138,700	17,598	23,647	144,749	16
1987.....	138,800	29,735	28,352	137,417	21
Value (1,000 dollars)					
1983.....	<u>3/</u> 63,360	13,632	13,463	<u>4/</u>	<u>4/</u>
1984.....	76,900	17,314	7,018	<u>4/</u>	<u>4/</u>
1985.....	91,343	15,661	10,514	<u>4/</u>	<u>4/</u>
1986.....	97,941	18,998	13,940	<u>4/</u>	<u>4/</u>
1987.....	91,102	28,076	16,081	<u>4/</u>	<u>4/</u>
Unit value (per pound)					
1983.....	<u>3/</u> \$0.72	\$0.80	\$0.67	<u>4/</u>	<u>4/</u>
1984.....	.74	.77	.49	<u>4/</u>	<u>4/</u>
1985.....	.79	.70	.58	<u>4/</u>	<u>4/</u>
1986.....	.71	1.08	.59	<u>4/</u>	<u>4/</u>
1987.....	.66	.94	.57	<u>4/</u>	<u>4/</u>

1/ For fresh market use; values are farm values.

2/ Export quantities to Canada are Canadian import data from the United States (because U.S. data understate U.S. exports to Canada); values are based on average unrounded unit values of U.S. exports.

3/ Estimated by the Commission staff.

4/ Not meaningful because of different stages of marketing.

Source: Production compiled from official statistics of the U.S. Department of Agriculture, except as noted; exports compiled from official statistics of Statistics Canada and the U.S. Department of Commerce, as noted; imports compiled from official statistics of the U.S. Department of Commerce.

Table 3-3.

Broccoli, fresh: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1983-87

Year	Production 1/	Ex-ports 2/	Imports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (1,000 pounds)					
1983.....	558,200	82,672	461	475,985	<u>3/</u>
1984.....	674,000	96,703	5,964	583,261	1
1985.....	715,400	104,884	4,885	615,401	1
1986.....	844,200	119,491	17,071	741,780	2
1987.....	849,500	128,902	29,583	750,181	4
Value (1,000 dollars)					
1983.....	157,281	20,982	116	<u>4/</u>	<u>4/</u>
1984.....	168,968	23,628	925	<u>4/</u>	<u>4/</u>
1985.....	173,053	25,520	810	<u>4/</u>	<u>4/</u>
1986.....	184,665	30,400	1,706	<u>4/</u>	<u>4/</u>
1987.....	183,595	33,721	3,790	<u>4/</u>	<u>4/</u>
Unit value (per pound)					
1983.....	\$0.28	\$0.25	\$0.25	<u>4/</u>	<u>4/</u>
1984.....	.25	.24	.16	<u>4/</u>	<u>4/</u>
1985.....	.24	.24	.17	<u>4/</u>	<u>4/</u>
1986.....	.22	.25	.10	<u>4/</u>	<u>4/</u>
1987.....	.22	.26	.13	<u>4/</u>	<u>4/</u>

1/ Production for fresh market; values are farm values.

2/ Export quantities to Canada are Canadian import data from the United States (because U.S. data understate U.S. exports to Canada); values are based on average unrounded unit values of U.S. exports.

3/ Less than 0.5 percent.

4/ Not meaningful because of different stages of marketing.

Source: Production compiled from official statistics of the U.S. Department of Agriculture; exports compiled from official statistics of Statistics Canada and the U.S. Department of Commerce, as noted; imports compiled from official statistics of the U.S. Department of Commerce.

Table 3-4.

Cauliflower, fresh: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1983-87

Year	Production 1/	Ex-ports 2/	Imports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (1,000 pounds)					
1983.....	370,400	51,366	12,546	331,580	4
1984.....	481,700	64,026	13,500	431,174	3
1985.....	490,400	68,209	16,296	438,487	4
1986.....	590,600	78,442	13,125	525,283	2
1987.....	607,600	89,006	13,799	532,393	3
Value (1,000 dollars)					
1983.....	118,464	15,501	2,227	3/	3/
1984.....	150,031	18,455	2,391	3/	3/
1985.....	145,955	19,495	2,905	3/	3/
1986.....	170,020	21,000	2,134	3/	3/
1987.....	172,629	23,820	1,916	3/	3/
Unit value (per pound)					
1983.....	\$0.32	\$0.30	\$0.18	3/	3/
1984.....	.31	.29	.18	3/	3/
1985.....	.30	.29	.18	3/	3/
1986.....	.29	.27	.16	3/	3/
1987.....	.28	.27	.14	3/	3/

1/ Production for fresh market; values are farm values.

2/ Export quantities to Canada are Canadian import data from the United States (because U.S. data understate U.S. exports to Canada); values are based on average unrounded unit values of U.S. exports.

3/ Not meaningful because of different stages of marketing.

Source: Production compiled from official statistics of the U.S. Department of Agriculture; exports compiled from official statistics of Statistics Canada and the U.S. Department of Commerce, as noted; imports compiled from official statistics of the U.S. Department of Commerce.

Table 3-5.

Asparagus, frozen: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1983-87

Year	Production 1/	Exports	Imports	Apparent consumption	Ratio of imports to consumption
		1,000 pounds			Percent
1983.....	13,599	2/	1,217	14,816	8
1984.....	15,099	2/	529	15,628	3
1985.....	19,990	2/	917	20,907	4
1986.....	18,008	2/	2,584	20,592	13
1987.....	16,725	2/	4,774	21,499	22

1/ Processed product weight of frozen asparagus.

2/ Export data are not separately reported.

Source: Production compiled from official pack statistics of the American Frozen Food Institute and imports compiled from official statistics of the U.S. Department of Commerce.

Table 3-6.

Broccoli, frozen: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1983-87

Year	Production 1/	Ex-ports 2/	Imports	Apparent consumption	Ratio of imports to consumption
	1,000 pounds				Percent
1983.....	285,358	2,834	33,551	316,075	11
1984.....	365,764	2,870	65,404	428,298	15
1985.....	356,806	4,105	77,147	429,848	18
1986.....	324,519	3,491	117,150	438,178	27
1987.....	312,460	5,047	194,818	502,231	39

1/ Processed product weight of frozen broccoli.

2/ Canadian imports from the United States; U.S. export data are not separately reported.

Source: Production compiled from official pack statistics of the American Frozen Food Institute; exports compiled from official statistics of Statistics Canada; imports compiled from official statistics of the U.S. Department of Commerce.

Table 3-7.

Cauliflower, frozen: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1983-87

Year	Production 1/	Exports	Imports	Apparent consumption	Ratio of imports to consumption
	1,000 pounds				Percent
1983.....	100,541	2/ 1,000	21,085	120,626	17
1984.....	102,106	2/ 1,000	30,835	131,941	23
1985.....	94,617	2/ 1,000	36,823	130,440	28
1986.....	89,120	2/ 1,000	37,843	125,963	30
1987.....	77,758	2/ 1,000	58,513	135,271	43

1/ Processed product weight of frozen cauliflower.

2/ Exports are not separately reported, but are estimated to exceed 1 million pounds annually based on U.S. and Canadian official statistics.

Source: Production compiled from official pack statistics of the American Frozen Food Institute and imports compiled from official statistics of the U.S. Department of Commerce.

Table 3-8.

Asparagus, canned or otherwise prepared or preserved: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1983-87

Year	Production 1/	Exports	Imports	Apparent consumption	Ratio of imports to consumption
	1,000 pounds				Percent
1983.....	59,647	2,366	2,944	60,225	5
1984.....	68,515	2,133	6,587	72,969	9
1985.....	72,470	1,562	5,251	76,159	7
1986.....	73,804	1,399	5,078	77,483	7
1987.....	78,647	1,654	5,923	82,916	7

1/ Processed product weight of canned asparagus.

Source: Production compiled from official statistics of the National Food Processors Association. Exports and imports compiled from official statistics of the U.S. Department of Commerce.

Table 3-9.

Monthly fresh asparagus, broccoli, and cauliflower arrivals in Atlanta, by origin, 1983-87

(In thousands of pounds)													
Crop, year, and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Asparagus:													
1983:													
California..	0	0	200	100	100	100	0	0	0	0	0	0	500
1984:													
California..	0	100	100	200	100	100	0	0	0	0	0	0	600
Mexico.....	0	0	0	0	0	0	0	0	100	100	100	0	300
1985:													
California..	0	0	0	100	200	0	0	0	0	0	0	0	300
Mexico.....	0	100	100	0	0	0	0	100	200	100	0	0	600
1986:													
California..	0	100	200	100	100	0	0	0	0	0	0	0	500
Mexico.....	0	0	0	0	0	0	0	100	100	100	0	0	300
1987:													
California..	0	100	100	100	100	100	0	0	0	0	0	0	500
Mexico.....	0	0	0	0	0	0	100	100	100	0	0	0	300
Broccoli:													
1983:													
California..	300	300	500	400	400	400	400	500	300	400	500	300	4,700
Texas.....	200	100	100	0	0	0	0	0	0	0	0	100	500
1984:													
California..	500	500	400	600	600	600	600	500	500	400	400	200	5,800
Texas.....	0	100	0	0	0	0	0	0	0	0	0	100	200
1985:													
California..	600	600	500	700	600	500	600	500	600	600	700	400	6,900
Texas.....	100	100	0	0	0	0	0	0	0	0	0	100	300
1986:													
California..	1,200	800	900	900	900	1,400	900	700	900	1,000	900	500	11,000
Texas.....	0	0	0	0	0	0	0	0	0	0	0	100	100
Arizona.....	0	100	0	0	0	0	0	0	0	0	0	100	200
1987:													
California..	700	1,000	1,000	900	900	1,000	1,000	1,100	1,200	1,200	900	800	11,700
Texas.....	200	0	0	0	0	0	0	0	0	0	100	100	400
Cauliflower:													
1983:													
California..	200	300	300	200	300	300	300	300	200	200	300	200	3,100
Florida.....	0	0	100	0	0	0	0	0	0	0	0	0	100
1984:													
California..	300	300	300	300	400	300	300	300	200	300	200	100	3,300
1985:													
California..	300	300	300	400	300	300	300	300	400	400	300	200	3,800
Florida.....	0	0	100	0	0	0	0	0	0	0	0	0	100
1986:													
California..	400	300	400	400	500	700	500	400	400	500	400	200	5,100
Florida.....	0	100	0	0	0	0	0	0	0	0	0	0	100
Arizona.....	0	0	0	0	0	0	0	0	0	0	0	100	100
1987:													
California..	400	500	600	400	400	500	500	400	400	500	300	200	5,100
Florida.....	0	100	0	0	0	0	0	0	0	0	0	0	100
Arizona.....	100	0	0	0	0	0	0	0	0	0	0	0	100

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-10.

Monthly fresh asparagus arrivals in New York-Newark, by origin, 1983-87

(In thousands of pounds)													
Year and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1983:													
California...	200	1,200	1,500	2,000	700	0	0	0	0	500	100	0	6,200
Washington...	0	0	0	100	400	300	0	0	0	0	0	0	800
New Jersey...	0	0	0	0	100	0	0	0	0	0	0	0	100
Chile.....	0	0	0	0	0	0	0	0	0	300	500	100	900
Mexico.....	0	0	0	200	100	0	0	100	100	200	100	0	800
1984:													
California...	100	400	1,400	2,100	1,900	300	100	0	0	0	0	0	6,300
Washington...	0	0	0	0	100	400	100	0	0	0	0	0	600
New Jersey...	0	0	0	0	200	0	0	0	0	0	0	0	200
Chile.....	0	0	0	0	0	0	0	0	0	1,000	600	300	1,900
Mexico.....	0	0	0	100	0	0	0	0	100	200	0	0	400
1985:													
California...	100	0	1,100	2,000	1,500	900	0	0	0	0	0	0	5,500
Washington...	0	0	0	0	200	100	100	0	0	0	0	0	400
New Jersey...	0	0	0	0	100	0	0	0	0	0	0	0	100
Chile.....	200	0	0	0	0	0	0	0	0	600	600	400	1,800
Mexico.....	0	0	0	0	0	0	100	200	200	100	0	0	600
1986:													
California...	400	1,300	1,300	1,600	1,000	300	0	100	0	0	0	0	6,000
Washington...	0	0	0	100	200	200	0	0	0	0	0	0	500
New Jersey...	0	0	0	0	100	0	0	0	0	0	0	0	100
Chile.....	100	0	0	0	0	0	0	0	0	1,500	1,800	500	3,900
Mexico.....	0	0	0	0	0	0	100	400	100	0	0	0	600
1987:													
California...	100	500	1,100	1,800	1,400	1,000	400	0	100	100	0	0	6,500
Washington...	0	0	0	100	300	900	1,400	0	0	0	0	0	2,700
New Jersey...	0	0	0	0	100	800	0	0	0	0	0	0	900
Mexico.....	0	0	0	0	0	0	700	600	300	100	0	0	1,700
Chile.....	0	0	0	0	0	0	0	0	0	100	200	300	600
Peru.....	0	0	0	0	0	0	0	0	0	0	0	100	100

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-11.

Monthly fresh broccoli arrivals in New York-Newark, by origin, 1983-87

(In thousands of pounds)

Year and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1983:													
California...	3,800	4,100	2,800	2,800	3,600	4,300	4,100	3,400	3,700	3,700	5,200	4,200	45,700
Texas.....	400	400	100	0	0	0	0	0	0	0	0	300	1,200
Arizona.....	0	100	0	0	0	0	0	0	0	0	0	0	100
1984:													
California...	3,900	3,700	4,200	5,300	5,800	4,700	5,100	5,000	4,700	3,400	3,800	5,000	54,600
Texas.....	0	100	0	0	0	0	0	0	0	0	100	0	200
Maine.....	0	0	0	0	0	0	0	100	0	0	0	0	100
1985:													
California...	5,300	5,200	6,000	6,400	7,800	5,400	4,800	4,400	4,500	6,500	6,400	5,300	68,000
Texas.....	100	100	100	100	0	0	0	0	0	0	0	0	400
Maine.....	0	0	0	0	0	0	0	100	0	0	0	0	100
Washington...	0	0	0	0	0	0	100	0	0	0	0	0	100
Wisconsin....	0	0	0	0	0	0	0	0	0	100	0	0	100
1986:													
California...	8,100	6,200	5,700	7,000	6,300	4,500	5,000	4,500	4,800	3,600	3,300	4,300	63,300
Texas.....	200	100	0	0	0	0	0	0	0	0	0	0	300
Maine.....	0	0	0	0	0	0	0	100	100	100	0	0	300
Arizona.....	0	100	0	0	0	0	0	0	0	0	0	0	100
1987:													
California...	4,100	3,700	4,100	3,700	5,000	6,400	6,800	5,500	4,400	4,600	3,400	2,700	54,400
Maine.....	0	0	0	0	0	0	200	800	400	0	0	0	1,400
Washington...	0	0	0	0	0	0	800	0	0	0	0	0	800
Arizona.....	0	100	600	0	0	0	0	0	0	0	0	0	700
Texas.....	0	200	0	0	100	0	0	0	0	0	0	300	600
New York.....	0	0	0	0	0	0	200	0	0	0	0	0	200
Mexico.....	0	0	0	0	100	0	0	0	0	0	0	0	100

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-12.

Monthly fresh cauliflower arrivals in New York-Newark, by origin, 1983-87

(In thousands of pounds)													
Year and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1983:													
California..	1,100	700	800	700	1,500	1,400	900	700	700	600	800	800	10,700
New York....	0	0	0	0	0	0	300	300	800	2,000	1,200	1,100	5,700
Florida.....	300	300	200	100	0	0	0	0	0	0	0	300	1,200
Arizona.....	0	100	300	200	0	0	0	0	0	0	0	0	600
Washington..	0	0	0	100	0	0	0	100	0	0	0	0	200
Mexico.....	0	100	0	0	0	0	0	0	0	0	0	0	100
1984:													
California..	1,200	2,400	1,800	1,500	1,800	1,300	1,000	800	800	800	900	1,000	15,300
New York....	0	0	0	0	0	0	100	600	800	900	800	0	3,200
Arizona.....	100	100	100	100	0	0	0	0	0	0	100	0	500
Florida.....	100	100	100	100	0	0	0	0	0	0	0	100	500
Washington..	0	0	0	0	0	0	0	100	0	0	0	0	100
Canada.....	0	0	0	0	0	0	0	200	0	100	0	0	300
1985:													
California..	1,700	1,100	1,400	1,300	2,300	1,900	2,000	700	1,500	1,700	1,700	1,300	18,600
Florida.....	300	200	400	0	100	0	0	0	0	0	0	200	1,200
New York....	0	0	0	0	0	0	0	100	0	300	300	100	800
Washington..	0	0	0	0	200	0	0	100	0	0	0	0	300
1986:													
California..	2,500	1,700	1,300	2,000	1,200	1,600	1,500	1,700	1,100	1,100	1,000	2,000	18,700
New York....	0	0	0	0	0	0	0	100	100	500	300	0	1,000
Florida.....	100	300	100	0	0	0	0	0	0	0	0	0	500
Washington..	0	0	0	0	0	0	0	100	0	0	0	0	100
Canada.....	0	0	0	0	0	0	0	100	0	0	0	0	100
1987:													
California..	900	1,400	1,300	1,000	1,600	3,500	3,300	2,000	1,400	900	700	1,300	19,300
New York....	0	0	0	0	0	0	600	100	300	400	100	0	1,500
Texas.....	0	0	0	0	0	0	0	0	0	0	0	100	100
Washington..	0	0	0	0	0	0	0	100	0	0	0	0	100

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-13.

Monthly fresh asparagus arrivals in Chicago, by origin, 1983-87

(In thousands of pounds)													
Year and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1983:													
California..	100	400	400	300	0	0	0	0	0	0	0	0	1,200
Washington..	0	0	0	100	100	700	0	0	0	0	0	0	900
Mexico.....	0	0	0	0	0	0	0	0	100	100	0	0	200
1984:													
California..	0	0	200	800	700	100	0	0	0	0	0	0	1,800
Washington..	0	0	0	100	300	200	0	0	0	0	0	0	600
Mexico.....	0	0	0	0	0	0	0	100	100	0	0	0	200
1985:													
California..	0	0	400	1,200	800	300	0	0	0	0	0	0	2,700
Mexico.....	0	0	0	0	0	0	0	100	100	100	0	0	300
1986:													
California..	100	200	400	500	600	200	0	0	0	0	0	0	2,000
Washington..	0	0	0	200	100	0	0	0	0	0	0	0	300
Mexico.....	0	100	0	0	0	0	100	100	100	100	0	0	500
1987:													
California..	100	300	1,400	1,300	1,200	100	100	0	0	0	100	0	4,600
Washington..	0	0	0	400	300	0	0	0	0	0	0	0	700
Mexico.....	0	100	0	0	0	0	100	100	100	0	0	0	400

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-14.

Monthly fresh broccoli arrivals in Chicago, by origin, 1983-87

(In thousands of pounds)													
Year and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1983:													
California..	4,300	4,300	2,300	3,500	4,600	2,900	1,800	2,300	4,600	5,000	7,100	8,500	51,200
Illinois....	0	0	0	0	0	0	200	200	300	200	100	0	1,000
Arizona.....	0	0	300	0	0	0	0	0	0	0	0	0	300
Texas.....	100	100	0	0	0	0	0	0	0	0	0	0	200
Wisconsin...	0	0	0	0	0	0	0	0	100	0	0	0	100
1984:													
California..	7,500	6,300	7,000	9,200	5,400	1,700	900	600	1,200	1,100	2,700	3,000	46,600
Illinois....	0	0	0	0	0	0	100	200	500	400	0	0	1,200
Wisconsin...	0	0	0	0	0	0	0	0	200	200	0	0	400
Texas.....	0	100	0	0	0	0	0	0	0	0	100	100	300
Arizona.....	100	0	0	0	0	0	0	0	0	0	0	0	100
Michigan....	0	0	0	0	0	0	0	0	0	100	0	0	100
1985:													
California..	4,600	3,800	2,800	5,400	3,100	1,600	900	1,300	800	1,500	1,700	2,600	30,100
Illinois....	0	0	0	0	0	300	400	300	300	400	200	0	1,900
Arizona.....	0	100	0	0	0	0	0	0	0	0	0	500	600
Texas.....	100	100	0	0	0	0	0	0	0	0	100	0	300
1986:													
California..	5,800	3,200	3,600	2,500	1,900	1,000	700	800	500	2,700	4,700	4,600	32,000
Illinois....	0	0	0	0	0	400	800	400	600	400	0	0	2,600
Texas.....	100	0	0	0	0	0	0	0	0	0	100	100	300
1987:													
California..	5,700	4,700	8,200	7,300	4,200	3,800	2,700	2,600	3,300	3,500	4,200	2,600	52,800
Illinois....	0	0	0	0	0	100	500	200	300	100	100	0	1,300
Arizona.....	0	0	100	0	0	0	0	0	0	0	0	0	100
Texas.....	200	100	0	0	0	0	0	0	0	0	0	200	500

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-15.

Monthly fresh cauliflower arrivals in Chicago, by origin, 1983-87

(In thousands of pounds)

Year and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1983:													
California..	1,700	1,000	800	1,200	3,200	3,200	1,500	800	600	1,000	1,800	1,400	18,200
Florida.....	100	100	100	300	0	0	0	0	0	0	0	0	700
Washington..	0	0	0	100	0	0	0	100	0	0	0	0	200
Arizona.....	100	0	0	0	0	0	0	0	0	0	0	0	100
Michigan....	0	0	0	0	0	0	0	0	0	100	0	0	100
New York....	0	0	0	0	0	0	0	0	0	0	0	100	100
Texas.....	0	0	100	0	0	0	0	0	0	0	0	0	100
Canada.....	0	0	0	0	0	0	0	0	0	100	0	0	100
1984:													
California..	2,000	3,800	3,100	2,500	3,200	1,600	900	500	800	500	800	1,400	21,100
Arizona.....	0	100	100	100	0	0	0	0	0	0	0	100	400
Michigan....	0	0	0	0	0	0	0	0	100	100	0	0	200
Florida.....	0	0	0	0	0	0	0	0	0	0	0	100	100
Washington..	0	0	0	0	0	0	0	0	0	100	0	0	100
Mexico.....	0	100	0	0	0	0	0	0	0	0	0	0	100
1985:													
California..	2,400	1,300	1,600	1,500	2,800	1,500	800	500	600	500	1,200	1,700	16,400
Arizona.....	300	0	0	0	0	0	0	0	0	0	0	600	900
Michigan....	0	0	0	0	0	0	0	0	100	100	100	0	300
Washington..	0	0	0	0	0	0	100	200	0	0	0	0	300
Florida.....	0	100	100	0	0	0	0	0	0	0	0	0	200
1986:													
California..	2,700	1,300	1,300	1,300	1,300	2,500	3,000	1,500	1,300	1,400	1,900	1,700	21,200
Arizona.....	100	0	100	0	0	0	0	0	0	0	100	100	400
Washington..	0	0	0	0	0	0	0	200	100	0	0	0	300
Florida.....	0	100	0	0	0	0	0	0	0	0	0	0	100
1987:													
California..	1,300	1,600	1,700	1,300	1,900	2,200	1,200	1,100	1,600	1,600	1,400	1,200	18,100
Arizona.....	200	200	100	0	0	0	0	0	0	0	0	0	500
Washington..	0	0	0	0	0	0	0	0	100	100	0	0	200

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-16.

Monthly fresh asparagus arrivals in San Francisco-Oakland, by origin, 1983-87

(In thousands of pounds)													
Year and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1983:													
California...	0	300	1,200	2,100	2,300	1,400	100	0	0	0	0	0	7,400
Mexico.....	0	400	100	0	0	0	0	100	100	100	100	0	900
1984:													
California...	0	300	1,300	2,100	1,800	500	0	0	0	100	0	0	6,100
Washington...	0	0	0	0	0	300	200	0	0	0	0	0	500
Mexico.....	0	200	0	0	0	0	0	0	100	100	0	0	400
1985:													
California...	0	200	1,200	2,700	2,100	600	0	0	0	100	0	0	6,900
Washington...	0	0	0	0	0	400	300	0	0	0	0	0	700
Mexico.....	0	0	100	0	0	0	0	100	100	100	0	0	400
1986:													
California...	100	900	1,700	2,300	2,100	400	0	0	0	0	0	0	7,500
Washington...	0	0	0	0	100	700	200	0	0	0	0	0	1,000
Mexico.....	0	0	0	0	0	0	0	200	300	300	0	200	1,200
New Zealand..	0	0	0	0	0	0	0	0	0	100	100	100	300
1987:													
California...	0	500	1,400	1,900	1,700	500	0	0	0	200	0	0	6,200
Washington...	0	0	0	0	300	500	100	0	0	0	0	0	900
Mexico.....	1,000	1,000	200	0	0	0	100	100	100	100	0	0	2,600
New Zealand..	0	0	0	0	0	0	0	0	0	0	100	100	200
Chile.....	0	0	0	0	0	0	0	0	0	100	0	0	100

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-17.

Monthly Fresh broccoli and cauliflower arrivals in San Francisco-Oakland, by origin, 1983-87

(In thousands of pounds)													
Crop, year, and origin	Months												Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Broccoli:													
1983:													
California..	1,700	1,900	1,700	1,500	1,400	1,600	1,500	1,800	1,600	1,800	1,600	1,800	19,900
1984:													
California..	2,000	2,100	1,800	1,900	2,200	1,900	1,700	1,700	1,600	1,600	1,800	2,100	22,400
1985:													
California..	2,700	2,200	2,500	2,300	2,600	2,100	1,800	1,700	2,100	2,600	2,300	2,300	27,200
1986:													
California..	2,900	2,400	2,400	2,600	2,100	2,100	2,200	2,200	2,300	2,700	2,000	3,200	29,100
1987:													
California..	2,700	2,100	2,800	2,500	2,100	2,200	1,900	2,000	2,000	2,400	2,300	3,000	28,000
Cauliflower:													
1983:													
California..	900	800	700	800	600	800	600	600	500	600	800	900	8,600
1984:													
California..	900	1,000	900	800	900	700	500	500	500	800	900	1,700	10,100
1985:													
California..	1,000	1,100	1,200	800	800	1,000	800	600	700	1,100	1,000	1,000	11,100
1986:													
California..	1,200	900	900	900	800	700	700	700	800	1,000	900	1,300	10,800
Washington..	0	0	0	0	0	0	0	100	0	0	0	0	100
1987:													
California..	800	800	1,100	900	800	1,000	1,300	1,000	900	1,000	800	1,000	11,400

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-18.

Asparagus, fresh or chilled: 1/ U.S. imports for consumption from Mexico, by selected Customs Districts, 1983-87

Customs Districts	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
San Diego, CA.....	14,242	7,888	10,070	11,211	14,237
Laredo, TX.....	2,597	3,346	3,626	6,373	6,509
Nogales, AZ.....	213	156	396	596	2,326
New York, NY.....	947	278	534	559	439
San Francisco, CA...	326	566	369	62	208
All other.....	372	261	424	258	282
Total.....	18,697	12,495	15,419	19,059	24,001
Value (1,000 dollars)					
San Diego, CA.....	11,043	4,388	6,629	7,318	8,813
Laredo, TX.....	871	1,073	1,248	2,096	2,514
Nogales, AZ.....	188	107	269	276	814
New York, NY.....	354	85	162	184	161
San Francisco, CA...	122	254	118	27	67
All other.....	160	94	135	192	127
Total.....	12,738	6,001	8,561	10,093	12,496

1/ Includes TSUSA items 135.0300, 135.0520, and 137.9720.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3-19.

Asparagus, frozen: 1/ U.S. imports for consumption from Mexico, by selected Customs Districts, 1983-87

Customs Districts	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
San Diego, CA.....	12	25	4	1,326	4,062
Nogales, AZ.....	0	0	0	0	326
Laredo, TX.....	1,185	452	697	787	183
All other.....	9	4	33	23	4
Total.....	1,206	481	734	2,136	4,575
Value (1,000 dollars)					
San Diego, CA.....	15	15	6	807	2,992
Nogales, AZ.....	0	0	0	0	149
Laredo, TX.....	599	179	314	235	82
All other.....	3	3	10	10	4
Total.....	617	197	330	1,052	3,227

1/ Includes TSUSA items 135.0540 and 138.4640.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3-20.

Asparagus, canned: 1/ U.S. imports for consumption from Mexico, by selected Customs Districts, 1983-87

Customs Districts	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
San Diego, CA.....	0	914	2,247	1,051	3,293
Laredo, TX.....	144	2	246	63	24
All other.....	32	0	5	3	0
Total.....	176	916	2,498	1,117	3,317
Value (1,000 dollars)					
San Diego, CA.....	0	789	2,084	1,163	2,624
Laredo, TX.....	86	3	97	6	23
All other.....	17	0	3	2	0
Total.....	103	791	2,184	1,171	2,647

1/ Includes TSUSA item 141.9300.

Note.--As a result of rounding, figures may not add to totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3-21.

Broccoli, fresh or chilled: 1/ U.S. imports for consumption from Mexico, by selected Customs Districts, 1983-87

Customs Districts	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Laredo, TX.....	61	822	2,440	4,755	18,903
Nogales, AZ.....	104	1,023	1,531	1,773	2,222
San Diego, CA.....	36	1,610	41	1,252	1,365
All other.....	0	3	0	28	11
Total.....	201	3,458	4,012	7,808	22,501
Value (1,000 dollars)					
Laredo, TX.....	11	83	224	357	2,148
Nogales, AZ.....	46	215	376	269	473
San Diego, CA.....	8	269	8	123	206
All other.....	0	1	0	4	1
Total.....	65	568	608	753	2,828

1/ Includes TSUSA item 137.9730.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3-22.

Broccoli, frozen: 1/ U.S. imports for consumption from Mexico, by selected Customs Districts, 1983-87

Customs Districts	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Laredo, TX.....	27,671	55,311	63,225	96,828	164,200
Detroit, MI.....	0	0	0	2	61
San Francisco, CA...	0	0	0	0	72
All other.....	76	7	151	7	81
Total.....	27,747	55,318	63,376	96,837	164,414
Value (1,000 dollars)					
Laredo, TX.....	9,084	17,826	21,094	28,005	40,067
Detroit, MI.....	0	0	0	1	31
San Francisco, CA...	0	0	0	0	14
All other.....	27	2	49	1	19
Total.....	9,111	17,828	21,143	28,007	40,131

1/ Includes TSUSA items 138.0535, 138.0540, 138.0545, and 138.0555.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3-23.

Cauliflower, fresh, chilled, or frozen: 1/ U.S. imports for consumption from Mexico, by selected Customs Districts, 1983-87

Customs Districts	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Nogales, AZ.....	1,653	2,421	1,635	3,023	7,453
Laredo, TX.....	376	374	981	597	355
All other.....	6	12	87	105	35
Total.....	2,035	2,807	2,703	3,725	7,843
Value (1,000 dollars)					
Nogales, AZ.....	340	526	283	298	750
Laredo, TX.....	35	77	113	78	36
All other.....	1	1	17	10	7
Total.....	376	604	413	386	793

1/ Includes TSUSA items 135.5000 and 135.5100.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3-24.

Cauliflower, frozen, reduced in size: 1/ U.S. imports for consumption from Mexico, by selected Customs Districts, 1983-87

Customs Districts	1983	1984	1985	1986	1987
Quantity (1,000 pounds)					
Laredo, TX.....	17,571	27,519	32,845	34,318	55,875
Detroit, MI.....	0	0	0	0	2
All other.....	0	40	24	29	0
Total.....	<u>17,571</u>	<u>27,559</u>	<u>32,869</u>	<u>34,347</u>	<u>55,877</u>
Value (1,000 dollars)					
Laredo, TX.....	5,689	9,121	10,469	9,873	14,274
Detroit, MI.....	0	0	0	0	1
All other.....	0	11	8	8	0
Total.....	<u>5,689</u>	<u>9,132</u>	<u>10,477</u>	<u>9,881</u>	<u>14,275</u>

1/ Includes TSUSA item 138.0560.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3-25.

Asparagus, broccoli, and cauliflower, fresh or frozen: 3-year average of U.S. imports for consumption under inspection of plant protection and quarantine programs of the U.S. Department of Agriculture, by port of entry, fiscal years ending Sept. 30, 1983-85

Port of entry	Fresh			Frozen		
	Asparagus	Broccoli	Cauli- flower	Asparagus	Broccoli	Cauli- flower
Share (percent) of total 1/						
<u>Texas border: 2/</u>						
Brownsville, TX....	3/	19	13	-	9	7
Progreso, TX.....	6	4	3	-	-	-
Hidalgo, TX.....	7	7	21	15	10	20
Roma, TX.....	-	16	-	-	-	-
Laredo, TX.....	6	14	2	85	68	62
El Paso, TX.....	3/	-	3/	-	-	-
Subtotal.....	20	59	40	100	87	90
<u>Arizona/California</u>						
<u>border: 2/</u>						
Nogales, AZ.....	1	9	35	-	-	-
San Luis, AZ.....	1	11	6	-	-	-
Calexico, CA.....	63	12	-	-	-	-
San Diego, CA.....	3/	2	1	-	-	-
Subtotal.....	65	33	42	-	-	-
<u>Nonborder ports:</u>						
New York, NY.....	7	3/	3/	-	3/	3/
San Francisco, CA..	3	-	-	-	-	-
Los Angeles, CA....	2	-	3/	3/	-	-
All other.....	3	8	18	-	13	10
Subtotal.....	15	8	18	3/	13	10
Grand total....	100	100	100	100	100	100
Quantity (1,000 pounds)						
Grand total.....	18,286	5,339	5,305	569	61,527	27,606

1/ As a result of rounding, figures may not add to totals shown.

2/ Border ports with Mexico listed from East to West.

3/ Less than 0.5 percent.

Note.--Fiscal-year 1985 data are the most recent available. Inspections under these programs include entries from all sources except Canada. During 1983-85, imports from Canada accounted for less than 1 percent of total U.S. imports of each product except fresh cauliflower (77 percent from Canada) and fresh broccoli (7 percent).

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 3-26.

Weekly per person expenditures for vegetables, by income quintile, 1977-78

(In dollars)						
Vegetable	I (lowest)	II	III (middle)	IV	V (highest)	Not re- ported
Fresh.....	0.64	0.60	0.54	0.56	0.68	0.61
Dark green.....	.09	.07	.06	.05	.07	.07
Deep yellow.....	.04	.04	.04	.04	.05	.04
Light green.....	.22	.19	.18	.18	.23	.20
Tomatoes.....	.11	.11	.09	.09	.11	.09
Other.....	.18	.19	.17	.19	.23	.20
Canned.....	.38	.36	.32	.30	.30	.31
Frozen.....	.10	.10	.11	.12	.15	.11
Total.....	1.13	1.06	.97	.97	1.13	1.03

Note.--As a result of rounding, figures may not add to totals shown.

Source: 1977-78 U.S. Department of Agriculture Nationwide Food Consumption Survey, in Smallwood and Blaylock, Household Expenditures for Fruit, Vegetables, and Potatoes, U.S. Department of Agriculture, Economic Research Service, May 1984.

Table 3-27.

Weekly per person expenditures for vegetables, by region, 1977-78

(In dollars)					
Vegetable	All regions	North- east	North- central	South	West
Fresh.....	0.60	0.73	0.49	0.54	0.71
Dark green.....	.07	.10	.05	.06	.07
Deep yellow.....	.04	.05	.04	.03	.05
Light green.....	.20	.22	.17	.20	.22
Tomatoes.....	.10	.12	.07	.09	.13
Other.....	.20	.25	.17	.16	.24
Canned.....	.32	.35	.30	.33	.30
Frozen.....	.12	.15	.10	.10	.12
Total.....	1.04	1.24	.89	.97	1.14

Note.--As a result of rounding, figures may not add to totals shown.

Source: 1977-78 U.S. Department of Agriculture Nationwide Food Consumption Survey, in Smallwood and Blaylock, Household Expenditures for Fruit, Vegetables, and Potatoes, U.S. Department of Agriculture, Economic Research Service, May 1984.

Table 3-28.

Weekly per person expenditures for vegetables, by season, 1977-78

(In dollars)					
Vegetable	All seasons	Spring	Summer	Fall	Winter
Fresh.....	0.60	0.66	0.61	0.55	0.60
Dark green.....	.07	.07	.06	.07	.07
Deep yellow.....	.04	.04	.03	.04	.05
Light green.....	.20	.21	.20	.18	.21
Tomatoes.....	.10	.11	.10	.08	.09
Other.....	.20	.22	.22	.17	.18
Canned.....	.32	.31	.28	.33	.37
Frozen.....	.12	.12	.09	.12	.14
Total.....	1.04	1.08	.98	.99	1.11

Note.—As a result of rounding, figures may not add to totals shown.

Source: 1977-78 U.S. Department of Agriculture Nationwide Food Consumption Survey, in Smallwood and Blaylock, Household Expenditures for Fruit, Vegetables, and Potatoes, U.S. Department of Agriculture, Economic Research Service, May 1984.

Table 3-29.

Simulated weekly per person expenditures for vegetables, by age group, 1977-78

Vegetable	Base 1/ Dollars	0-2	3-12	13-19	20-39	65 and over
-----Percentage change from base-----						
Fresh.....	0.819	-50.7	-20.5	-19.0	-14.1	-1.7
Dark green.....	.085	-69.5	-37.7	-27.7	-18.1	-5.1
Deep yellow.....	.052	-33.6	3.2	-20.4	-24.6	25.0
Light green.....	.273	-58.9	-19.3	-4.0	-15.3	3.3
Tomatoes.....	.110	-33.6	19.1	5.3	2.3	-4.7
Other.....	.277	-44.7	-24.3	-23.9	-15.2	-6.7
Canned.....	.376	31.3	-9.0	7.0	5.4	-2.2
Frozen.....	.119	27.6	35.0	35.3	5.0	7.4

1/ Age 40-64 years.

Note.—As a result of rounding, figures may not add to totals shown.

Source: Based on 'tobit' analysis of the 1977-78 U.S. Department of Agriculture Nationwide Food Consumption Survey, in Smallwood and Blaylock, Household Expenditures for Fruit, Vegetables, and Potatoes, U.S. Department of Agriculture, Economic Research Service, May 1984.

Table 3-30.

Weekly per person expenditures for vegetables, by urbanization, 1977-78

(In dollars)				
Vegetable	All	Central city	Suburban	Nonmetropolitan
Fresh.....	0.60	0.74	0.62	0.46
Dark green.....	.07	.11	.06	.04
Deep yellow.....	.04	.05	.04	.03
Light green.....	.20	.23	.21	.17
Tomatoes.....	.10	.12	.09	.08
Other.....	.20	.24	.21	.14
Canned.....	.32	.36	.31	.30
Frozen.....	.12	.14	.13	.08
Total.....	1.04	1.24	1.07	.85

Note.--As a result of rounding, figures may not add to totals shown.

Source: 1977-78 U.S. Department of Agriculture Nationwide Food Consumption Survey, in Smallwood and Blaylock, Household Expenditures for Fruit, Vegetables, and Potatoes, U.S. Department of Agriculture, Economic Research Service, May 1984.

CHAPTER 4. U.S. INDUSTRY

General

The United States is a major world producer and consumer of asparagus, broccoli, and cauliflower. Historically, U.S. growers and processors have produced principally for the domestic market and been the dominant suppliers of the subject fresh and frozen vegetables to this market, shipping limited exports to Canada. However, U.S. producers are now facing stiff competition in the domestic market from Mexico, especially, and, to a lesser extent, from Guatemala, which are producing the subject fresh and frozen vegetables expressly for export to the United States. In addition to the competition from imports, U.S. producers (especially those in California, the major U.S. producing area) are also facing an increase in water costs, wage rates for a dwindling labor supply, and pressure from nonagricultural users for existing land in production, and tighter restrictions on pesticide usage. However, harvested acreage for the subject vegetables has been increasing in recent years. 1/

Growing Sector

Structure

The growing sector for asparagus, broccoli, and cauliflower in the United States consists primarily of a large number of independent farms dispersed throughout the country. Since the number of cooperatives and firms that bring groups of farms together is small, the market structure of the growing sector can be characterized as competitive. In recent years, farm size (by sales class) has changed considerably, with the number of small operations (annual sales of less than \$10,000) declining from just over three-fourths to about one-half of all farms, and the percentage of farms in each of the other sales classes increasing (table 4-1).

Number and location.--In recent years, asparagus, broccoli, and cauliflower, together, were grown (for all uses) on about 8,000 farms, up 19 percent from an estimated 6,700 farms in 1978 and up 67 percent from 4,800 farms in 1969, as shown in the following tabulation of data from the U.S. Department of Commerce's Census of Agriculture:

<u>Year</u>	<u>Number of farms</u> <u>1/</u>
1969	4,800
1974	4,400
1978	6,700
1982	7,900
1987	<u>2/</u> 8,000

1/ According to industry sources, many of the reported farms raising broccoli are the same farms reported as raising cauliflower. Thus, the total number may be overstated.

2/ Estimated by the Commission staff.

1/ Responses of Mr. Ray Borton to questions of Commissioner Brunsdale, transcript of Commission hearing, p. 45.

The total number of farms and average farm size vary by State for each commodity. In recent years, the leading States in numbers of farms producing asparagus, broccoli, and cauliflower for all uses were Michigan, New York, California, Pennsylvania, Washington, and New Jersey. California farms ranged in size from about 120 to 220 harvested acres; the average farm size in almost all other States was less than 50 acres.

In 1987, the principal States in production of the subject vegetables were California, Washington, Michigan, Texas, and Arizona. In California, the principal broccoli and cauliflower production area is Monterey County, followed by Santa Barbara/San Luis Obispo, Ventura, and Imperial counties (figure 4-1). Asparagus production is located principally in the San Joaquin/Contra Costa County area, with additional production in Riverside, Monterey, and Imperial counties.

Washington State production of asparagus is located primarily in the Walla Walla/Yakima area in the Southeast and in Snohomish and Whatcom counties in the Northwest (figure 4-2). In Michigan, the principal asparagus production areas are in Oceana and Mason counties in the West Central area and in Van Buren and Berrien counties in the Southwest (figure 4-3). The principal Texas broccoli and cauliflower production area is in the Lower Rio Grande Valley counties of Hidalgo, Starr, and Cameron, with additional production in the San Antonio-Winter Garden area (figure 4-4). Broccoli and asparagus production in Arizona is centered in the Southwestern valley area around Yuma (figure 4-5).

Industry concentration.--There appears to be no significant industry concentration of farms raising asparagus, broccoli, or cauliflower. However, there is a geographic concentration among farms raising most of these vegetables. Although some marketing firms are grower cooperatives or centralized sales agencies for groups of growers, and others are part of a larger parent firm, there are no growers or grower groups known to account for a large enough share of total U.S. production to hold a dominant market position. There are, also, grower associations, such as the California Asparagus Growers Association, Washington Asparagus Growers Association, and the Michigan Agricultural Cooperative Marketing Association, which act on behalf of grower members as bargaining agents and/or for lobbying or other services. Such local associations bargain with processors for product prices and for other terms or conditions. Many larger growing or marketing firms belong to national associations such as the United Fresh Fruit and Vegetable Association or the Produce Marketing Association, for marketing and national lobbying benefits.

Integration and diversification: Asparagus.--With asparagus, vertical integration of farms is limited to growing and shipping fresh product. In some areas, asparagus growers have their own packing shed at the fields, where the product is packed for fresh-market distribution. In California and Washington, growers deliver raw product to the shipper and are reimbursed for transportation costs, or the shipper arranges for delivery himself. The shipper then arranges for the product to be cooled until sold, with the buyer paying handling, shipping, and cooling expenses. Michigan asparagus growers are responsible for the expense of transporting raw product to shippers.

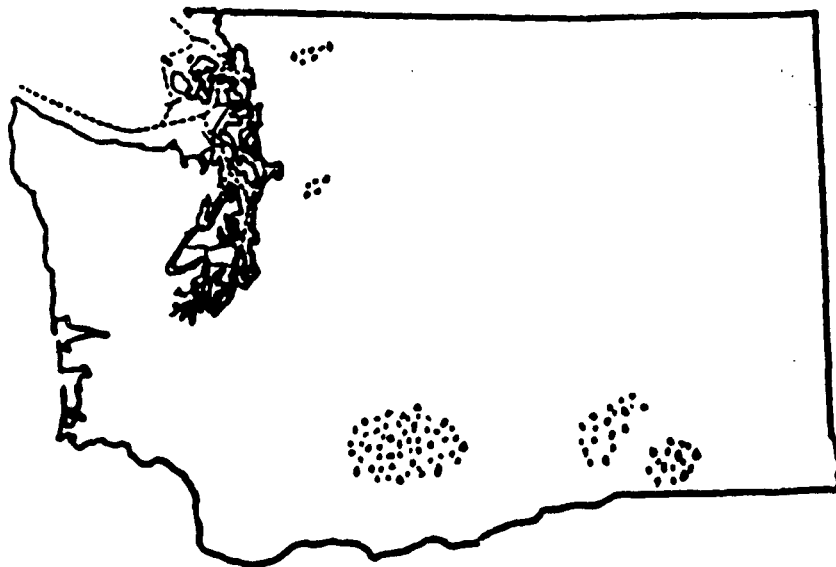
The Commission requested a sample of 50 asparagus growers to report on the types of operations their farms were involved in with respect to asparagus production. According to responses from 22 growers, virtually all were

Figure 4-1.
California asparagus, broccoli, and cauliflower production areas, 1987



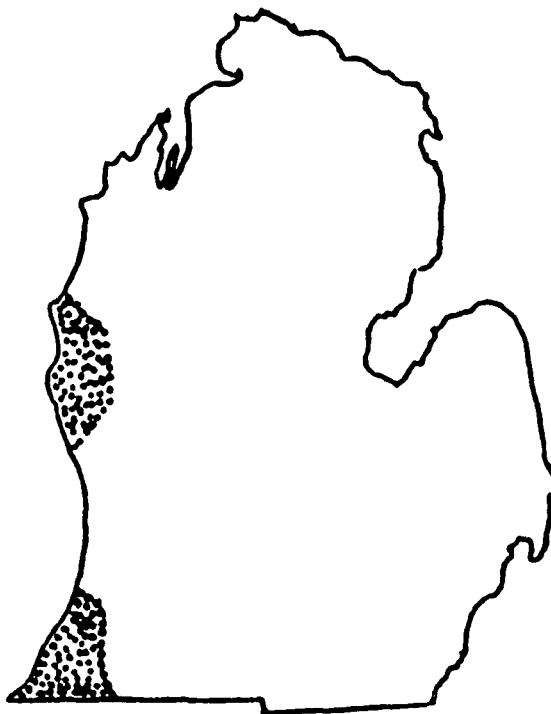
Source: California Agriculture Statistical Review.

Figure 4-2.
Washington asparagus production areas, 1987



Source: Washington Agricultural Statistics.

Figure 4-3.
Michigan asparagus and cauliflower production areas, 1987



Source: Michigan Agricultural Statistics.

Figure 4-4.

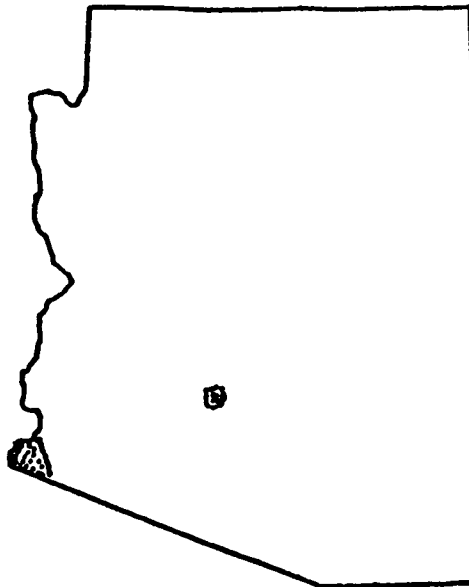
Texas broccoli and cauliflower production areas, 1987



Source: Texas Vegetable Statistics.

Figure 4-5.

Arizona broccoli and cauliflower production areas, 1987



Source: Map from the Congressional Directory.

involved in harvesting and growing asparagus, with nearly three-fifths of respondents also involved in packing, and one-fourth conducting marketing operations. None of the respondents reported that they were involved in freezing or brokering operations.

In California, the California Asparagus Growers Association works with 10 to 12 shipper/handler/sales agents through which over 95 percent of all member asparagus production is distributed. These agents also handle imported asparagus. Some member growers have contracts whereby they only supply product directly to particular processors. In recent years, there has been no canned asparagus production in California; fresh product is shipped to Washington State for processing. In Washington and Michigan, where the majority of the asparagus is grown for processing, much of the production is contracted for directly between grower and processor, with grower associations acting as bargaining agents.

As an indicator of industry diversification, U.S. asparagus growers were requested to provide information on their share of total crop sales accounted for by asparagus. On the basis of the 22 questionnaire responses, all of which listed asparagus as the primary subject vegetable sold, one-third of the firms reported asparagus sales accounting for over 60 percent of total crop sales, with most of the remaining firms reporting asparagus sales of less than 30 percent of total sales. Other crops grown by respondents included fruit (e.g., cherries, peaches, grapes, plums, and apples) and other vegetables.

Integration and diversification: Broccoli and cauliflower.--The U.S. broccoli and cauliflower industry is expanding by increasing planted acreage both within current producing areas and into other States (e.g., Arizona, Maine, and Illinois), and by increasing acres planted per individual farm. The development of relatively inexpensive field-packing and cooling equipment has reportedly increased the number of fresh broccoli and cauliflower shippers over the handful of large growers controlling most shipments in the past. ^{1/} Some broccoli and cauliflower growers are also vertically integrated into packing, brokering, and transporting the subject vegetables to fresh-market outlets. In addition, there are packing firms which pack and broker fresh product for a number of growers under contract. Further, some growers are integrated by growing under contract directly for processors. Most of these contracts are negotiated prior to planting, and stipulate such things as quantity to be delivered, product quality, price, and delivery dates.

According to 36 questionnaire responses from a sample of 100 broccoli and cauliflower growers, over one-half of such growers were involved in harvesting and growing operations, with most of these growers also conducting their own packing and shipping operations. In addition, a number of other respondents not involved in growing were involved in harvesting, packing, and shipping. None of these respondents reported any involvement in brokering operations.

Growers were requested to provide information on their share of total crop sales accounted for by broccoli and cauliflower, as well as other vegetables. On the basis of the 36 questionnaire responses, one-third of these firms

^{1/} David Runsten and Kirby Moulton, "Competition in Frozen Vegetables," in Competitiveness at Home and Abroad: Report of a 1986-87 Study Group on Marketing California Specialty Crops--Worldwide Competition and Constraints, University of California Agricultural Issues Center, Davis, CA, 1987.

reported aggregate broccoli and cauliflower sales accounting for over 50 percent of total crop sales; most of the remaining firms reported such sales as less than 30 percent of their total crop sales. Most growers reported significant sales of lettuce and celery, with limited sales for a number of other vegetables.

Production and harvested acreage

Overall U.S. fresh-vegetable production has expanded significantly in the 1980's, with broccoli and cauliflower among those vegetables experiencing the most dramatic growth; asparagus production has also risen, but at a much slower rate. During 1978-87, U.S. production of asparagus, broccoli, and cauliflower increased at average annual rates of 3, 10, and 10 percent, respectively (tables 4-2 to 4-4).

Asparagus.--Asparagus production for the fresh market and for processing increased in quantity by an average 3 percent annually, from 186 million pounds, valued at \$81 million, in 1978 to 235 million pounds, valued at \$136 million, in 1987, with production for fresh-market use accounting for all of the increase (table 4-2). California accounted for 77 percent (by value) of total fresh-market production in 1987, followed by Washington, Michigan, and New Jersey, with 16, 3, and 2 percent, respectively. Washington accounted for nearly three-fifths (by value) of asparagus production for processing in 1987, with most of the remainder accounted for by Michigan and California. 1/ In recent years, an increasing share of production for processing has gone for freezing rather than canning.

Harvested acreage in asparagus (for fresh-market and processing use) rose by about 20 percent during 1978-87, with California and Washington accounting for most of the increase; in 1987, California, Washington, and Michigan accounted for 40, 31, and 22 percent, respectively, of the total harvested acres (table 4-5). In California, the share of total acreage in the Southern San Joaquin Valley and South Coast areas has risen dramatically, while the share for the Delta area has fallen. 2/ In Washington and Michigan, acreage rose much more slowly. In 1987, per-acre yields were highest in California; yields in both California and Washington were above the U.S. average.

Broccoli.--In 1987, U.S. broccoli production for all uses totaled 1.14 billion pounds, valued at \$235 million, up by 112 percent in quantity from 540 million pounds, valued at \$98 million, in 1978, an average annual increase of 10 percent (table 4-3). Virtually all of the increase was accounted for by increased production for fresh-market use. From 1984 to 1987, however, fresh-market production increased at a much slower rate than during 1978-84, and production for processing actually declined 26 percent during 1984-87. In 1987, about three-fourths of overall production volume went for fresh-market use, with California accounting for 90 percent of the total and Arizona, Oregon, and Texas accounting for the remainder.

1/ As noted earlier, all California asparagus sold for canning is actually processed in Washington.

2/ On the basis of data from the prehearing submission of the California Asparagus Growers Association.

During 1978-87, broccoli harvested acreage rose 76 percent; California accounted for most of the increase and the bulk of the U.S. total each year (table 4-6). California harvested acreage has risen dramatically since 1978, but its share of total U.S. acreage has fallen. As with asparagus and cauliflower, acreage in the South Coast and San Joaquin Valley areas has taken a larger share of the total. 1/ Harvested acreage has risen in a number of other States since 1978, especially Texas, Oregon, Arizona, Maine, New York, and Illinois. According to U.S. Department of Agriculture (USDA) projections, harvested acreage of fresh vegetables (including broccoli and cauliflower) is expected to rise by 2 percent in 1988 compared with that in 1987. 2/ Since 1984, yields have been highest in Oregon and California; in 1987, yields of 10,000 and 9,600 pounds per acre, respectively, were reported for the two States.

Cauliflower.--Cauliflower production for all uses totaled 782 million pounds, valued at \$195 million, in 1987, up 105 percent in quantity from 381 million pounds, valued at \$69 million, in 1978, an average annual increase of 10 percent (table 4-4). Cauliflower experienced all its growth during 1978-87 in production for fresh-market usage. During 1984-87, production for processing fell by 11 percent. California accounted for about three-fourths of 1987 production for all uses; followed by Arizona with 12 percent (all for fresh-market use); and Michigan, New York, Oregon, and Texas with the remainder of production for all uses.

Total U.S. harvested acreage of cauliflower for all uses rose by nearly 60 percent during 1978-87, with California accounting for most of the increase and an estimated four-fifths of total U.S. acreage throughout the period (table 4-7). The share of total California harvested acreage has fallen in the Central Coast area, but risen for all other areas. 3/ Other States reporting increased acreage include Arizona and Oregon. In 1987, per-acre yields were highest in Oregon, Arizona, and California.

Employment and wages

Asparagus.--The Commission requested data from the sample of 50 asparagus growers on the average total number of persons employed by their firm during 1985-87, along with their annual average number of persons employed in asparagus growing and harvesting operations and the number employed only in harvesting operations during specified months. According to the 22 responses to the questionnaire, the average total number of persons employed in asparagus-growing operations, as well as the average number of persons employed in asparagus growing and harvesting operations, trended upward throughout the period (table 4-8). The months with the highest average number of persons employed in growing and harvesting operations were March, April, and May. Total number of hours worked followed similar trends.

1/ On the basis of data from the prehearing submission of the California Asparagus Growers Association.

2/ U.S. Department of Agriculture, Economic Research Service, Vegetables and Specialties--Situation and Outlook Report, Publication No. TVS-844, August 1988.

3/ On the basis of data from the prehearing submission of the California Asparagus Growers Association.

The total wages paid to all persons employed by establishments in which asparagus is grown rose from \$16.1 million in 1985 to about \$17.5 million in 1986-87; during this same period, total wages paid for asparagus growing and harvesting operations rose steadily to \$3.7 million in 1987. For 1988, the ranges of average hourly wage rates paid for fieldwork (e.g., land preparation, weeding, thinning, etc.) and average piece-work wage rates are shown in the following tabulation (in dollars): 1/

Hourly wage rates paid for:

Fieldwork.....	per hour..	5.00-6.00
Harvesting.....	per hour..	5.00-6.00
Packing.....	per hour..	5.00-6.00

Piece-work wage rates for:

Harvesting.....	per crate..	3.75
Packing.....	per crate..	1.75

It is estimated that other employee benefits amount to an additional 40 percent over wages paid to U.S. laborers. 2/ It should be noted that this is approximately the same percentage accounted for by benefits for Mexican laborers, making wage rates alone the appropriate comparison.

Broccoli and cauliflower.--The Commission also requested employment data from the sample of 100 broccoli and cauliflower growers. On the basis of the 36 questionnaire responses, the average total number of persons employed in broccoli and cauliflower growing and harvesting operations declined steadily during 1985-87 (table 4-9). During this period, the total number of hours worked as well as total wages paid in broccoli and cauliflower harvesting operations trended downward. The bulk of the wages paid were for harvesting operations only. Average hourly wage rates paid for fieldwork, harvesting, and packing all rose during 1985-87, as shown in the following tabulation (in dollars per hour):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Hourly wage rates paid for:			
Fieldwork.....	5.72	5.74	5.98
Harvesting.....	5.91	5.91	6.12
Packing.....	5.31	5.25	5.43

Other employee benefits for U.S. broccoli and cauliflower growers are estimated to range between 35 and 40 percent in addition to wages. 3/ These estimates are also approximately the same as for Mexican laborers.

Transportation costs

Vegetable shippers in different parts of the United States face significant differences in transportation costs to various destinations. An important factor affecting transportation costs is the shipment mode used. As noted earlier, approximately 85 percent of California's fresh-market produce

1/ Ibid., exhibits S-1 and T.

2/ Statement of Mr. William Ramsey, transcript of Commission hearing, p. 58.

3/ On the basis of data from the posthearing brief of the Grower-Shipper Vegetable Association of Central California, p. 7.

moves by trucks. The remaining 15 percent of the produce moves by train, and most of that is in truck trailers on flat rail cars (called piggy-back transport). Shippers in Maine, Maryland, and New York rely entirely on truck transport, as do growers in most other States.

A major reason that shippers may prefer truck to rail transport, even if the initial rail rate is lower than the truck rate, is total delivered travel time. It usually takes much longer for a shipment to travel from point of shipping to final destination by rail than by truck. Not only are trucks able to travel to the exact destination, as opposed to rail travel which is limited by the availability of the nearest rail spur, but the rail cars then have to be unloaded at an additional expense to the purchaser. Thus, any initial cost advantage of rail transport is offset by the travel time disadvantage and the convenience of trucks delivering directly to a given place of business.

Transportation costs also may vary as a percentage of product value. Price is likely to be depressed when the supply of product is abundant. Because transport equipment is in greatest demand when product supply is largest--at the same time prices are depressed--the cost of shipping the product is inflated. The magnitude of the price depression also depends on the availability of raw-product supply from competing production areas. Supply is dependent on local weather conditions, so product availability from these competing areas may be reduced if weather conditions are adverse.

Table 4-10 lists per-carton transportation costs for broccoli and cauliflower shipments from a number of suppliers to major U.S. markets. All eastern suppliers are shown to have significantly lower transportation costs to eastern markets. For example, transportation costs from Salinas, California to New York are \$4.58 per carton compared with rates to the same destination ranging from \$0.42 to \$2.08 for eastern suppliers. Thus, suppliers in the East may have a competitive advantage in marketing broccoli in eastern cities because of such transportation costs. Broccoli is currently produced in limited, but rising, quantities in eastern States. As growing practices improve, unit costs of production may decline, giving eastern States' producers a competitive advantage in production costs in addition to transportation costs. As a result of technological difficulties, cauliflower acreage in the East and South is not expected to expand substantially.

Transportation costs were examined for domestic shipments of fresh vegetables. Because truck transport is the primary method used, truck rates for shipping product from major production areas to major markets were selected as a measure of transportation costs. The production areas chosen were Southern California; Salinas/Watsonville, California; Imperial Valley, California; Nogales, Arizona; and Lower Rio Grande Valley, Texas. Costs from the Lower Rio Grande Valley are the same as those for Mexican shippers crossing at border ports in this area, which include most shipments of Mexican broccoli and cauliflower. The markets chosen were Atlanta, Chicago, and New York.

In general, these truck rates demonstrated seasonal patterns, being considerably higher in the summer than in the winter. Also, the rates from California production areas were higher than those from Arizona and Texas production areas, and those to New York were the highest for the three markets. For certain production areas, data are incomplete because production does not occur year-round in these areas. In order to facilitate the discussion of

transportation costs, only truck rates from Southern California will be discussed in detail, data for which are presented in figures 4-6 to 4-8 (data for all other truck rates are presented in appendix H).

Truck rates from Southern California to all markets exhibited marked seasonal patterns (figures 4-6 to 4-8). Rates for June through August were nearly double those for November through March in the three markets. Rates to Atlanta ranged from about 5 to 9 cents per pound, rates to Chicago from about 4 to 8 cents, and rates to New York from about 6 to 11 cents. During 1983-87, the rates exhibited no definite increasing or decreasing trends.

Truck rates from Southern California were basically the same as those from Imperial Valley, California and Salinas/Watsonville, California. The ranges from Arizona started at about the same low rates but did not reach the highest rates of California ranges. The ranges of truck rates from Texas were considerably lower overall for each of the three markets.

California truck rates appear to indicate that the State is at a competitive disadvantage in terms of transportation costs. Whether this places California fresh vegetables at a significant disadvantage in these markets depends on labor and other costs involved in producing the vegetables and shipping to these markets faced by growers in California, other States, and Mexico.

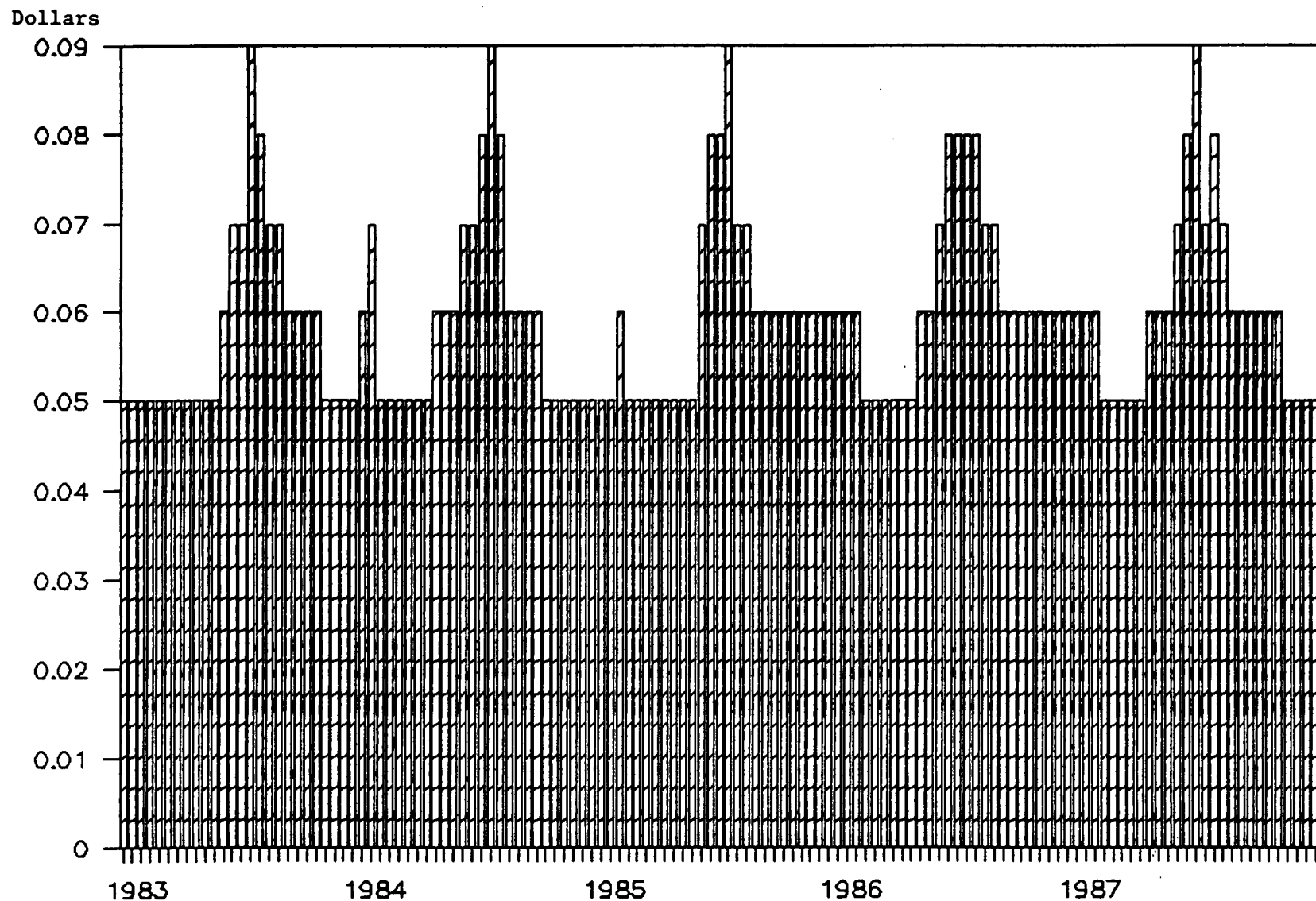
Prices

Grower prices for fresh asparagus, broccoli, and cauliflower (fresh product at the grower's facility) fluctuate seasonally, and often on a weekly or even daily basis. Hence, prices reported on a monthly basis tend to mask any significant supply changes that commonly occur (e.g., oversupply or undersupply, availability of supplies from other States or countries). Nonetheless, average monthly grower prices are useful in discussing the direction of overall price changes during a season as well as for comparing price trends over a number of years.

During 1978-87, season average prices for asparagus, broccoli, and cauliflower trended upward, with prices for broccoli and cauliflower reaching their peak average during the 1983 season and falling back to near 1978 levels in 1986 (figures 4-9 to 4-11). Asparagus prices showed a similar response during this period, but maintained a higher level through 1986. Broccoli prices tended to peak sometime during the November-April period, and prices for cauliflower peaked during a more narrow range (i.e., generally March to May). Asparagus prices were highest in January and declined steadily through the end of the season in June or July. Data for January-July 1988, as compared with the corresponding period of 1987, show higher average prices in 1988.

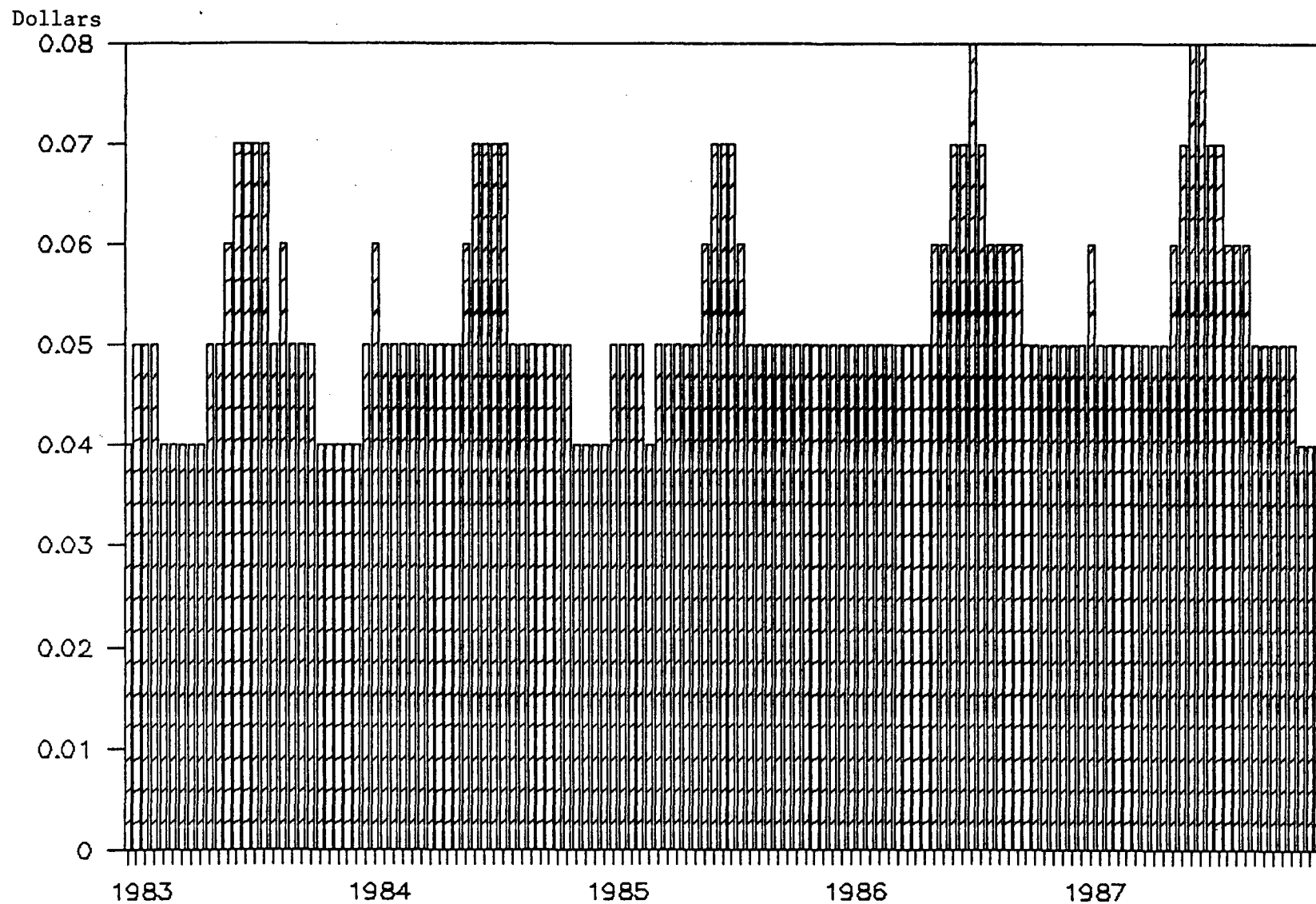
The sample of 150 asparagus, broccoli, and cauliflower growers were asked to report the share of their production sent to the fresh market and to processing, along with their field/roadside or processing-plant door contract prices received for the season from freezers and canners, including applicable transportation costs from field to processor, during 1985-87. On the basis of limited questionnaire data from 60 growers, over one-half of 24 asparagus growers reported sending more than 90 percent of their production to fresh-market outlets in recent years; most of the remaining firms sent the bulk

Figure 4-6.
Southern California to Atlanta truck rates, per pound, by week, 1983-87



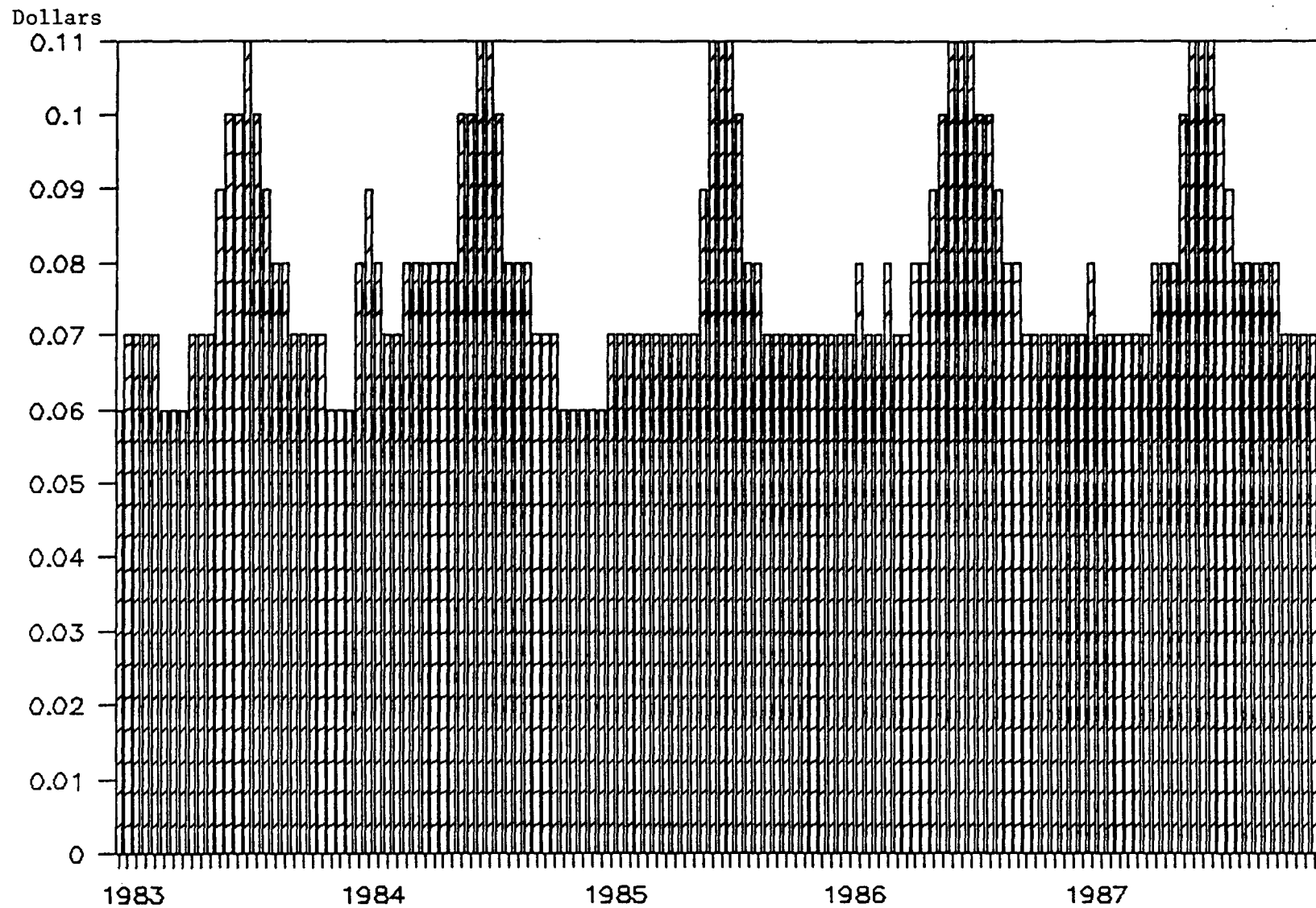
Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure 4-7.
Southern California to Chicago truck rates, per pound, by week, 1983-87



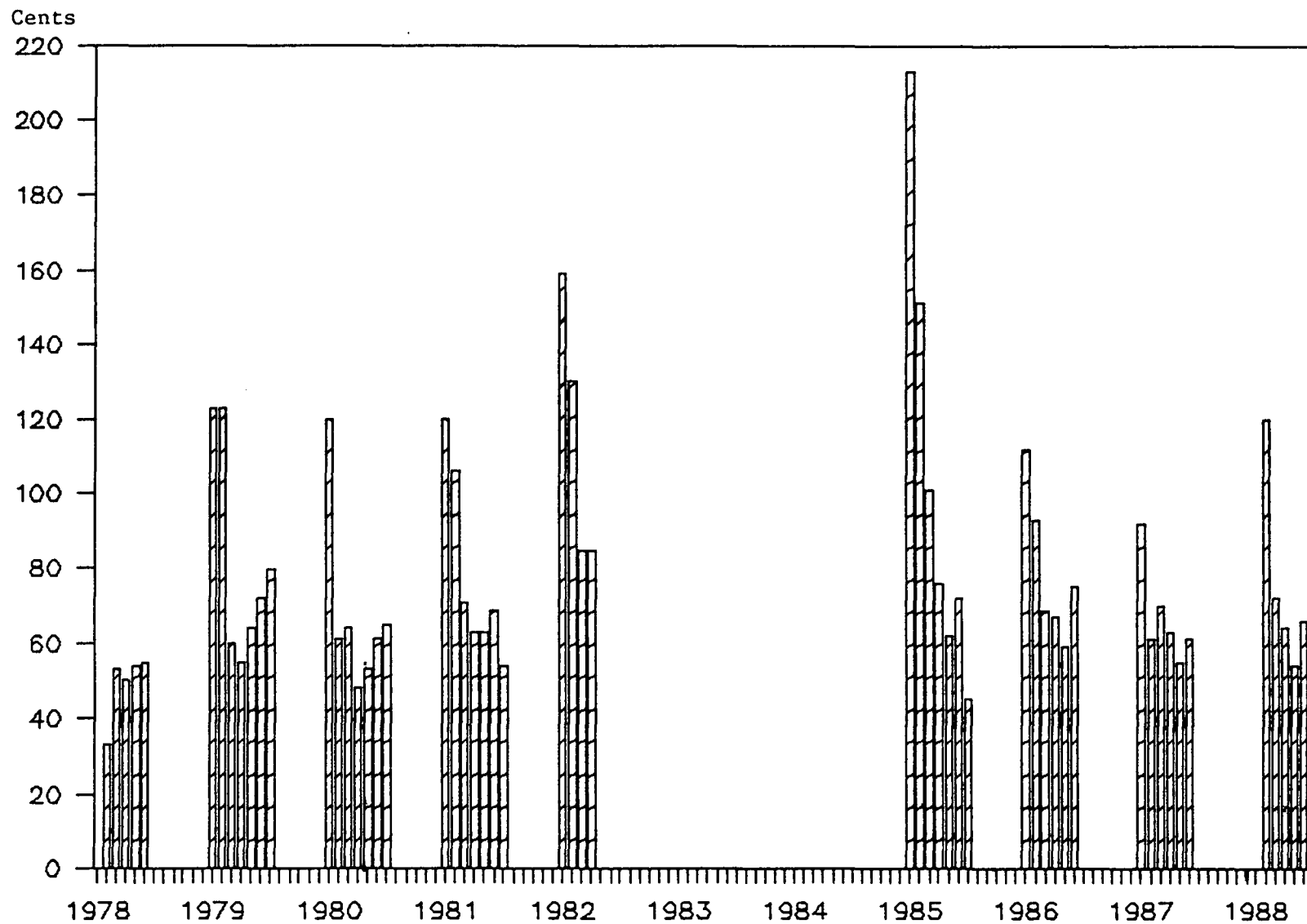
Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure 4-8.
Southern California to New York truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

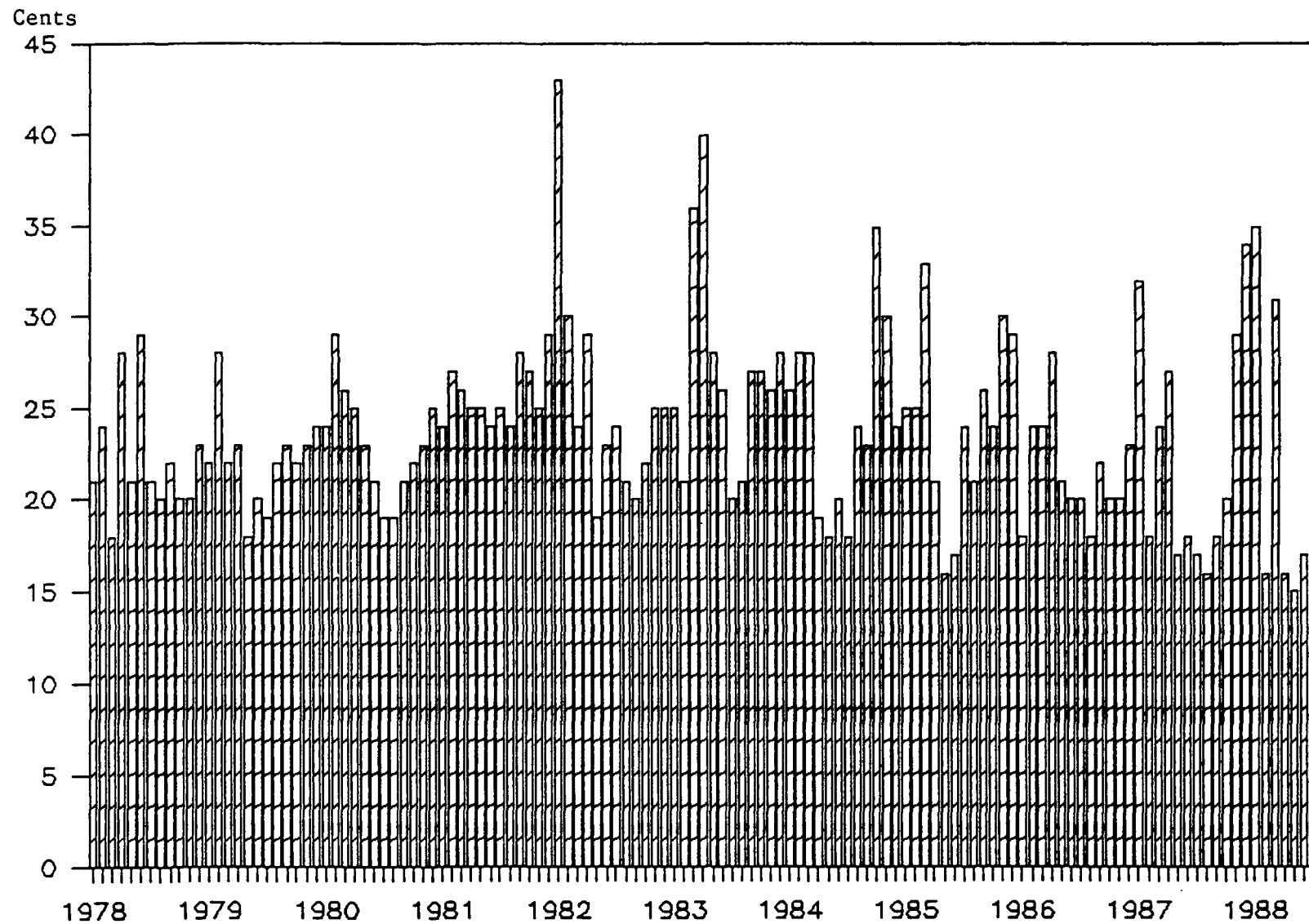
Figure 4-9.,
Asparagus: Average U.S. grower prices, per pound, by month, 1978-88



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure 4-10.

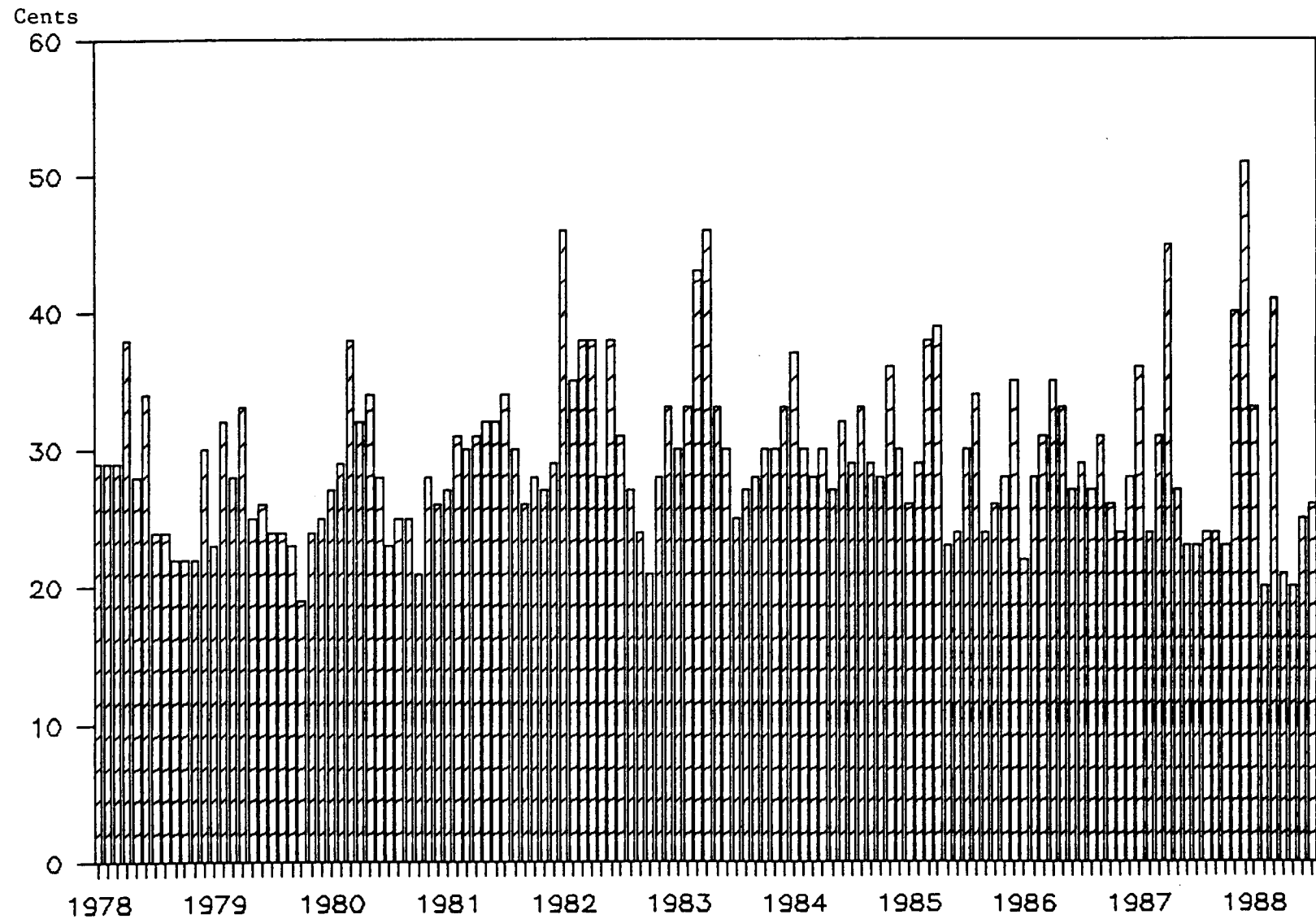
Broccoli: Average U.S. grower prices, per pound, by month, 1978-88



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure 4-11.

Cauliflower: Average U.S. grower prices, per pound, by month, 1978-88



Source: Compiled from official statistics of the U.S. Department of Agriculture.

of their product to canners or freezers. Nearly one-half of 36 broccoli growers sent over 90 percent of their production to fresh-market outlets; for cauliflower production, the share for fresh-market was nearly 70 percent.

On the basis of the limited questionnaire data received, the 39 responding growers reported that contract prices received at the field/roadside from freezers remained steady at 56 and 19 cents per pound for asparagus and broccoli, respectively, during 1985-87, as shown in the following tabulation (in cents per pound):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Prices received from freezers:			
Asparagus.....	57	56	56
Broccoli.....	19	19	18
Prices received from asparagus canners..	42	43	43

During 1985-87, contract prices for asparagus received from canners was about 43 cents per pound.

A review by Commission staff of research on the markets for fresh vegetables uncovered no studies containing estimates of the price elasticities of supply of the subject vegetables.

Financial performance

Overall operations.--The Commission requested information from the total sample of 150 asparagus, broccoli, and cauliflower growers concerning income, expenses, and other financial data on their overall growing operations, along with specific data on their asparagus, broccoli, and cauliflower operations. According to questionnaire responses of 39 growers for their overall operations, net sales were \$440 million, \$474 million, and \$520 million during 1985-87 (table 4-11). An aggregate net loss was reported for 1985; 15 firms reported losses in that year. Net gains were noted for 1986 and 1987, although 13 firms reported losses in 1986 and 17 firms in 1987.

Asparagus-growing operations.--During 1985-87, income-and-loss data for 15 reporting asparagus-growing operations showed net losses each year, with the number of firms reporting losses each year remaining steady at 10 (table 4-12). Net sales were \$15.2 million in 1987; in that year, total growing and operating expenses amounted to \$15.4 million. The ratio of total growing and operating expenses to net sales was 101 percent in 1987.

Broccoli-growing operations.--Total net sales for 12 reporting broccoli-growing operations were \$51.6 million in 1987; in that year, total growing and operating expenses exceeded total net sales by \$4.5 million (table 4-13). The ratio of total growing and operating expenses to net sales was 109 percent in 1987, with a negative ratio of net loss to net sales of 9 percent.

Cauliflower-growing operations.--Data for 12 reporting cauliflower-growing operations followed those for broccoli. In 1987, total net sales and total growing and operating expenses both amounted to \$41.6 million (table 4-14). Net loss before income taxes was 4.5 percent in 1987; 6 farms reported a net loss that year.

Processing Sector

Structure

The number of U.S. processors (i.e., freezers and canners) of asparagus, broccoli, and cauliflower is significantly smaller than it was a decade ago, but most processors still represent a small enough share of the market to behave as competitive firms. Few of these firms are cooperatives; many firms may have contractual arrangements with growers to raise product specifically for their processing operation. For almost all processors, asparagus, broccoli, and cauliflower operations are generally less than one-half of their total operations. The presence of large U.S.-based multinational firms has a significant impact on the performance of the industry.

Number and location.--In 1987, there were over 200 firms in the U.S. frozen-vegetable industry; however, a much smaller number were primary freezers of fresh vegetables. 1/ Approximately 60 firms processed canned or frozen asparagus as well as frozen broccoli and cauliflower. 2/ Over the last decade, however, the number of asparagus canners fell 37 percent and the number of freezers more than doubled. There is no known domestic commercial production of canned broccoli or cauliflower.

Primary freezers of broccoli also freeze cauliflower. There are an estimated 13 to 18 primary freezers of broccoli and cauliflower in the United States with commercial production; their facilities are located primarily in California, Texas, and Oregon. There are an estimated 4 to 8 firms freezing asparagus, with processing facilities primarily in California and Washington; asparagus freezers may also freeze broccoli and cauliflower. 3/ The number of firms freezing asparagus, broccoli, or cauliflower varies; freezers, under suitable economic conditions, might add asparagus, broccoli, or cauliflower to their production line.

Most firms maintain bulk cold-storage areas at their processing facilities for the purpose of holding processed inventory of the subject and other vegetables in one central location. Most independent freezers agree to supply buyers with a fixed amount of product at specified intervals over the length of the contract. 4/ Once processed according to the buyers' specifications and ready for shipment, product is held in cold-storage by the processor at the freezer's expense until shipment.

Industry concentration.--There is a high concentration of processors of frozen broccoli and cauliflower in California. In recent years, such producers accounted for about 90 percent of total U.S. production of frozen broccoli and

1/ A primary freezer is a firm that receives, cleans, grades, blanches, and freezes fresh vegetables. Considerably more capital equipment is required by such firms than by firms that only receive and process bulk frozen vegetables. Business directories in the frozen food industry generally do not make a distinction between primary freezers and other freezers.

2/ James J. Judge, Inc., The Directory of Canning, Freezing, Preserving Industries, 1986-87, Westminster, MD.

3/ For more information on the present number and location of processors, see discussion of industry responses to questionnaires.

4/ On the basis of conversations of Commission staff with industry representatives, May 1988.

70 percent of frozen cauliflower. In 1987, the average volume of broccoli shipments per firm, for those firms with freezing facilities in California, was about 36 million pounds or more than 3 times greater than the average for primary freezers elsewhere. ^{1/} For frozen cauliflower, California firms averaged 10 million pounds as opposed to 5 million pounds for other firms.

Processed-asparagus production is concentrated in California, Washington, and Michigan, with nearly all U.S. output accounted for by about 5 firms. All California- and Washington-grown asparagus for canning is processed in Washington. Virtually all California-grown asparagus for freezing is processed in California; Washington-grown asparagus is frozen both in Washington and California. Michigan-grown asparagus for all uses is virtually all processed in Michigan.

Integration and diversification.--The U.S. asparagus, broccoli, and cauliflower-freezing industry in California benefits from economies of scale, in the volume of broccoli and cauliflower and other products processed. Some processors have become vertically integrated with larger firms, enabling them to expand market coverage and facilitate product diversification. Mergers and acquisitions have reportedly been encouraged in recent years by the relaxed enforcement of antitrust laws, resulting in generally larger, more concentrated, and highly diversified firms. ^{2/} At the same time, such firms have aggressively embraced new processing and packaging technologies, both in an effort to cut production costs and to respond to changing consumer preferences, lifestyles, and health concerns. Some firms have renovated existing facilities or constructed additional warehouses, leading to improved delivery schedules.

High energy costs, as well as higher interest rates, have encouraged a trend towards energy-efficient, low-temperature warehouses. Computerized ordering and billing practices have led to a reduction in administrative costs and integration of orders into single, multi-order truckloads, thus reducing unit shipping costs.

Product innovations are numerous and encompass everything from package size and ingredients to package encasement for extending shelf life. The traditional 10 oz.-size frozen box of brand-name product now competes with the 12 oz.-size box of private-label product. The 16 oz.-size bag of a single vegetable or two-vegetable combination now competes with combinations of many vegetables in the same size bag, as well as vegetables packed in sauces of various types. Product development also includes coated vegetables, such as battered or breaded products (primarily for institutional buyers) used as "finger foods" or hors d'oeuvres. The popularity of such vegetable preparations has spread to the retail, fast food, and theme markets.

The U.S. asparagus-canning industry has undergone substantial change in recent years, both in the volume of raw product processed and in the number and location of processors. Some processors, as a result of their large size, have been able to expand market coverage and diversify into other canned products.

^{1/} Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

^{2/} Katharine C. Buckley, Shannon R. Hamm, Ben Huang, and Glenn Zepp, U.S. Fruit and Vegetable Processing Industries, U.S. Department of Agriculture, Economic Research Service, Staff Report No. AGES 880216, p. 63.

Although new processing or packaging technologies for canned products have not been developed as they have for frozen products, firms have been able to remain in business through more aggressive marketing techniques and tighter cost-control procedures.

The Commission asked the 20 known asparagus canners to report on other canned or frozen vegetables or fruit that they were currently processing, or could process, in the same facilities in which canned asparagus was being processed. Such items included canned potatoes, sweet potatoes, tomatoes, beans, and cherries, as well as frozen peas, corn, squash, beans, carrots, and cherries.

Procurement

Freezers.--To identify the sources of raw product for freezing, the Commission asked the 52 known asparagus, broccoli, and cauliflower freezers to report the share of their total 1987 procurement of fresh product obtained under various procurement methods. There were no vegetable freezing or canning facilities reported for Arizona. As compared with published data, questionnaire responses covered the bulk of U.S. production.

According to questionnaire responses of 25 freezers, the 6 California firms purchased nearly two-fifths of their broccoli and cauliflower supplies from fresh-market shippers, with or without prearranged price agreements, and about one-third of their raw product through grower contracts without providing any significant aid to growers (table 4-15).

U.S. primary freezers of broccoli and cauliflower procure most of their supply from domestically grown fresh product, as compared with nonprimary freezers that received four-fifths of their broccoli supplies and about two-thirds of their cauliflower supplies from foreign sources (table 4-16). During 1985-87, primary freezers in California obtained increasing amounts from foreign sources, accounting for increasing shares of their total procurement; broccoli supplies from foreign sources for California processors rose from 7 to 21 percent of total procurement. Primary freezers in other States also increased their use of foreign broccoli supplies, but at a faster rate.

Canners.--The 20 known U.S. asparagus canners were requested to provide data on the quantity of U.S.- and foreign-grown raw product used by their firm during 1985-87. According to 9 responding canners, during this period, the share of raw product grown in California or Arizona declined steadily from 11 to 5 percent, as shown in the following tabulation (in percent):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Raw product grown in:			
California or Arizona.....	11	6	5
Other States.....	89	94	95

There were no reported procurements of fresh asparagus from foreign countries during 1985-87.

Processors of canned asparagus were requested to report the quantity and raw product cost of their asparagus procurements during 1985-87. According to the 9 questionnaire responses, fresh-product procurement from all States rose

48 percent from 46.6 million pounds, valued at \$22.2 million, in 1985 to 69.0 million, valued at \$32.5 million, in 1987, as shown in the following tabulation:

	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
	<u>1,000 pounds</u>			<u>1,000 dollars</u>		
Raw product grown in:						
California or Arizona.....	5,227	3,206	3,744	2,472	1,557	1,852
Other States.....	41,414	49,525	65,213	19,691	23,591	30,634
Total.....	46,641	52,731	68,957	22,163	25,148	32,486

Production

Although production of fresh vegetables has risen in the United States over the last decade, the production of frozen vegetables has increased even faster. The trend in vegetable processing has been away from canned vegetables toward frozen. For a number of years, California has been a leader in the frozen food industry and currently produces approximately one-third of the nation's frozen vegetables.

Data on U.S. production of asparagus, broccoli, and cauliflower for processing, on a fresh-weight basis, and on harvested acreage, are published by the USDA, while production on a finished processed-product basis is compiled by the American Frozen Food Institute (AFFI) for frozen vegetables. The following discussions refer to such data.

Frozen asparagus.--Data on U.S. production of frozen asparagus are reported in three styles of pack: retail, food service, and bulk. Within each style of pack, asparagus is frozen as spears and as cuts and tips. According to AFFI data, total U.S. production of frozen asparagus increased irregularly, from 15 million pounds in 1978 to 20 million in 1985, before falling steadily to 17 million in 1987; production increased by 18 percent for the 1978-87 period (table 4-17). Regional production of frozen asparagus during 1978-87 showed that California's production increased in the latter part of the period, whereas that for all other States declined. Production by style of pack showed that retail and food-service packs decreased throughout the period and bulk pack increased almost threefold. This threefold increase in bulk pack was all in cuts and tips and is attributed to the trend towards bulk packs, which maximize storage and inventory holdings in one location. All spears' packs declined whereas retail and food-service packs of cuts and tips rose over the 10-year period. U.S. asparagus freezers were requested to provide data on frozen asparagus production, however, as a result of the confidential nature of the responses that data cannot be published.

Frozen broccoli.--Frozen broccoli production is reported by the AFFI, by region and in four styles of pack: retail, food service, bulk, and other. During 1978-87, total U.S. production of frozen broccoli increased 13 percent, from 277 million pounds in 1978 to 312 million in 1987 (table 4-18). On a regional basis, production in California and the Northeast fell steadily from 1985, whereas production in all other regions more than doubled. Total reported production of broccoli cuts rose 63 percent, whereas production of both chopped broccoli and broccoli spears fluctuated dramatically throughout the 10-year period.

Production of food-service packs rose dramatically from 1978 to 1984 before falling steadily through 1987. In the retail-size category, packs of both chopped broccoli and spears declined whereas cuts increased. Production of broccoli spears in retail-size containers, the principal retail pack, peaked in 1980, then declined from 1984 to 1987. The total reported pack for retail-size containers fell 7 percent during 1978-87. Bulk production of frozen broccoli may ultimately be sold in retail or food-service containers, but is reported as bulk production because it is provisionally preserved in that form. Throughout most of 1978-87, bulk production ranged from 20 to 30 million pounds annually.

According to questionnaire responses, frozen broccoli production from domestically grown product by the 5 California freezers increased by 10 percent from 1985 to 1986 and declined by 12 percent in 1987 (table 4-19). The same pattern was reported for each style of pack. There was no decline in production of frozen broccoli by 6 other primary freezers.

Broccoli and cauliflower freezers were asked to report their production capacity and capacity utilization for 1985-87. The determination of production capacity and capacity utilization for vegetable freezers is difficult because most freezers do not specifically designate a portion of their freezer area for a particular vegetable. As such, production capacity data are reported here based on respondents' own best estimates of their operations, but data on capacity utilization are meaningless.

Total frozen broccoli production capacity of 11 responding firms rose 9 percent from 502 million pounds in 1985 to 549 million in 1987, as shown in the following tabulation (in millions of pounds):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Broccoli production capacity:			
California freezers.....	372	365	357
Other States.....	<u>130</u>	<u>133</u>	<u>192</u>
Total.....	502	498	549

Production capacity for the 5 California freezers fell 4 percent during 1985-87, whereas capacity of the 6 other primary freezers rose 48 percent. In 1987, California freezer capacity accounted for 65 percent of total capacity.

Frozen cauliflower.--Frozen-cauliflower production is reported by AFFI by origin and in three styles of pack: retail, food service and bulk, and other. During 1978-87, U.S. frozen-cauliflower production fell, with the largest decline noted for California (table 4-20). During the same period, total U.S. production in retail and food service and bulk styles of pack declined irregularly while production of other packs increased over 1 1/2 times; this is believed to be the result of increased consumer demand for mixtures of cauliflower with other frozen vegetables.

According to questionnaire data, the 5 California freezers reported a trend for frozen cauliflower production similar to that for frozen broccoli but with a greater drop in 1987; most of this decline was in the bulk pack (table 4-19). The 5 other primary freezers indicated outputs in 1987 similar to that in 1985; however, the composition of the 1987 pack was made up more of food-service containers, and, like California, less in bulk pack.

According to responses from 10 primary cauliflower freezers, production capacity remained steady for all freezers, as shown in the following tabulation (in millions of pounds):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Cauliflower production capacity:			
California freezers.....	149	150	149
Other States.....	<u>86</u>	<u>70</u>	<u>84</u>
Total.....	235	220	233

Frozen vegetable mixtures.--In addition to the previously mentioned styles of pack, frozen-mixed vegetable production is reported for five combinations or blends of frozen vegetables, most of which contain broccoli and/or cauliflower. Data for these blends are also reported according to their respective style of pack. Total production of frozen mixed vegetables increased steadily from 54 million pounds in 1978 to 214 million in 1985, before dropping to 169 million in 1987 (table 4-21). The popularity of the California blend is shown by the dramatic increase throughout the period, with the bulk of this increase in the retail style of pack. Winter blend, consisting of only broccoli and cauliflower, also increased substantially.

Canned asparagus.--U.S. processors were requested to report canned-asparagus production (from U.S.-grown product) by container size and style of pack. According to the 9 questionnaire responses, aggregate production rose 21 percent from 28 million pounds in 1985 to 34 million in 1987, with retail-size packs accounting for the bulk of production throughout the period, as shown in the following tabulation (in thousands of pounds):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Retail-size containers:			
Spears.....	14,345	15,093	15,751
Cuts and tips.....	<u>12,681</u>	<u>15,932</u>	<u>16,318</u>
Subtotal.....	27,026	31,025	32,069
Food service-size containers.....	<u>684</u>	<u>813</u>	<u>1,484</u>
Total.....	27,710	31,838	33,553

Canned-asparagus production capacity was estimated at 69 million pounds in 1987, up 4 percent from 66 million pounds in 1985, with reporting firms in canning operations an average of 7 weeks each year.

Shipments

Frozen broccoli.--Shipments of frozen broccoli by California primary freezers increased during 1985-87, while shipments of frozen cauliflower by such firms declined. For the 4 respondent California firms, broccoli shipments increased by 15 percent from 128 million pounds in 1985 to 147 million in 1987, whereas shipments of frozen cauliflower dropped from 45 million pounds to 43 million, or by 4 percent (table 4-22). For the 14 other U.S. freezers, shipments of both frozen broccoli and frozen cauliflower increased during 1985-87, resulting in increases for total reported shipments of 29 percent for broccoli and 15 percent for cauliflower. Shipments are combined for both domestic and foreign-grown product handled by U.S. processors.

The packs accounting for the largest shares of frozen broccoli shipments for all freezers were retail containers (packed without sauce or breading and not mixed with other vegetables) and in mixtures, as shown in the following tabulation (in million of pounds):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Retail-size containers:			
California freezers.....	62	75	76
Other U.S. freezers.....	<u>25</u>	<u>31</u>	<u>35</u>
Total.....	87	106	111
In vegetable mixtures:			
California freezers.....	30	34	37
Other U.S. freezers.....	<u>26</u>	<u>31</u>	<u>35</u>
Total.....	56	65	72
All types of pack: <u>1/</u>			
California freezers.....	128	145	147
Other U.S. freezers.....	<u>62</u>	<u>84</u>	<u>99</u>
Total.....	190	229	246

1/ Includes packs in food-service size containers and in sauce or breaded.

For California shipments in 1987, the retail pack accounted for 52 percent of the total and broccoli-in-mixtures accounted for 25 percent, whereas for other U.S. freezers the shares in retail containers and in mixtures were each 35 percent in 1987. Thus, for freezers without processing plants in California, frozen broccoli sold in vegetable mixtures is a larger part of their business, and sales of plain broccoli in all styles of retail packs (cartons and polybags) are a smaller part.

U.S. freezers outside of California, therefore, appear to have more marketing flexibility because broccoli shipped in mixtures is inventoried in bulk, prior to packing, which is less costly to pack and hold in cold storage than are retail packs of cartons. In addition, plain-pack broccoli shipments in food service containers by responding California freezers declined by 9 percent from 1985 to 1987, while food-service shipments of broccoli by other U.S. freezers increased significantly, from 6 to 20 million pounds.

U.S. firms were requested to report their shares of 1987 sales of frozen broccoli from domestically- and foreign-grown product by type of sales outlet. According to 15 questionnaire responses, retail sales through major chain store outlets and food-service outlets were the most important for domestically grown broccoli (table 4-23). For foreign-grown broccoli, sales through distributors or jobbers were the most important.

Frozen cauliflower.--In 1987, frozen cauliflower in vegetable mixtures accounted for the largest share of frozen cauliflower shipments for all freezers. During 1985-87, the 4 California freezers shipped about equal amounts of cauliflower in mixtures and unmixed in retail containers, as shown in the following tabulation (in millions of pounds):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Retail-size containers:			
California freezers.....	18	18	16
Other U.S. freezers.....	<u>6</u>	<u>9</u>	<u>6</u>
Total.....	24	27	22
In vegetable mixtures:			
California freezers.....	17	18	18
Other U.S. freezers.....	<u>7</u>	<u>12</u>	<u>15</u>
Total.....	24	30	33
All types of pack: <u>1/</u>			
California freezers.....	45	47	43
Other U.S. freezers.....	<u>19</u>	<u>27</u>	<u>31</u>
Total.....	64	74	74

1/ Includes packs in food-service size containers and in sauce or breaded.

Shipments of frozen cauliflower mixtures rose significantly throughout 1985-87 for the 18 U.S. freezers, whereas shipments from 4 California freezers rose slightly. The relatively large share of total shipments accounted for by cauliflower in sauce or breaded for other U.S. freezers is explained in part because many of these freezers are secondary freezers who purchased frozen product from primary freezers for repacking or reprocessing (as in sauce or breaded).

The 22 U.S. cauliflower freezers were also asked to report their 1987 frozen cauliflower sales, from domestically grown product, by type of outlet. As with broccoli, the majority of sales were retail through major chain stores and to food-service outlets (table 4-23). Sales of foreign-grown product were heaviest to distributors and jobbers, with another one-fourth also sold to reprocessors or manufacturers and repackers.

Canned asparagus.--During 1985-87, domestic shipments of canned asparagus rose 65 percent, with shipments of retail-size containers (especially cuts and tips) accounting for the bulk of the increase, as shown in the following tabulation (in millions of pounds):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Retail-size containers:			
Spears.....	12	16	17
Cuts and tips.....	<u>11</u>	<u>12</u>	<u>20</u>
Subtotal.....	22	28	37
Food service-size containers.....	<u>1</u>	<u>1</u>	<u>1</u>
Total.....	23	29	38

Asparagus canners were asked to report their 1987 canned-asparagus sales, by type of outlet, and the share of total 1987 sales by type of product. According to the 9 questionnaire responses, over three-fifths of canned asparagus sales were to major food chain stores, followed by sales to other retail outlets and institutional outlets, as shown in the following tabulation:

<u>Outlet</u>	<u>Percent</u>
Major food chain stores.....	62
Retail outlets other than major food chain stores...	12
Institutional.....	12
Distributors or jobbers.....	10
Government purchases.....	2
Reprocessors, manufacturers, or other outlets.....	2

The share of total 1987 sales of domestically produced food products sold by the same firms, as shown in the following tabulation, was 37 and 36 percent for other canned vegetables and other canned food products, respectively; canned asparagus accounted for an estimated 11 percent of sales:

<u>Type of product</u>	<u>Percent</u>
Other canned vegetables.....	37
Canned food products (other than canned vegetables).	36
Other food products.....	12
Canned asparagus.....	11
Other miscellaneous products.....	4

Inventories

Freezers.--According to USDA data, total cold-storage inventories of frozen asparagus, broccoli, and cauliflower, together, rose 11 percent from 1978-87 and averaged 179 million pounds annually (table 4-24). During this period, inventories of broccoli trended upward, whereas those of cauliflower decreased by 7 percent and those of asparagus more than doubled. Inventories for all frozen vegetables (including potatoes) increased 10 percent over the 9-year period; inventories of asparagus, broccoli, and cauliflower, as a group, averaged 9 percent of the total throughout the period.

During 1983-87, stocks of frozen asparagus peaked (as of June 30) at a higher point each succeeding year, with carryover stocks as of the following September and December also trending upward each year. Throughout the 5-year period, stocks in the Pacific (primarily Washington and California) and East North Central (Michigan, etc.) production areas accounted for the bulk of the stocks and followed the same general trend.

During 1983-87, overall stocks of frozen broccoli spears and broccoli chopped and cuts were highest as of the end of September with rising carryover levels through December. The bulk of these stocks were from the Pacific area (primarily California) with similar trends for the other areas as well. Carryover stocks of frozen cauliflower in the second highest period have reached, and remained at, record levels since 1985.

Broccoli and cauliflower inventory levels, as of December 31, by product type were reported by the 19 primary and other freezers for 1985-87 (table 4-25). Broccoli inventories rose 33 percent from 67 million pounds in 1985 to 89 million in 1987. In 1987, the majority of inventories for other U.S. freezers were in bulk packs, whereas primary freezers in California reported their largest share in retail containers. Cauliflower inventories fell 6 percent during 1985-87; the bulk of the decline was for other U.S. freezers in retail containers.

Canners--Inventories, as of December 31, 1985-87, of canned asparagus processed from U.S.-grown product rose sharply from 18 million pounds in 1985 to 20 million in 1986 before falling in 1987, as reported by the 9 respondents, are shown in the following tabulation (in thousands of pounds):

	<u>As of December 31,--</u>		
	<u>1985</u>	<u>1986</u>	<u>1987</u>
Retail-size containers:			
Spears.....	5,134	5,831	6,231
Cuts and tips.....	<u>11,442</u>	<u>13,738</u>	<u>9,998</u>
Subtotal.....	16,576	19,569	16,229
Food service-size containers of cuts and tips.	<u>968</u>	<u>606</u>	<u>864</u>
Total.....	17,544	20,175	17,093

Throughout the 3-year period, retail-size containers of cuts and tips accounted for the bulk of the change.

Costs

Transportation--There are no USDA reported transportation-cost data for canned or frozen vegetables. According to industry sources, the truck-rate costs for shipping processed vegetables are basically the same as those for fresh vegetables discussed previously.

Freezing--Vegetable freezers were asked to report their estimated unit processing cost for freezing the subject vegetables during 1985-87. According to 7 questionnaire responses, about 72 percent of asparagus-freezing costs were attributed to the costs of raw materials purchased and transportation, with the remainder of the costs equally divided between direct labor and other miscellaneous costs. Overall, processing costs trended upward over the period, ranging from a weighted average of \$1.23 to \$1.28 per pound.

Processors were requested to provide data relating to unit costs for processing frozen broccoli. Weighted-average costs of freezing broccoli remained almost steady during 1985-87, as shown in the following tabulation (in cents per pound):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Fresh broccoli delivered to plant.....	18.6	18.0	18.2
Direct labor.....	9.4	9.0	9.5
Energy.....	3.2	3.1	3.3
Other plant costs.....	<u>9.8</u>	<u>9.0</u>	<u>10.8</u>
Total.....	41.0	39.1	41.8

Raw-product cost accounted for nearly one-half of total processing costs, with labor cost and other plant costs accounting for most of the remainder.

Total weighted-average cost of freezing cauliflower remained steady at about 45 cents per pound during 1985-86, before increasing to 49 cents in 1987, as shown in the following tabulation (in cents per pound):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Fresh cauliflower delivered to plant....	23.7	24.4	24.6
Direct labor.....	8.9	9.1	10.3
Energy.....	3.0	2.8	3.3
Other plant costs.....	<u>8.9</u>	<u>8.6</u>	<u>10.9</u>
Total.....	44.5	44.9	49.1

For cauliflower, raw-product cost during 1985-87 accounted for over one-half of total processing costs during the period.

Canning.--Asparagus canners were requested to provide data regarding their unit cost for canning asparagus. Weighted-average processing costs trended downward through 1985-87, while raw-product cost remained steady, as shown in the following tabulation based on 9 responses (in dollars per pound):

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Fresh asparagus delivered to plant....	0.53	0.52	0.52
Direct labor.....	.17	.15	.17
Packaging.....	.18	.17	.17
Other plant costs.....	<u>.16</u>	<u>.16</u>	<u>.15</u>
Total.....	1.04	1.00	1.01

The cost of fresh asparagus accounted for just over 50 percent of total processing costs, followed by direct labor, packaging, and other plant costs ranging from 15 to 18 percent.

Prices

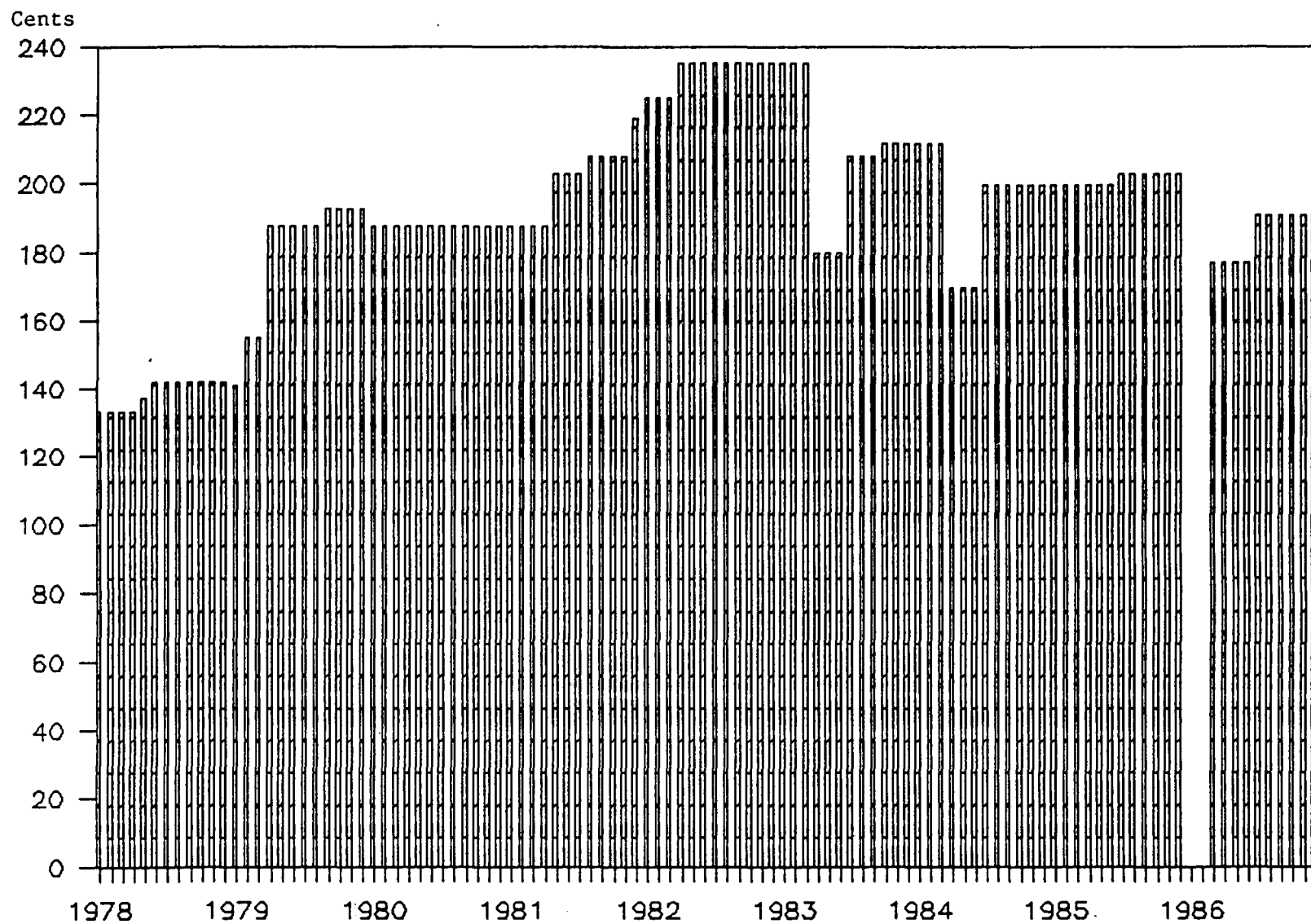
Frozen.--The American Institute of Food Distribution (AIFD) publishes a series of pricing data on a monthly basis quoting estimated list prices for frozen vegetables. In an effort to supplement this and other data, the Commission requested freezers to provide pricing data on sales, by certain container sizes and styles of pack, on a quarterly basis from January 1985 to March 1988. Such data, however, were insufficient to report here.

Average monthly prices for selected frozen asparagus products are shown in figures 4-12 and 4-13. These prices represent net f.o.b. West Coast quotations including trading allowances or other adjustments to list prices; cash discounts, however, are not included. Data are presented for frozen asparagus spears and cuts and tips in institutional-size containers. Prices of frozen asparagus trended upward from 1978 to 1982, peaked in 1982/83, and trended downward through 1987; trends were similar for spears and cuts and tips throughout the period.

Average monthly prices for frozen broccoli spears and cuts in institutional-size containers followed similar trends, rising steadily from 1980 to 1982, then plateauing at a slightly higher level through 1986 (figures 4-14 and 4-15). Prices for spears averaged about 55 cents per pound in 1986, compared with 44 cents in 1978; prices for cuts averaged about 44 cents in 1986, up from 38 cents in 1978. List-price data for frozen cauliflower showed a steadily rising trend from about 50 cents per pound in 1978-80 to a peak of 61 cents from mid-1981 to mid-1983, then remained stagnant at about 60 cents through 1986 (figure 4-16).

Figure 4-12.

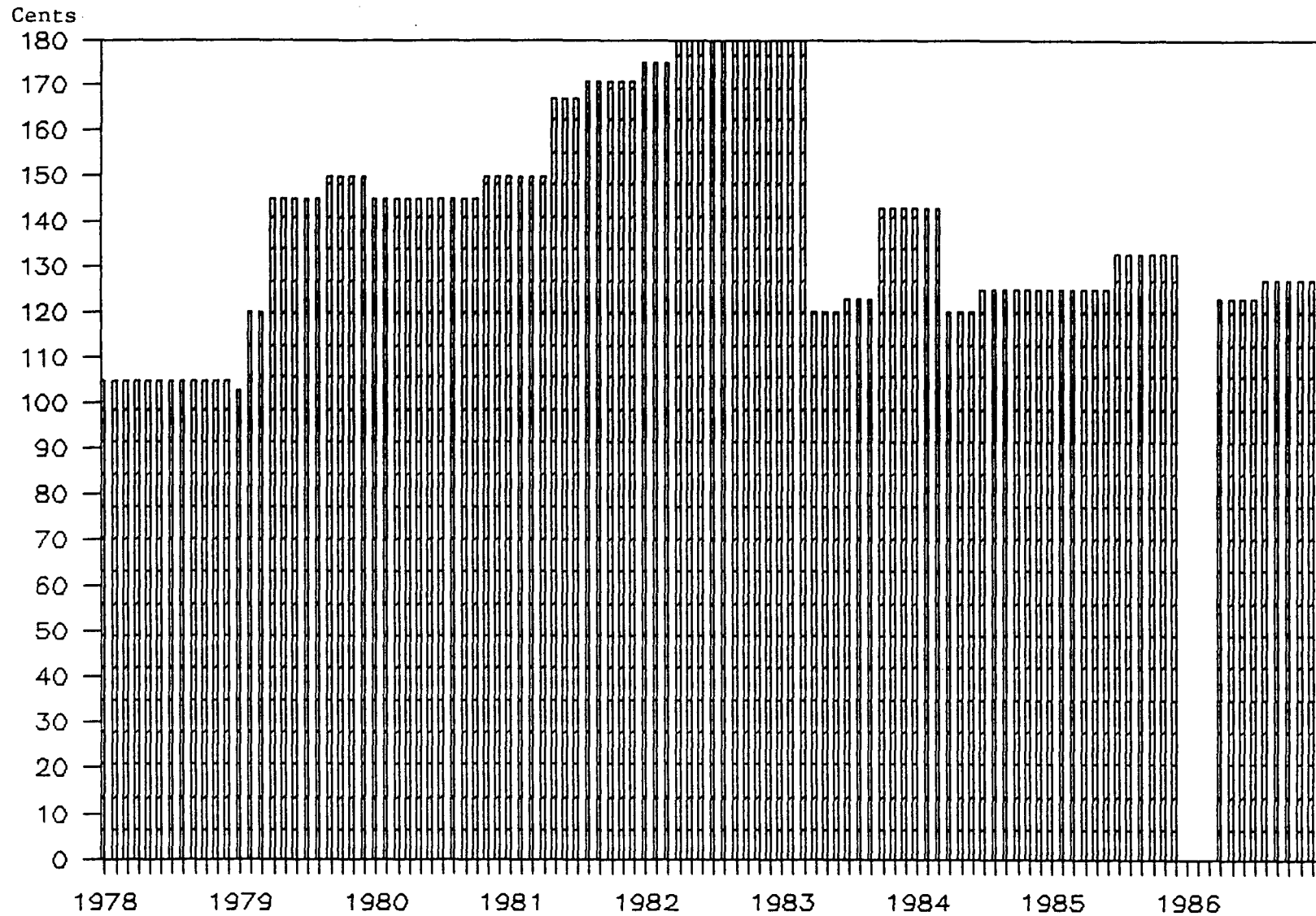
Frozen asparagus spears: Prices for institutional pack, per pound, by month, 1978-86



Source: On the basis of data from the American Frozen Food Institute.

Figure 4-13.

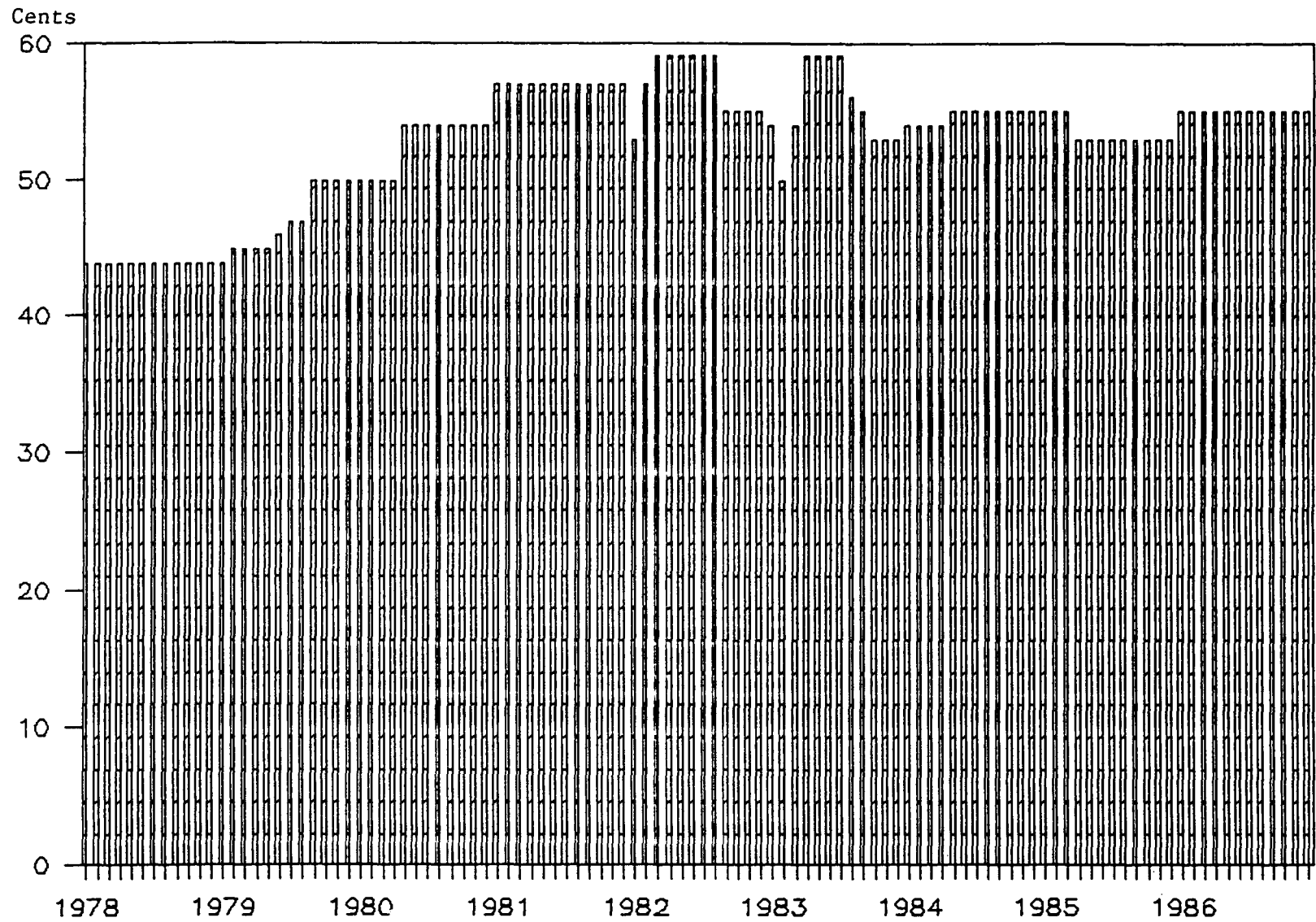
Frozen asparagus cuts and tips: Prices for institutional pack, per pound, by month, 1978-86



Source: On the basis of data from the American Frozen Food Institute.

Figure 4-14.

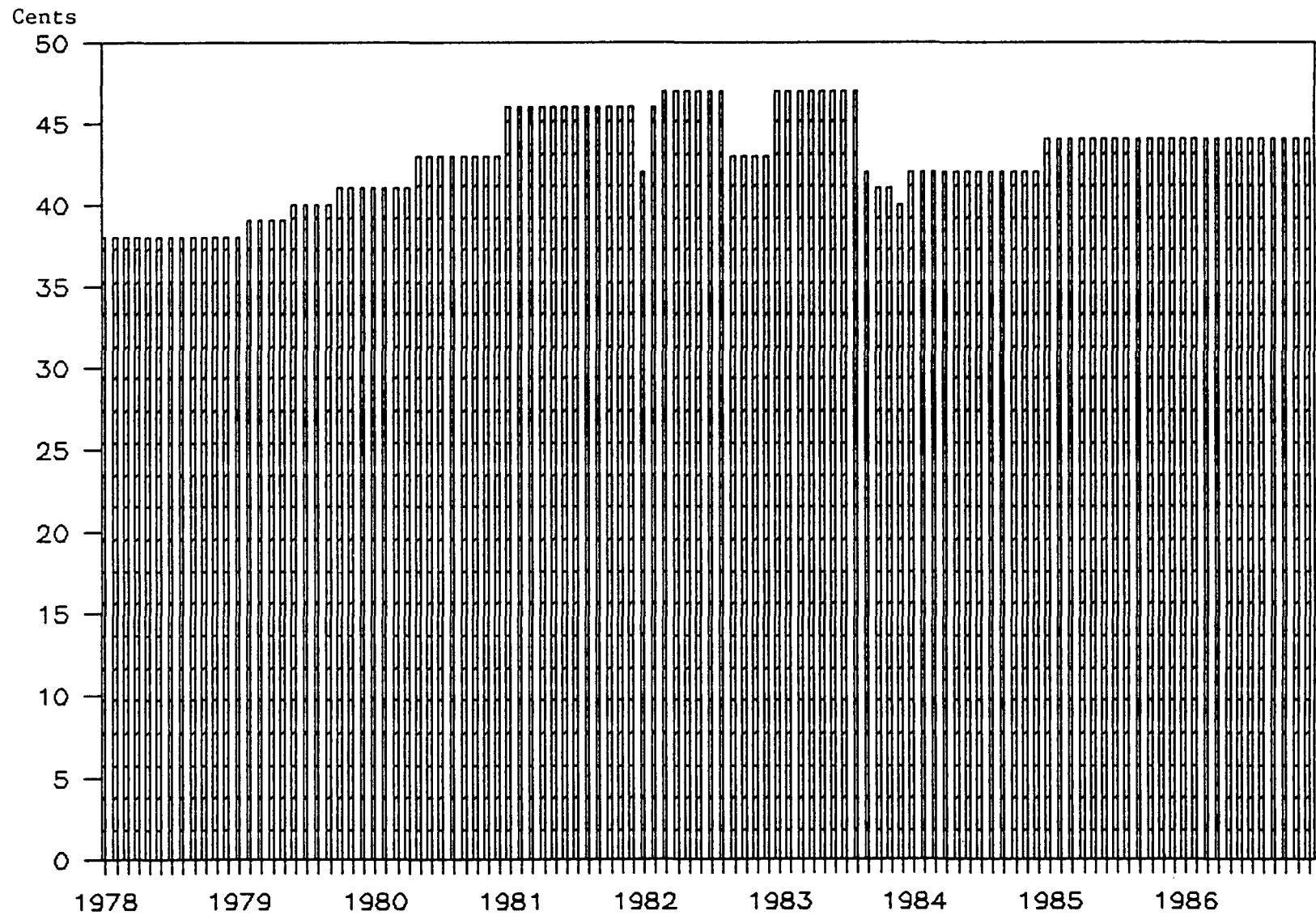
Frozen broccoli spears: Prices for institutional pack, per pound, by month, 1978-86



Source: On the basis of data from the American Frozen Food Institute.

Figure 4-15.

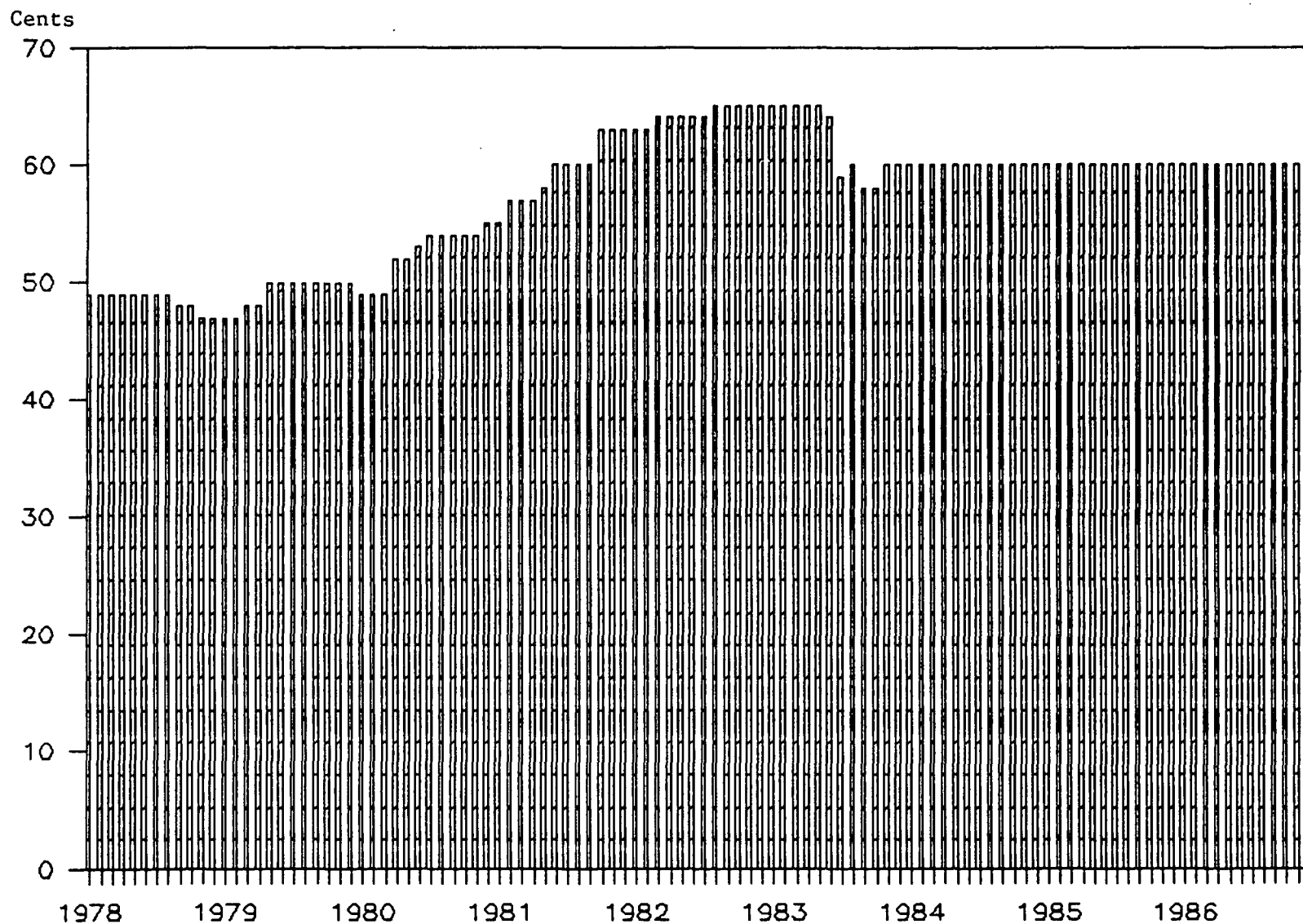
Frozen broccoli cuts: Prices for institutional pack, per pound, by month, 1978-86



Source: On the basis of data from the American Frozen Food Institute.

Figure 4-16.

Frozen cauliflower: Prices for institutional pack, per pound, by month, 1978-86



Source: On the basis of data from the American Frozen Food Institute.

Canned.--According to the 9 questionnaire responses, prices for canned-asparagus spears, packed under a brand-name label, averaged about \$2.70 per pound from April 1985 through March 1988, whereas prices for buyer's-label product averaged about \$1.08 per pound from April 1985 to March 1987, before rising abruptly through December 1987 (figure 4-17). Prices for canned-asparagus cuts and tips in buyer's-label cans followed a steadily declining trend from about \$1.46 per pound in January 1985 to \$1.30 in March 1988, whereas prices for brand-name label cuts and tips fell erratically from \$1.84 per pound in January 1985 to \$1.79 in March 1988 (figure 4-18). There are no reported AIFD data for monthly canned asparagus prices.

A review by Commission staff of research on the markets for frozen vegetables uncovered no studies containing estimates of the price elasticities of supply of the subject vegetables.

Financial performance

Freezers: Asparagus.--According to income-and-loss data from the 4 questionnaire responses for frozen asparagus operations, total net sales of frozen asparagus declined by 11 percent from \$13.5 million in 1985 to \$12.0 million in 1986, before increasing to \$13.2 million in 1987 (table 4-26). Aggregate operating income fell by 33 percent from \$814,000 in 1985 to \$547,000 in 1986, and by 93 percent to \$36,000 from 1986 to 1987, in spite of increasing sales. The ratio of operating income to net sales dropped from 6.0 percent in 1985 to 0.3 percent in 1987. As a share of net sales, gross profit and selling, general, and administrative expenses each rose from 1985 to 1986, before falling in 1987; the share for cost of goods sold rose throughout the period.

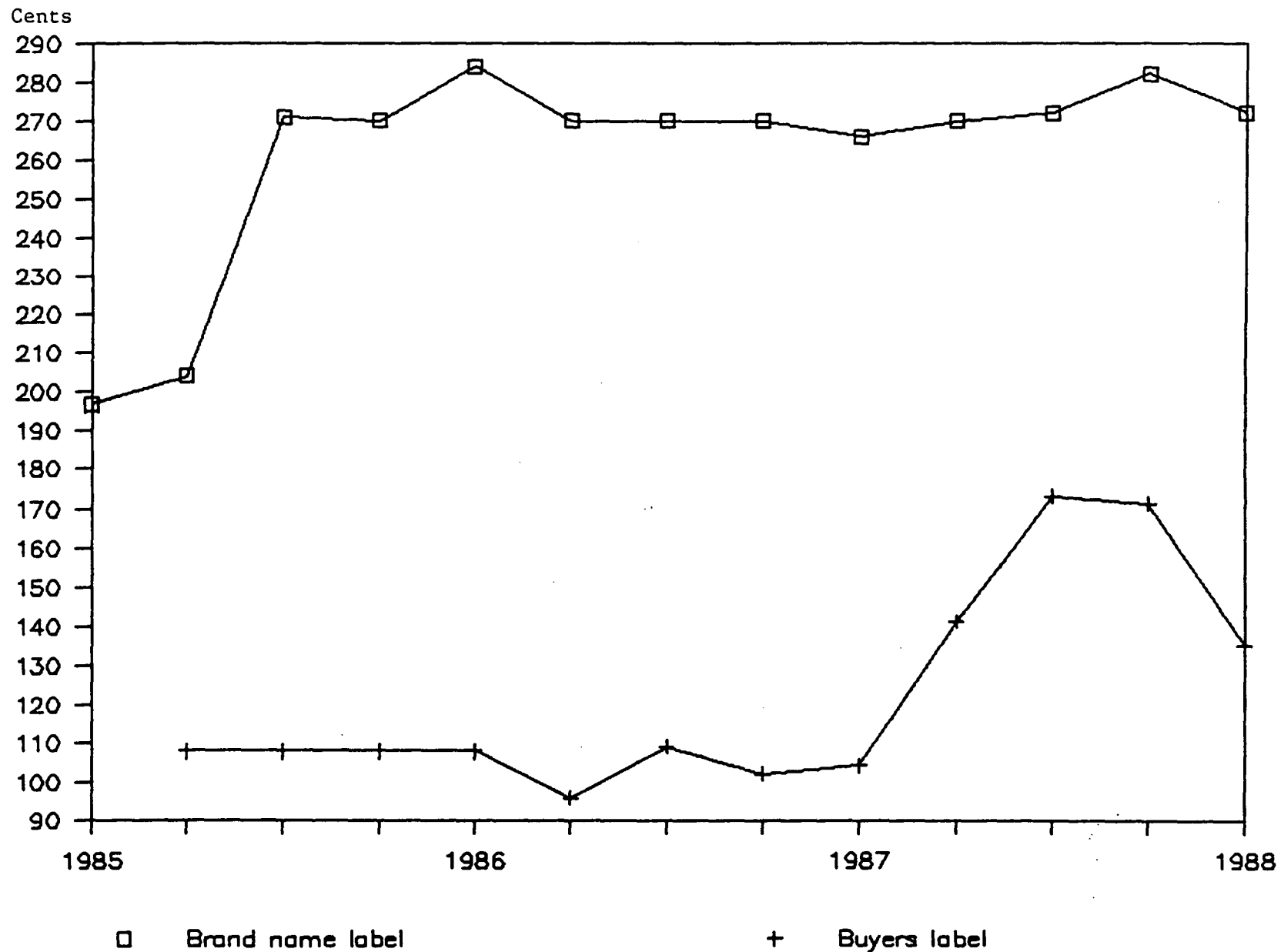
Freezers: Broccoli.--According to the 7 questionnaire responses from individual firms on their frozen broccoli operations, total net sales of frozen broccoli increased slightly from \$97.9 million in 1985 to \$99.3 million in 1986, before declining to \$98.3 million in 1987 (table 4-27). Aggregate operating income rose from \$2.9 million, or 3 percent of net sales, in 1985 to \$4.6 million, or 4.6 percent, in 1986, and then fell to \$3.0 million, or 3 percent, in 1987. Cost of goods sold, as a share of net sales, fluctuated between 80 to 83 percent, whereas the share for selling, general, and administrative expenses showed a drop from 15.3 percent in 1985 to 14.3 percent in 1987.

Freezers: Cauliflower.--Income-and-loss data for the 7 frozen cauliflower operations were compiled from questionnaire responses (table 4-28). According to these responses, total net sales of frozen cauliflower increased by 5 percent from \$24.0 million in 1985 to \$25.1 million in 1986, and then fell to \$22.7 million in 1987. Aggregate operating income remained steady at \$1.4 million in 1985-86, before falling to \$404,000 in 1987. The ratio of operating income to net sales declined throughout the period, whereas the ratio of gross profit to net sales rose slightly from 1985 to 1986 and fell sharply in 1987. As a share of net sales, cost of goods sold averaged about 81 percent during 1985-87, whereas selling, general, and administrative expense remained steady at about 14.1 percent.

Canners.--Data on the financial performance of individual firms was compiled from questionnaire responses. Income-and-loss data for canned asparagus operations were received from six asparagus canners. According to

Figure 4-17.

Canned asparagus spears: Prices per pound, by quarter, 1985-88

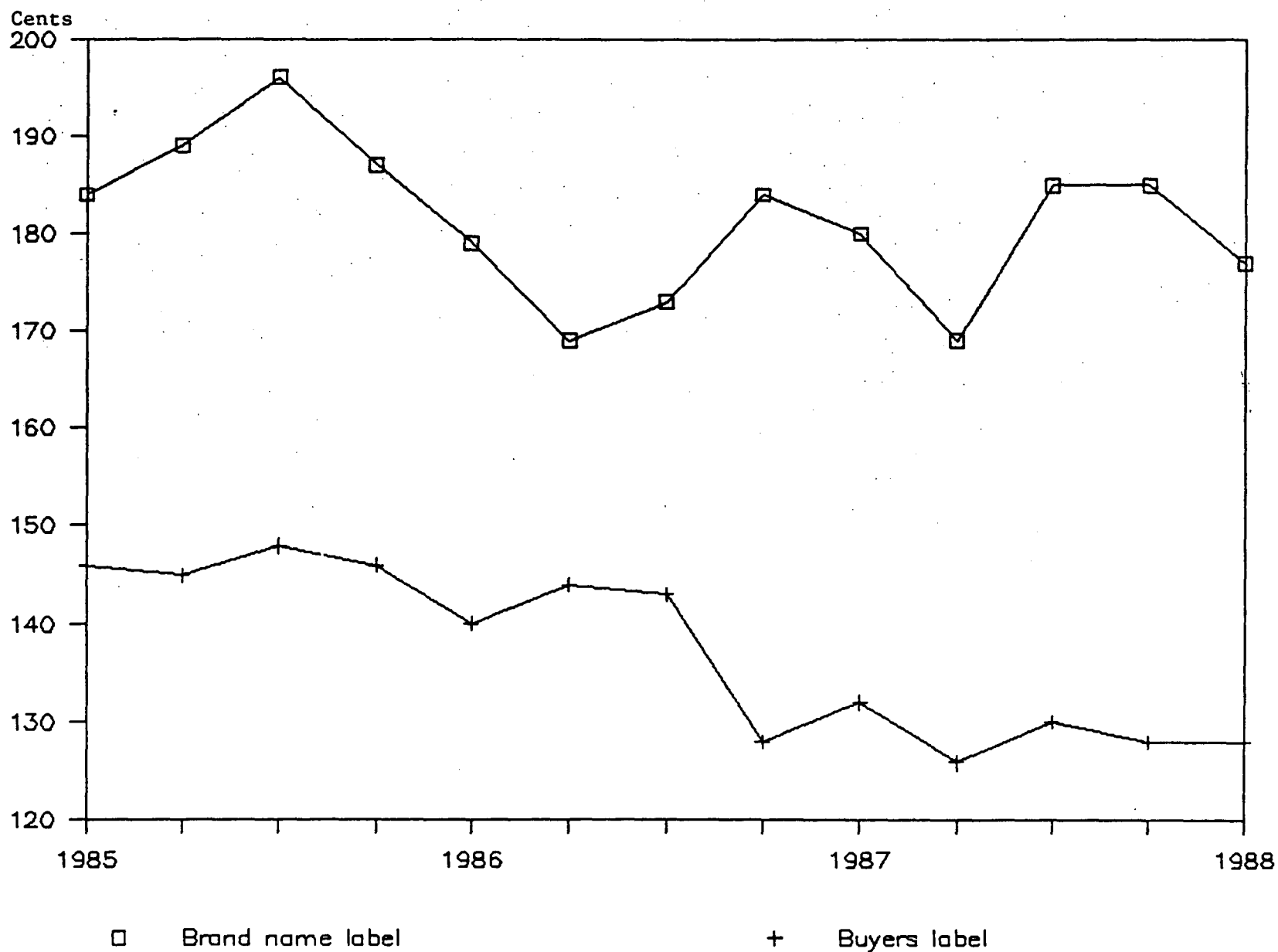


4-36

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 4-18.

Canned asparagus cuts and tips: Prices per pound, by quarter, 1985-88



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

these questionnaire responses, total net sales of canned asparagus increased by 26 percent, from \$54 million in 1985 to \$68 million in 1987 (table 4-29). U.S. canners' operations were profitable throughout the period; however, profitability varied among canners. In 1987, the ratio of operating income to net sales for each firm ranged from 8 to 27 percent.

Aggregate operating income rose by 27 percent, from \$9.1 million in 1985 to \$11.5 million in 1987. The ratio of aggregate operating income to total net sales averaged about 18 percent during 1985-87. Cost of goods sold, as a share of net sales, was stable at 73 percent during 1985-87. Selling expenses averaged 4 percent of net sales, and general and administrative expenses about 4 percent of net sales during the period.

Employment

Asparagus.--Canned-asparagus processors were asked to report data on their average number of employees, hours worked, and total wages paid to workers in the establishments in which canned asparagus was processed. According to the 9 questionnaire responses, the average number of production and related workers employed in asparagus processing operations remained relatively unchanged during 1985-87, but accounted for a declining share of all production and related workers, as shown in the following tabulation:

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Average number employed in the establishments in which canned asparagus is processed:			
All persons.....	2,322	2,707	2,690
Production and related workers:			
All operations.....	2,172	2,514	2,489
Asparagus processing operations.....	1,909	1,968	1,936
Hours worked by production and related workers in:			
All operations.....1,000 hours..	2,285	2,510	2,750
Asparagus processing operations.....1,000 hours..	1,366	1,286	1,403
Total wages paid to production and related workers in:			
All operations.....1,000 dollars..	5,923	6,046	7,605
Asparagus processing operations.....1,000 dollars..	2,309	2,293	2,461

During 1985-87, the number of hours worked by production and related workers in asparagus processing operations only, along with the total wages paid to such workers, trended upward.

Broccoli and cauliflower.--The Commission requested the 52 known U.S. broccoli and cauliflower freezers to provide data on their employment, hours worked, and hourly wage rates with respect to frozen broccoli and cauliflower production. According to 9 questionnaire responses, the number of workers employed by primary freezers rose 12 percent from 14,627 in 1985-86 to 16,295 in 1987 (table 4-30). During 1985-87, the number of workers involved in broccoli freezing operations rose steadily to 2,488 in 1987; the bulk of the rise was accounted for by 5 broccoli freezing operations outside of California. The number of workers involved in cauliflower freezing were 2,681 in 1987, up 52 percent from 1985; this increase was accounted for by operations outside of California.

The number of hours worked by employees in all operations of primary freezing establishments in which frozen broccoli and cauliflower were produced rose 28 percent from 8.2 million in 1985 to 10.5 million in 1987; during the same period, hours worked in broccoli freezing operations rose 8 percent while those for cauliflower freezing operations rose 98 percent. Hourly wage rates for broccoli operations in California were about 28 percent higher than those in other States. With cauliflower, hourly wage rates in California also were higher than in other States throughout the period.

U.S. exports

Canners and freezers were requested to report exports of product produced by their firm during 1985-87. As a result of the confidential nature of the limited response, data for canners and asparagus and cauliflower freezers cannot be discussed here. According to the responses of 15 broccoli freezers, their 1987 exports of domestically frozen broccoli produced from U.S.-grown product amounted to 2.1 million pounds. More than 90 percent of the exports were in nonbulk containers (more than one-half were in retail-size containers of less than 2 pounds each). The principal markets were Norway, Sweden, and Japan.

Government Programs

There are a number of activities supported by Federal and State funding that influence the competitiveness of U.S. asparagus, broccoli, and cauliflower producers, many of which may add to production costs and hence may affect U.S. competitiveness compared with foreign rivals. In most cases, however, such programs are not product specific and would not influence competitiveness of the subject vegetables any more than any other agricultural items.

Federal programs

Administrative.--Asparagus, broccoli, and cauliflower, for both fresh-market and processing, are covered under established USDA grade standards for inspection. These standards generally relate to such things as product size (stem, stalk, or head diameter or length), color, quality, general appearance, and state of maturity. None of these Federal grades are mandatory, however.

There are no Federal or State marketing orders currently in effect on any of the subject vegetables. Marketing orders are regulatory programs, established and administered by the Secretary of Agriculture, which obligate handlers of certain agricultural commodities to adhere to certain specified trade practices and restrictions in sales. Under such a program, an industry attempts to regulate the handling and marketing of its crop by minimizing erratic flow of product to market, preventing the marketing of low-quality product, standardizing containers, and correcting other existing marketing problems.

The sale of all fresh and frozen vegetables is covered under the Perishable Agricultural Commodities Act (PACA). All brokers, commission merchants, shippers, growers' agents, and dealers (including jobbers, truckers,

wholesalers, and retailers) that trade in large quantities at a wholesale level must be licensed and must observe all rules of fair trade under PACA. The purpose of PACA is to protect growers of perishable items from unfair and fraudulent trade practices, and to enforce marketing contracts so that growers are paid promptly.

Domestic growers have to comply with the marketing, storage, and use requirements for the pesticide materials they use, as regulated by the EPA. They have to carefully manage the application of pesticides and keep accurate records of usage to insure against illegal pesticide residues of vegetables offered for sale in the marketplace. Some domestic producers have publicly expressed concern about the purported level of pesticide residues contained in vegetables imported into the United States, including those from Mexico, and by inference the presumed lower cost of pesticide programs in Mexico.

Pesticide marketing and use in the United States is regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), administered by the Environmental Protection Agency (EPA), which also requires that pesticide products be registered with the EPA. Pesticides not intended for use in the United States are not required to be registered, but must comply with certain labeling and notification requirements to ensure that exporters to the United States are aware of significant regulatory actions taken.

Since their institution in 1912, Federal plant quarantines and regulations have been in effect on numerous vegetables, including asparagus, broccoli, and cauliflower. Under these programs administered by the Animal and Plant Health Inspection Service (APHIS) of the USDA, importers are required to obtain permission to enter fresh or frozen vegetables into the United States, and every shipment is subject to inspection at the port of entry. 1/ When a producer country is host to an unwanted pest on a particular crop, permission for entry is denied unless an acceptable treatment program has been established. APHIS administers similar programs for domestically produced vegetables.

The Food and Drug Administration (FDA) administers the Federal Food, Drug, and Cosmetic Act (FFDCA) to protect the public safety from food contamination, including freedom from exposure to illegal pesticide residues in imported and domestic food. Under its pesticide monitoring program, FDA collects and analyzes samples of shipments of imported and domestic food to determine whether illegal residues are present. Since 1979, FDA has conducted a special surveillance program for pesticide residues in fruits and vegetables imported from Mexico, because of the substantial percentage of U.S. consumption of such produce in the winter months. A recent study indicated that, during 1979-85, the overall violation rate of illegal pesticides found in imports from Mexico was lower than that for other countries: 5.5 percent for Mexico as compared with 6.8 percent for all other countries. 2/ The study also cited what the

1/ Excluding entries from Canada.

2/ United States General Accounting Office (GAO) Report to the Honorable Frank Horton, House of Representatives, on Pesticides, Better Sampling and Enforcement Needed on Imported Foods, September 1986 (GAO/RCED-86-219), p.25. Selected pages from the GAO report are reproduced in app. E.

authors considered to be shortcomings in FDA's pesticide surveillance programs, including small sampling rates and the lack of effective deterrents (or penalties) against illegal pesticide residue entry. 1/

There are certain programs that relate specifically to vegetable processing. For example, Occupational Safety and Health Administration (OSHA) safety regulations are applicable for plant workers. 2/ Processors must adhere to FDA regulations concerning product quality, identity, and proper filling of containers. U.S. Department of Commerce regulations affect various issues of weights and measures, while regulations of the Federal Trade Commission and the U.S. Treasury Department govern particular trade practices. The contents and placement of information on the package label must be according to regulations of the Fair Packaging and Labeling Act, while additional requirements of the FFDCA must be met, insuring that the processed vegetables are produced under sanitary conditions, that all packaging and labeling is informative, truthful, and in no way deceptive, and that the finished products are pure, wholesome, and safe to eat. Other pertinent regulations or groups which influence vegetable processing include the Frozen Food Code, the Frozen Food Roundtable, and the Codex Alimentarius.

Legislative.--A number of legislative issues are currently under review by Congress that relate to this investigation. On pesticide issues, the FIFRA, enacted in 1978, is reviewed annually by the Congress to determine if changes are warranted. Of the changes under discussion (H.R. 2463, S. 1516, S. 2035), the industry is in favor of a national uniform standard for pesticide tolerances as well as specific language preventing an agricultural producer from liability for damages resulting from pesticide use if pesticide applications were made according to the label instructions. The industry opposes certain worker health and safety amendments in the bills and the establishment of a private right-of-action and citizens suits.

The proposed Pesticide Monitoring Improvements Act (H.R. 3504, H.R. 4205) was introduced on October 19, 1987, in response to the General Accounting Office report which criticized the FDA's pesticide-residue inspection program for imported and domestically produced fresh produce. H.R. 3504 would require the FDA to establish a computerized data-management system to track and evaluate its program for monitoring pesticide residues. In addition, it would prohibit the importation of any raw agricultural commodity into the United States unless the accompanying import document identified each of the pesticides used on the commodity during production. Under H.R. 4205, a list of potential pesticides to be used on a crop would be filed at the beginning of the growing season. The industry strongly supports both bills.

The passage of the Minimum Wage Bill (S. 837, H.R. 1834, enacted July 1, 1988) raised the minimum wage from \$3.35 to \$4.25 per hour in 1988, with annual increments that will raise it to \$5.05 per hour in 1992. This bill was opposed by agricultural interests on the grounds that it would eliminate many low-skill, low-paying jobs, such as in agriculture.

Through the Immigration Reform and Control Act of 1986, the Federal Government is attempting to regulate the use of illegal aliens by requiring employers of agricultural labor hire only U.S. citizens or authorized

1/ GAO Report, various pages.

2/ Buckley, et al, U.S. Fruit and Vegetable Processing Industries.

aliens. According to industry sources, 1/ the effects of this law will be administratively and financially burdensome to California and Washington agricultural interests, especially since it is the employer's responsibility to establish worker identity, verify eligibility, and maintain employee records for a number of years. The law may have also caused a labor shortage by eliminating all but authorized aliens in the migrant labor force; the vast majority of the harvesting work has traditionally been carried out by migrant labor.. 2/

The Omnibus Trade and Competitiveness Act of 1988 was supported by the fresh fruit and vegetable industry for its provisions requiring mandatory country-of-origin labeling for all imported produce. The industry supported the following items included in the legislation: a General Agreements on Tariff and Trade (GATT)-legal fast-track import relief program for perishable products; Presidential flexibility in deciding actions in relation to unfair-trade-barrier and import-relief petitions; a time limit set on Section 301 trade-barrier cases; agricultural-export promoting; a requirement that U.S. agencies consider the impact of regulatory actions on U.S. exports; a requirement that USDA arrange cases in the Section 1132 unfair trade reports by order of priority, and take actions based on recommendations from the Agricultural Trade Agreements Committee; and, a requirement that the Administration initiate more Section 301 unfair-trade-barrier petitions.

State programs

Many States offer a number of programs relating to agricultural production but little in the way of specific programs for the subject vegetables. In most cases, information is available for California but not for other States.

In California, water supplies for agricultural irrigation, urban use, and recreation are under the management of the State of California Department of Water Resources (DWR). The principal activity of the DWR is management of the California State Water Project (SWP). The SWP collects water from rain and snow at high elevations in the eastern parts of the State, and transports the water to urban and low-rainfall agricultural areas in central and western parts of the State. The SWP began deliveries of water for agricultural use in 1967, and in 1985 delivered 1.3 million acre feet of water for such use. 3/

Also in California, the following activities are authorized through California State marketing programs: market expansion (consumer education, advertising, and sales promotion); research on production, processing, and distribution; inspection and regulation of grade, quality, size, and product condition; regulation of the product flow to market; elimination of unfair trade practices; and, control or eradication of insects, diseases, predators, and parasites. In recent years, the trend reportedly has been for the legislature to create commissions on the basis of commodities which function

1/ On the basis of Commission staff conversations with asparagus industry representatives in Washington and California, July 1988.

2/ Commission staff interviews with industry representatives in Southern California, July 1988.

3/ State of California, the Resources Agency, Management of the California State Water Project, Bulletin 132-86, p.7.

the same way as marketing orders, but which are favored by industry members because of the additional administrative freedom and autonomy within California State laws. 1/ In 1987, although California budgeted \$142 million for such programs, the bulk of funding (72 percent) was appropriated for market-development activities on vegetables other than asparagus, broccoli, or cauliflower.

Proposition 65, approved by referendum in California on November 4, 1986, mandates that the environment be protected from contamination by dangerous chemicals, including agricultural pesticides. State officials are also responsible for establishing regulations that protect consumers in such areas as water quality. On February 27, 1987, the first 29 chemicals were named to the Governor's list of chemicals known to cause cancer or reproductive toxicity. Many industry people feel that changed laws and regulations, as a result of Proposition 65, will increase costs to California vegetable producers.

Under the California Worker's Compensation Law, workers are covered financially against accidents or injuries suffered while on the job. In the fresh-produce industry, six semi-annual insurance premium rate hikes have been approved in California since 1985, with a resulting 80-percent rise in employee premiums. 2/ However, most of the increase is reported to have been used for litigation costs in settling claims. The Western Growers Association estimates an increase in such costs of over 300 percent industry wide, with one California fresh-vegetable packer reporting that nearly three-fifths of its employees' lost-time accident claims went to litigation. In addition, rising costs are attributed to the specific types of injury claims being submitted (stress claims were the number one type in recent years) and the cost of rehabilitation and retraining. 3/

Technology transfer

Government policy affects U.S. technological development in agriculture and the subsequent transfer of such technology abroad, including to competitors. Recent studies by the Office of Technology Assessment (OTA) concluded that technology transfer is indeed a factor in explaining changes in U.S. competitiveness in agriculture, including vegetables. 4/ Although the

1/ Thomas I. Gunn, California Agricultural Market Development: An Overview of State and Federal Programs, Center for Agricultural Business and California Agricultural Technology Institute, California State University, Fresno, CA, January 1988.

2/ Lillian O'Connor, "The Reform of California's Workers Compensation Law," Farm Focus, Monterey County Farm Bureau, Salinas, CA, Vol. 6, No. 3, Summer 1988.

3/ Ibid, p. 10.

4/ U.S. Congress, Office of Technology Assessment, Technology, Public Policy, and the Changing Structure of American Agriculture, OTA-F-285 (Washington, DC: U.S. Government Printing Office, March 1986); and U.S. Congress, Office of Technology Assessment, A Review of U.S. Competitiveness in Agricultural Trade--A Technical Memorandum, OTA-TM-TET-29 (Washington, DC: U.S. Government Printing Office, October 1986).

United States maintains a long-held technological advantage, OTA notes that the increasing ease with which new technology is disseminated internationally is closing the gap between U.S. producers and their foreign competitors.

There are several causes of technology transfer, including U.S. academic training of foreign students, the publication of research results in journals and other publications, and the direct transfer of information by U.S. multinational firms to their respective foreign subsidiaries. The OTA studies suggest that differing national treatments of patent protection, for example, serve to stimulate research in countries where patent data is sufficiently vague to maintain trade secrets, and to retard research where patent applications require more disclosure of technological details. The likely net effect is uncertain: in countries where patent protection is weak, "a foreign technology that can be imported constitutes an inexpensive alternative (to domestic research and development). In this situation, however, foreign firms may be reluctant to transfer technology, and fewer incentives exist to import or adopt foreign innovations." 1/

1/ OTA, A Review of U.S. Competitiveness in Agricultural Trade, p. 52.

Table 4-1.

Number of vegetable farms, 1/ by sales class, 1964, 1969, 1974, 1978, and 1982

Sales class	1964	1969	1974	1978	1982
Number of farms					
Less than \$10,000.....	29,829	22,726	17,936	20,660	17,435
\$10,000 to \$19,999.....	3,189	3,165	4,051	4,102	4,306
\$20,000 to \$39,999.....	2,525	2,654	3,086	3,075	3,467
\$40,000 to \$99,999.....	2,207	2,330	2,741	3,085	3,605
\$100,000 to \$199,999.....	1,222	848	1,340	1,538	2,006
\$200,000 to \$499,999.....	<u>2/</u>	561	1,114	1,334	1,329
\$500,000 and over.....	<u>2/</u>	449	806	1,095	1,276
Total.....	38,792	32,733	31,074	34,887	33,424
Percent of total					
Less than \$10,000.....	76.9	69.4	57.7	59.2	52.2
\$10,000 to \$19,999.....	8.2	9.7	13.0	11.8	12.9
\$20,000 to \$39,999.....	6.5	8.1	9.9	8.8	10.4
\$40,000 to \$99,999.....	5.2	7.1	8.8	8.8	10.8
\$100,000 to \$199,999.....	3.2	2.6	4.3	4.4	6.0
\$200,000 to \$499,999.....	-	1.7	3.6	3.8	4.0
\$500,000 and over.....	-	1.4	2.6	3.1	3.8

1/ Includes farms raising vegetables and melons.2/ Not available.

Note.--As a result of rounding, figures may not add to totals shown.

Source: Agapi Somwaru, Disaggregated Farm Income by Type of Farm, 1964-82, AER-558, Economic Research Service, U.S. Department of Agriculture, August 1986.

Table 4-2.

Asparagus: U.S. production, by usage and by selected production areas, 1978-87 ^{1/}

Usage and pro- duction area	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Quantity (1,000 pounds, fresh-weight basis)										
Fresh market:										
California.....	52,900	48,000	63,100	64,400	^{3/}	^{3/}	73,900	81,800	99,000	105,500
Washington.....	8,400	6,200	4,100	6,900	^{3/}	^{3/}	21,700	24,200	29,000	23,700
Michigan.....	4,400	5,200	7,000	5,300	^{3/}	^{3/}	3,800	3,600	4,800	4,000
New Jersey.....	-	-	-	-	^{3/}	^{3/}	3,000	3,600	3,600	3,200
Other States ^{2/} ..	4,400	4,600	4,200	4,300	^{3/}	^{3/}	1,900	2,000	2,300	2,400
Total.....	70,100	64,000	78,400	80,900	^{3/}	^{3/}	104,300	115,200	138,700	138,800
Processing:										
Washington.....	58,800	52,600	47,020	52,400	^{3/}	^{3/}	50,820	57,000	49,000	56,880
Michigan.....	21,000	20,160	16,440	11,800	^{3/}	^{3/}	19,200	19,440	19,760	20,200
California.....	25,500	44,400	15,000	17,500	^{3/}	^{3/}	11,600	16,800	10,600	13,560
Other States ^{2/} ..	10,700	9,840	10,360	7,580	^{3/}	^{3/}	3,760	5,180	4,800	5,120
Total.....	116,000	127,000	88,820	89,280	^{3/}	^{3/}	85,380	98,420	84,160	95,760
Canning.....	86,460	78,860	69,080	69,900	^{3/}	^{3/}	66,950	67,660	58,660	66,300
Freezing.....	29,540	48,140	19,740	19,380	^{3/}	^{3/}	18,430	30,760	25,500	29,460
Total all States...	186,100	191,000	167,220	170,180	^{3/}	^{3/}	189,680	213,620	222,860	234,560
Value (1,000 dollars)										
Fresh market:										
California.....	26,556	29,952	34,957	44,822	^{3/}	^{3/}	54,982	68,139	71,379	69,736
Washington.....	4,637	3,832	2,862	5,085	^{3/}	^{3/}	15,754	16,650	19,517	15,002
Michigan.....	2,640	4,077	4,550	3,816	^{3/}	^{3/}	2,508	2,556	3,245	2,656
New Jersey.....	-	-	-	-	^{3/}	^{3/}	2,127	2,473	2,326	2,090
Other States ^{2/} ..	2,726	3,353	3,166	3,274	^{3/}	^{3/}	1,529	1,525	1,474	1,618
Total.....	36,559	41,214	45,535	56,997	^{3/}	^{3/}	76,900	91,343	97,941	91,102
Processing:										
Washington.....	19,698	22,539	18,032	24,183	^{3/}	^{3/}	21,700	25,793	21,095	25,255
Michigan.....	11,760	11,461	7,464	6,874	^{3/}	^{3/}	10,810	10,867	11,066	11,514
California.....	8,708	18,604	5,850	7,140	^{3/}	^{3/}	4,814	6,527	4,134	5,010
Other States ^{2/} ..	4,531	4,548	5,237	4,211	^{3/}	^{3/}	2,239	2,946	2,733	2,823
Total.....	44,697	57,152	36,583	42,408	^{3/}	^{3/}	39,563	46,133	39,028	44,602
Canning.....	32,650	35,217	28,170	32,877	^{3/}	^{3/}	31,120	32,156	27,133	31,284
Freezing.....	12,047	21,935	8,413	9,531	^{3/}	^{3/}	8,443	13,977	11,895	13,318
Total all States...	81,256	98,366	82,118	99,405	^{3/}	^{3/}	116,463	137,476	136,969	135,704

^{1/} Due to program modifications, data prior to 1984 are not comparable with data for 1984-87.^{2/} 1978-81: fresh market-IA, IL, IN, MD, NJ, and OR; processing-DE, IA, IL, IN, MD, MN, NJ, OR, and VA; 1984-87: IL, IN, MD, MN, and OR.^{3/} Estimates discontinued for 1982-83.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 4-3.

Broccoli: U.S. production, by usage and by selected production areas, 1978-87 ^{1/}

Usage and production area	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Quantity (1,000 pounds fresh-weight basis)										
Fresh market:										
California.....	253,100	313,500	356,700	399,600	474,800	502,600	614,600	641,500	766,700	773,000
Arizona.....	-	-	-	-	-	5,400	9,900	17,700	23,800	38,200
Other States ^{2/} ...	11,600	12,000	22,800	52,100	66,600	50,200	49,500	56,200	53,700	38,300
Total.....	264,700	325,500	379,500	451,700	541,400	558,200	674,000	715,400	844,200	849,500
Processing:										
California.....	262,700	296,000	285,700	289,200	319,200	252,600	329,400	316,000	276,000	260,000
Other States ^{2/} ...	12,500	8,600	10,100	11,280	21,240	21,840	24,780	31,320	32,700	32,980
Total.....	275,200	304,600	295,800	300,440	340,440	274,440	354,180	347,320	308,700	292,980
Total all States....	539,900	630,100	675,300	752,140	881,840	832,640	1,028,180	1,062,720	1,152,900	1,142,480
Quantity (1,000 dollars)										
Fresh market:										
California.....	54,614	68,911	82,519	102,620	118,042	134,553	147,016	153,960	164,074	163,103
Arizona.....	-	-	-	-	-	1,458	2,772	4,620	5,474	8,328
Other States ^{2/} ...	2,716	3,375	6,808	16,025	26,595	21,270	19,180	14,473	15,117	12,164
Total.....	57,330	72,286	89,327	118,645	144,637	157,281	168,968	173,053	184,665	183,595
Processing:										
California.....	38,880	47,360	53,712	54,659	62,882	49,257	64,892	61,304	49,956	46,800
Other States ^{2/} ...	1,409	1,267	1,574	1,828	3,567	3,567	4,024	4,988	5,118	4,521
Total.....	40,289	48,627	55,286	56,487	66,449	52,824	68,916	66,292	55,074	51,321
Total all States....	97,619	120,913	144,613	175,132	211,086	210,105	237,884	239,884	239,345	234,916

^{1/} Due to program modifications, data prior to 1984 are not comparable with data for 1984-87.^{2/} 1978-84: Fresh market-AZ, OR, and TX; processing-OR and TX.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 4-4.

Cauliflower: U.S. production, by usage and by selected production areas, 1978-87 ^{1/}

Usage and pro- duction area	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Quantity (1,000 pounds, fresh-weight basis)										
Fresh market:										
California.....	137,200	199,100	206,800	254,800	245,500	274,700	367,000	368,800	467,000	463,700
Arizona.....	8,200	18,900	23,900	28,400	28,400	34,800	46,000	56,400	70,200	92,800
Other States ^{2/}	36,300	44,700	49,400	64,500	66,400	60,900	68,700	65,200	53,400	51,100
Total.....	181,700	262,700	280,100	347,700	340,300	370,400	481,700	490,400	590,600	607,600
Processing:										
California.....	169,900	119,600	110,000	139,200	142,000	121,800	118,100	110,000	116,000	124,000
Other States ^{2/}	29,200	29,460	35,440	33,980	53,060	49,220	69,020	65,880	46,120	50,880
Total.....	199,100	149,060	145,440	173,180	195,060	171,020	187,120	175,880	162,120	174,880
Total all States..	380,800	411,760	425,540	520,880	535,360	541,420	668,820	666,280	752,720	782,480
Value (1,000 dollars)										
Fresh market:										
California.....	37,602	51,390	58,456	78,106	79,328	88,522	114,504	110,271	133,095	132,155
Arizona.....	2,582	5,674	9,008	9,953	11,519	12,250	16,514	19,345	20,498	25,427
Other States ^{2/}	7,799	9,073	11,579	16,299	15,333	17,692	19,013	16,339	16,427	15,047
Total.....	47,983	66,137	79,043	104,358	106,180	118,464	150,031	145,955	170,020	172,629
Processing:										
California.....	18,689	12,797	13,640	17,678	19,525	16,443	17,243	16,170	17,110	17,050
Other States ^{2/}	2,482	2,187	3,079	3,271	5,091	5,082	7,657	7,008	4,733	5,157
Total.....	21,171	14,984	16,719	20,949	24,616	21,525	24,900	23,178	21,843	22,207
Total all States..	69,154	81,121	95,762	125,307	130,796	139,989	175,931	169,133	191,863	194,836

^{1/} Due to program modifications, data prior to 1984 are not comparable with data for 1984-87.^{2/} 1978-87: MI, NY, OR, and TX.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 4-5.

Asparagus: 1/ U.S. harvested acreage and yield per acre, by State, 1978-87 2/

State	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Harvested acres										
California.....	28,000	26,400	27,900	27,300	<u>4/</u>	<u>4/</u>	34,200	35,200	37,800	39,700
Washington.....	21,000	21,000	22,200	23,700	<u>4/</u>	<u>4/</u>	29,000	29,000	30,000	31,000
Michigan.....	19,500	19,500	19,500	19,000	<u>4/</u>	<u>4/</u>	19,200	19,200	20,500	22,000
New Jersey.....	1,900	1,600	1,500	1,500	<u>4/</u>	<u>4/</u>	2,000	1,900	1,900	1,800
Illinois.....	4,200	3,100	2,900	2,700	<u>4/</u>	<u>4/</u>	1,400	1,300	1,300	700
Other States <u>3/</u>	9,200	9,060	8,950	6,490	<u>4/</u>	<u>4/</u>	4,130	4,850	4,680	4,240
Total.....	83,830	80,660	82,950	80,690	<u>4/</u>	<u>4/</u>	89,930	91,450	96,180	99,840
Yield (Pounds per acre)										
California.....	2,800	3,500	2,800	3,000	<u>4/</u>	<u>4/</u>	2,500	2,800	2,900	3,000
Washington.....	3,200	2,800	2,300	2,500	<u>4/</u>	<u>4/</u>	2,500	2,800	2,600	2,600
Michigan.....	1,300	1,300	1,200	900	<u>4/</u>	<u>4/</u>	1,200	1,200	1,200	1,100
New Jersey.....	1,400	1,700	1,500	1,900	<u>4/</u>	<u>4/</u>	1,500	1,900	1,900	1,800
Illinois.....	900	1,100	1,300	1,000	<u>4/</u>	<u>4/</u>	1,000	1,100	800	1,400
Other States <u>3/</u>	900	900	900	1,000	<u>4/</u>	<u>4/</u>	1,000	1,200	1,300	1,400
Average.....	2,200	2,400	2,000	2,100	<u>4/</u>	<u>4/</u>	2,100	2,300	2,300	2,400

1/ For fresh-market and processing use.2/ Due to program modifications, data prior to 1984 are not comparable with data for 1984-87.3/ 1978-81: Fresh market-IA, IL, IN, MD, NJ, and OR; processing-DE, IA, IL, IN, MD, MN, NJ, OR, and VA; 1984-87: IL, IN, MD, MN, and OR.4/ Estimates discontinued for 1982-83.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 4-6.

Broccoli: 1/ U.S. harvested acreage and yield per acre, by State, 1978-87 2/

State	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Harvested acres										
California...	64,400	68,000	72,600	71,400	81,800	82,000	95,700	97,700	106,400	107,600
Texas.....	2,200	950	3,500	5,300	7,600	6,800	7,500	7,300	6,800	5,400
Arizona.....	800	1,050	750	720	800	700	1,300	1,900	2,900	4,200
Oregon.....	900	900	1,000	1,100	1,800	2,000	2,000	2,600	3,000	2,800
Total.....	68,300	70,900	77,850	78,520	92,000	91,500	106,500	109,500	119,100	120,000
Yield (Pounds per acre)										
California...	8,010	8,960	8,850	9,650	9,710	9,210	9,860	9,800	9,800	9,600
Texas.....	5,550	5,160	5,260	8,910	8,220	8,090	7,560	8,600	8,290	7,500
Arizona.....	5,370	8,370	6,130	7,360	7,000	7,710	7,620	9,320	8,210	9,100
Oregon.....	8,440	10,000	9,900	9,910	11,000	8,500	8,800	9,500	10,000	11,000
Average....	7,900	8,890	8,670	9,580	9,590	9,100	9,650	9,710	9,680	9,520

1/ For fresh-market and processing use.

2/ Due to program modifications, data prior to 1984 are not comparable with data for 1984-87.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 4-7.

Cauliflower: 1/ U.S. harvested acreage and yield per acre, by State, 1978-87 2/

State	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Harvested acres										
California...	33,400	33,700	33,900	36,300	40,000	41,900	46,200	45,600	53,000	51,100
Arizona.....	1,250	2,150	2,200	2,200	2,200	2,900	4,000	4,900	6,100	6,400
Oregon.....	2,100	2,100	2,000	2,000	2,900	3,100	3,400	3,800	3,900	3,800
New York.....	2,600	3,000	3,200	3,600	3,700	3,500	3,900	3,900	3,100	3,100
Michigan.....	1,100	1,100	1,000	1,000	1,500	1,400	1,500	1,500	700	1,200
Texas.....	1,000	700	1,020	920	1,100	1,800	1,800	1,500	1,000	700
Total.....	41,450	42,750	43,320	46,020	51,400	54,600	60,800	61,200	67,800	66,300
Yield (Pounds per acre)										
California...	9,190	9,460	9,350	10,850	9,690	9,460	10,500	10,500	11,000	11,500
Arizona.....	6,560	8,790	10,860	12,910	12,910	12,000	11,500	11,510	11,510	14,500
Oregon.....	15,520	17,000	19,500	19,500	20,000	15,000	19,500	17,000	13,000	15,000
New York.....	8,650	9,600	10,190	12,810	12,270	11,290	12,030	11,490	11,520	10,260
Michigan.....	5,000	7,000	5,000	6,200	5,800	5,500	6,530	6,530	5,571	6,000
Texas.....	4,900	2,710	8,040	7,830	8,180	9,110	8,170	8,000	9,200	8,570
Average....	9,190	9,630	9,820	11,320	10,420	9,920	11,000	10,890	11,100	11,800

1/ For fresh-market and processing use.2/ Due to program modifications, data prior to 1984 are not comparable with data for 1984-87.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 4-8.

Employment data for asparagus-growing operations, 1985-87

Item	1985	1986	1987
Average number of persons employed in the establishments in which asparagus is grown:			
All persons.....	66	78	77
Average number of persons employed in asparagus growing and harvesting operations.....			
Harvesting operations only during:	41	50	47
February.....	9	22	15
March.....	33	45	41
April.....	47	49	52
May.....	47	53	55
June.....	20	25	23
All other months.....	6	9	10
Annual average for harvesting.....	13	18	19
<hr/>			
	1,000 hours		
Total number of hours worked by persons employed in the establishments in which asparagus is grown:			
All persons.....	2,631	2,830	2,860
Total number of hours worked in asparagus growing and harvesting operations.....			
Harvesting operations only during:	790	839	938
February.....	52	73	61
March.....	115	136	135
April.....	174	176	216
May.....	146	168	162
All other months.....	46	87	58
Annual average for harvesting.....	533	641	632
<hr/>			
	1,000 dollars		
Total wages paid to persons employed in the establishments in which asparagus is grown:			
All persons.....	16,130	17,444	17,496
Total wages paid for asparagus growing and harvesting operations.....			
Harvesting operations only during:	3,026	3,489	3,674
February.....	255	305	368
March.....	505	701	549
April.....	859	778	1,073
May.....	754	868	878
All other months.....	317	474	415
Annual total wages paid for harvesting.....	2,689	3,126	3,385

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-9.

Employment data for broccoli- and cauliflower-growing operations, 1985-87

Item	1985	1986	1987
Average number of persons employed in the establishments in which broccoli and cauliflower are grown:			
All persons.....	299	297	290
Average number of persons employed in broccoli and cauliflower growing and harvesting operations:			
Broccoli.....	77	66	50
Cauliflower.....	62	65	64
Annual average number of persons employed in broccoli and cauliflower harvesting operations:			
Broccoli.....	62	52	41
Cauliflower.....	54	49	50
<hr/> 1,000 hours <hr/>			
Total number of hours worked by persons employed in the establishments in which broccoli and cauliflower are grown:			
All persons.....	9,217	9,488	8,735
Total number of hours worked in broccoli and cauliflower growing and harvesting operations:			
Broccoli.....	1,592	1,366	1,140
Cauliflower.....	1,755	1,818	1,667
Annual average number of hours worked in broccoli and cauliflower harvesting operations:			
Broccoli.....	1,478	1,256	1,065
Cauliflower.....	1,556	1,655	1,484
<hr/> 1,000 dollars <hr/>			
Total wages paid to persons employed in the establishments in which broccoli and cauliflower are grown:			
All persons.....	82,769	83,798	78,700
Total wages paid for broccoli and cauliflower growing and harvesting operations:			
Broccoli.....	13,767	11,445	9,069
Cauliflower.....	12,739	13,751	12,822
Annual total wages paid for broccoli and cauliflower harvesting:			
Broccoli.....	12,661	10,551	8,481
Cauliflower.....	11,607	12,696	11,660

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-10.

Transportation costs for fresh broccoli/cauliflower shipments, 1985 and 1987 1/

Shipping point	(Dollars per carton)		
	Destination		
	New York	Chicago	Boston
Northeast.....	0.52	-	-
Mid-Atlantic.....	.42	0.83	-
North Carolina.....	1.24	1.61	-
Southeast.....	2.08	2.00	-
Salinas, California.....	4.58	2.92	4.58

1/ Using 1985 fruit and vegetable truck rate reports, and for California, February 1987 personal interviews with truck companies.

Source: "Vegetables and Specialties," Situation and Outlook Report, Economic Research Service, U.S. Department of Agriculture, TVS-244, February 1988.

Table 4-11.

Income-and-loss experience of asparagus, broccoli, and cauliflower growers on their overall farming operations, 1985-87 1/

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales:			
All farm products.....	416,607	437,564	488,399
Other income.....	23,873	36,819	31,381
Total net sales and other income.....	440,480	474,383	519,780
Total growing and operating expenses.....	442,464	463,493	494,914
Net income (loss) before income taxes.....	(1,984)	10,890	24,866
	Ratio to net sales (percent)		
Total growing and operating expenses.....	100.5	97.7	95.2
Net income (loss) before income taxes.....	(0.5)	2.3	4.8
	Number of firms		
Firms reporting losses.....	15	13	17

1/ Includes one or more of the following operations: growing, harvesting, packing, shipping, brokering, or other related operations.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-12.

Income-and-loss experience of growers on their asparagus-growing operations,
1985-87 1/

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales:			
To fresh-market outlets.....	7,122	11,518	14,534
To processing.....	793	640	684
Total net sales.....	7,905	12,158	15,218
Total growing and operating expenses.....	8,767	13,248	15,351
Net income (loss) before income taxes.....	(862)	(1,090)	(133)
	Ratio to net sales (percent)		
Total growing and operating expenses.....	110.9	109.0	100.9
Net income (loss) before income taxes.....	(10.9)	(9.0)	(0.9)
	Number of firms		
Firms reporting losses.....	10	10	10

1/ Includes one or more of the following operations: growing, harvesting, packing, shipping, brokering, or other related operations.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-13.

Income-and-loss experience of growers on their broccoli-growing operations,
1985-87 1/

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales:			
To fresh-market outlets.....	39,321	42,302	44,186
To processing.....	8,234	7,262	7,441
Total net sales.....	47,555	49,564	51,627
Total growing and operating expenses.....	52,005	50,977	56,155
Net income (loss) before income taxes.....	(4,450)	(1,413)	(4,528)
	Ratio to net sales (percent)		
Total growing and operating expenses.....	109.4	102.9	108.9
Net income (loss) before income taxes.....	(9.4)	(2.9)	(8.8)
	Number of firms		
Firms reporting losses.....	9	10	15

1/ Includes one or more of the following operations: growing, harvesting, packing, shipping, brokering, or other related operations.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-14.

Income-and-loss experience of growers on their cauliflower-growing operations, 1985-87 ^{1/}

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales:			
To fresh-market outlets.....	37,761	36,827	40,451
To processing.....	1,082	1,437	1,123
Total net sales.....	38,843	38,264	41,574
Total growing and operating expenses.....	39,057	39,781	43,441
Net income (loss) before income taxes.....	(214)	(1,517)	(1,867)
	Ratio to net sales (percent)		
Total growing and operating expenses.....	100.6	104.0	104.5
Net income (loss) before income taxes.....	(0.6)	(4.0)	(4.5)
	Number of firms		
Firms reporting losses.....	10	7	6

^{1/} Includes one or more of the following operations: growing, harvesting, packing, shipping, brokering, or other related operations.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-15.

Fresh product procurement methods of U.S. freezers ^{1/} in 1987

Procurement method	Share (percent) of total quantity processed			
	Broccoli		Cauliflower	
	Calif-ornia	Other	Calif-ornia	Other
From crops grown on acreage owned by the freezer.	-	-	-	-
Purchased under grower contracts where significant aid was supplied to growers for growing or harvesting.....	15	27	29	-
Purchased under grower contracts without significant aid supplied to growers.....	34	12	32	14
Purchased outright from growers without a prior contract.....	3	6	2	9
Payments to growers over time under a profit-sharing arrangement, such as a grower cooperative.....	9	44	-	74
Purchased from fresh-market shippers under a prearranged price agreement.....	18	-	16	-
Purchased from fresh-market shippers without a prearranged price agreement.....	21	-	21	-
Other methods.....	-	11	-	3

^{1/} California data are from 6 firms, other States' data are from 6 firms.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-16.

Procurement of broccoli and cauliflower, by type of freezers, by vegetable, by product type, and by source, 1985-87

Source and product type	Primary freezers			Other			Other freezers		
	California								
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Quantity (1,000 pounds)									
Broccoli:									
Domestic sources:									
Fresh for processing...	146,668	164,045	173,870	31,857	37,413	36,499	1,805	1,762	2,286
Frozen for processing..	2,621	2,544	4,133	1,446	3,547	3,679	7,754	13,196	14,868
Foreign sources:									
Fresh or frozen for processing.....	8,901	23,719	41,776	568	14,567	25,352	23,905	41,187	58,457
Frozen, not for processing.....	3,868	2,715	4,851	0	0	0	14,704	14,899	20,292
Total.....	162,058	193,023	224,630	33,871	55,527	65,530	48,168	71,044	95,903
Cauliflower:									
Domestic sources:									
Fresh for processing...	41,726	49,705	46,020	33,669	24,466	32,821	6,202	6,148	0
Frozen for processing..	1,029	2,553	2,704	989	1,496	1,538	293	2,426	1,101
Foreign sources:									
Fresh or frozen for processing.....	8,725	9,734	17,490	619	2,273	3,614	6,906	9,381	16,150
Frozen, not for processing.....	1,268	83	144	0	0	0	2,154	2,425	1,560
Total.....	52,748	62,075	66,358	35,277	28,235	37,973	15,555	20,380	18,811
Share of total (percent)									
Broccoli:									
Domestic sources:									
Fresh for processing...	91	85	77	94	68	56	4	2	2
Frozen for processing..	2	1	2	4	6	6	16	19	16
Foreign sources:									
Fresh or frozen for processing.....	5	12	19	2	26	38	50	58	61
Frozen, not for processing.....	2	2	2	-	-	-	30	21	21
Cauliflower:									
Domestic sources:									
Fresh for processing...	79	80	69	95	87	86	40	30	-
Frozen for processing..	2	4	4	3	5	4	2	12	6
Foreign sources:									
Fresh or frozen for processing.....	17	16	26	2	8	10	44	46	86
Frozen, not for processing.....	2	1/	1/	-	-	-	14	12	8

1/ Less than 0.5 percent.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-17.

Asparagus, frozen: U.S. production, by region and by style of pack, 1978-87

(In thousands of pounds)										
Region and style of pack	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Region:										
California.....	7,256	1/	1/	1/	8,107	4,652	1/	8,840	11,149	11,677
Washington.....	2/	1/	1/	1/	2/	2/	1/	2/	2/	3/
East, South, and Midwest.....	8,171	1/	1/	1/	8,851	8,947	1/	11,150	6,859	5,048
Total.....	15,427	23,989	11,232	11,289	16,958	13,599	15,099	19,990	18,008	16,725
Style of pack:										
Retail:										
Spears.....	5,134	6,481	3,169	3,635	3,227	3,051	3,441	4,236	4,031	4,818
Cuts and tips....	1,817	2,745	1,110	1,645	863	1,615	822	965	1,222	1,370
Total.....	6,951	9,226	4,279	5,280	4,090	4,666	4,263	5,201	5,253	6,188
Food Service:										
Spears.....	4,237	8,947	3,463	2,854	6,454	4,512	4,071	5,486	4,100	2,973
Cuts and tips....	2,996	4,484	2,470	3,152	5,048	3,622	4,097	3,616	2,681	2,354
Total.....	7,233	13,431	5,933	6,006	11,502	8,134	8,168	9,102	6,781	5,327
Bulk:										
Spears.....	4/ (304)	-	-	-	-	-	264	56	4/ (5)	4/ (21)
Cuts and tips....	1,547	1,332	1,020	3	1,366	799	2,404	5,631	5,979	5,231
Total.....	1,547	1,332	1,020	3	1,366	799	2,668	5,687	5,974	5,210
Total:										
Spears.....	9,067	15,428	6,632	6,489	9,681	7,563	7,776	9,778	8,126	7,770
Cuts and tips....	6,360	8,561	4,600	4,800	7,277	6,036	7,323	10,212	9,882	8,955
Total.....	15,427	23,989	11,232	11,289	16,958	13,599	15,099	19,990	18,008	16,725

1/ Data are not separately reported; included in total.

2/ Data are not separately reported; included in East, South, and Midwest region.

3/ Data are not separately reported; included in California.

4/ Deficit due to previous years' carryover and imported product repacked in the United States.

Source: Compiled from official statistics of the American Frozen Food Institute.

Table 4-18.

Broccoli, frozen: U.S. production, by region and by style of pack, 1978-87

		(in thousands of pounds)									
Region and style of pack	Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Region:											
California.....	265,088	1/	1/	288,700	303,850	260,359	330,375	337,732	298,162	286,025	
Northwest.....	2/	1/	1/	2/	3/	3/	3/	3/	3/	3/	
East, South, and Midwest....	11,431	1/	1/	18,055	31,666	24,999	35,389	19,074	26,357	26,435	
Total.....	276,519	298,618	290,657	306,755	335,516	285,358	365,764	356,806	324,519	312,460	
Style of pack:											
Retail:											
Cuts.....	37,014	39,279	40,067	38,422	43,852	42,438	35,161	38,170	43,353	53,275	
Chopped.....	26,947	28,084	26,429	28,502	29,368	23,521	29,834	35,365	26,338	23,758	
Spears 4/.....	94,018	99,732	100,687	87,911	80,954	67,542	86,931	80,079	74,469	70,311	
Total.....	157,979	167,095	167,183	154,835	154,174	133,501	151,926	159,614	144,160	147,344	
Food Service:											
Cuts.....	17,550	17,619	15,343	22,959	23,756	26,089	31,124	29,897	32,888	35,380	
Chopped.....	7,645	5,617	6,548	8,050	6,396	7,158	9,115	12,454	9,228	9,035	
Spears 4/.....	50,974	57,126	50,455	64,724	65,890	70,935	75,092	72,063	66,094	69,349	
Total.....	76,169	80,362	72,346	95,733	96,042	104,182	115,331	114,414	108,210	113,764	
Bulk:											
Cuts.....	7,018	26,383	12,601	21,210	9,852	7,879	48,000	23,313	27,748	(5,583)	
Chopped.....	5,748	965	3,044	3,390	3,890	2,788	6,760	3,176	7,724	1,940	
Spears 4/.....	8,480	220	641	2,532	23,684	11,043	17,453	2,749	(13,323)	5/(2,973)	
Total.....	21,246	27,568	16,286	27,132	37,426	21,710	72,213	29,238	22,149	9/ (616)	
Other: 6/											
Cuts.....	21,125	23,593	34,842	27,950	47,874	25,965	26,294	55,705	34,677	51,968	
Chopped.....	0	0	0	1,105	1/	1/	1/	3,835	1/	1/	
Spears 4/.....	0	0	0	0	1/	1/	1/	1/	15,323	1/	
Total.....	21,125	23,593	34,842	29,055	47,874	25,965	26,294	59,540	50,000	51,968	
Total:											
Cuts.....	82,707	106,874	102,853	110,541	125,334	102,371	140,579	147,085	138,666	135,040	
Chopped.....	40,340	34,666	36,021	41,047	39,654	33,467	45,709	54,830	43,290	40,733	
Spears 4/.....	153,472	157,078	151,783	155,167	170,528	149,520	179,476	154,891	142,563	136,687	
Total.....	276,519	298,618	290,657	306,755	335,516	285,358	365,764	356,806	324,519	312,460	

1/ Data are not separately reported; included in total.

2/ Data are not separately reported; included in East, South, and Midwest region.

3/ Data are not separately reported; included in California.

4/ May be repackaged into other styles.

5/ Deficit attributable to previous years' carryover and imported product repacked in the United States.

6/ Initial frozen broccoli weight going into combination (mixed) vegetables, canned, and prepared foods.

7/ Data are not separately reported; included in Bulk.

Source: Compiled from official statistics of the American Frozen Food Institute.

Table 4-19.

Production of frozen broccoli and cauliflower from domestically grown fresh product by primary freezers, by vegetable, by container size, and by style of pack, 1985-87

Container size and style of pack	(In thousands of pounds)								
	California			Other 1/			Total		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Broccoli:									
Retail containers:									
Cartons and polybags....	67,940	73,558	64,676	7,418	7,589	7,734	75,358	81,147	72,410
In mixtures (weight of broccoli).....	19,931	22,818	20,012	3,650	4,577	6,743	23,581	27,395	26,755
Total.....	87,871	96,376	84,688	11,068	12,166	14,477	98,939	108,542	99,165
Food service containers (2 to 60 pounds) 2/.....	42,401	44,005	43,546	7,391	8,339	7,497	49,792	53,344	51,043
Bulk tote boxes (over 400 pounds).....	41,542	48,416	38,317	13,257	16,024	14,923	54,799	64,440	53,240
Total.....	171,814	188,797	166,551	31,716	36,529	36,897	203,530	225,326	203,448
Cauliflower:									
Retail containers:									
Cartons and polybags....	15,810	16,764	14,784	3,297	2,444	3,266	19,107	19,208	18,050
In mixtures (weight of cauliflower).....	11,505	12,932	11,077	3,514	3,553	4,796	15,019	16,485	15,837
Total.....	27,315	29,696	25,861	6,811	5,997	8,062	34,126	35,693	33,923
Food service containers (2 to 60 pounds) 2/.....	14,536	17,214	13,352	985	1,573	3,956	15,521	18,787	17,308
Bulk tote boxes (over 400 pounds).....	17,342	18,746	10,624	16,978	8,187	11,974	34,320	26,933	22,598
Total.....	59,193	65,656	49,837	24,774	15,757	23,992	83,967	81,413	73,829

1/ Processing plants located in Oregon and Texas.

2/ Including food-service mixtures.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-20.
Cauliflower, frozen: U.S. production, by region and by style of pack, 1978-87

		(In thousands of pounds)									
Region and style of pack	Year										
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	
Region:											
California.....	96,771	76,957	66,369	85,370	85,339	71,779	72,062	60,250	64,631	51,244	
East, South, and Northwest.....	30,742	24,173	18,397	19,791	26,305	28,762	30,044	34,367	24,489	26,514	
Total.....	127,513	101,130	84,766	105,161	111,644	100,541	102,106	94,617	89,120	77,758	
Style of pack:											
Retail.....	59,930	48,954	41,916	40,970	36,468	29,821	27,523	27,004	28,217	28,266	
Food Service and Bulk.....	57,687	39,788	1/21,397	50,165	52,968	52,093	53,820	28,540	2/ 35,190	20,330	
Other 3/.....	9,896	12,388	21,453	14,026	22,208	18,627	20,763	39,073	25,713	29,162	
Total.....	127,513	101,130	84,766	105,161	111,644	100,541	102,106	94,617	89,120	77,758	

1/ Includes a deficit of 5,194,000 pounds due to previous years' carryover.

2/ Includes a deficit of 5,336,000 pounds due to previous years' carryover.

3/ Initial frozen cauliflower weight going into combination (mixed) or canned vegetables, and prepared foods.

Source: Compiled from official statistics of the American Frozen Food Institute.

Table 4-21.

Frozen mixed vegetables: U.S. production, by type of blend and style of pack, 1978-87

(In thousands of pounds)

Blend and style of pack	Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
California: 1/										
Retail.....	10,520	15,808	24,161	20,573	36,778	41,046	48,744	63,627	54,686	46,073
Food service and bulk....	2,100	1,706	4,080	8,491	11,823	17,709	21,812	14,763	19,213	26,060
Total.....	12,620	17,514	28,241	29,069	48,601	58,755	70,556	78,390	73,899	72,133
Italian: 2/										
Retail.....	8,500	15,939	12,364	13,841	11,785	15,176	16,170	22,516	19,680	17,829
Food service and bulk....	5,314	3,247	6,985	7,085	8,304	12,969	13,897	8,973	9,574	10,117
Total.....	13,814	19,186	19,349	20,926	20,089	28,145	30,067	31,489	29,254	27,946
Northwest: 3/										
Retail.....	4/	4/	4/	800	0	0	0	0	9,233	0
Food service and bulk....	4/	4/	4/	1,800	13,248	14,134	15,081	18,002	5,752	3,698
Total.....	4/	4/	4/	2,600	13,248	14,134	15,081	18,002	14,985	3,698
Oriental: 5/										
Retail.....	19,490	27,775	21,583	25,719	37,804	39,987	43,445	41,559	39,387	29,855
Food service and bulk....	949	1,023	1,758	1,861	4,382	7,513	7,709	6,473	4,944	5,920
Total.....	20,439	28,798	23,341	27,580	42,186	47,500	51,154	48,032	44,331	35,805
Winter: 6/										
Retail.....	5,782	10,319	16,722	9,604	15,656	21,622	22,379	29,614	27,327	24,806
Food service and bulk....	1,411	1,613	2,566	3,779	4,469	4,974	6,496	8,350	14,393	5,087
Total.....	7,193	11,932	19,288	13,383	20,125	26,596	28,875	37,964	41,720	29,893
Grand total.....	54,066	77,380	90,219	93,558	144,249	175,130	195,733	213,877	204,189	169,475

1/ Includes broccoli, cauliflower, and carrots.

2/ Includes cauliflower, zucchini squash, Italian green beans, and onions.

3/ Includes corn, green beans, sliced carrots, and peas.

4/ Not available.

5/ Includes green beans, broccoli, onions, and mushrooms.

6/ Includes broccoli and cauliflower.

Source: Compiled from official statistics of the American Frozen Food Institute.

Table 4-22.

Shipments of frozen broccoli and cauliflower, by primary freezers in California, by other U.S. freezers, and by type of pack, 1985-87 ^{1/}

(In thousands of pounds)									
Vegetable and type of pack	Primary freezers in California ^{2/}			Other U.S. freezers ^{3/}			Total		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Frozen broccoli:									
Plain pack:									
Retail containers.....	62,165	75,063	75,888	25,356	31,271	35,045	87,521	106,334	111,003
Food service containers (2 to 60 pounds).....	25,850	24,448	23,409	6,130	14,588	19,734	32,030	39,036	43,143
In vegetable mixtures (broccoli content)....	29,646	34,445	36,666	26,023	31,141	34,980	55,669	65,586	71,646
Sub-total.....	117,661	133,956	135,963	57,559	77,000	89,759	175,220	210,956	225,722
In sauce or breaded (retail, food service, and in mixtures).....	9,980	11,222	10,983	4,880	6,554	8,942	14,860	17,781	19,925
Total.....	127,641	145,183	146,946	62,439	83,554	98,701	190,080	228,737	245,647
Frozen cauliflower:									
Plain pack:									
Retail containers.....	17,697	18,329	15,778	5,648	8,873	6,338	23,345	27,202	22,116
Food service containers (2 to 60 pounds).....	7,861	7,030	6,555	2,011	1,917	4,005	9,872	8,947	10,560
In vegetable mixtures (cauliflower content)....	16,810	18,438	17,918	7,311	12,053	15,104	24,121	30,491	33,022
Sub-total.....	42,368	43,797	40,251	14,970	22,843	25,447	57,338	66,640	65,698
In sauce or breaded (retail, food service, and in mixtures).....	2,911	2,810	2,530	3,627	4,183	5,128	6,538	6,993	7,658
Total.....	45,279	46,607	42,781	18,597	27,026	30,575	63,876	73,633	73,356

^{1/} Shipments of domestic and foreign-grown product by U.S. processors.

^{2/} Data are for 4 firms. Two firms supplied data for 1987 only that are not included.

^{3/} Primary freezers in States other than California, and non-primary freezers; data are for 14 firms.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-23.

Frozen asparagus, broccoli, and cauliflower: Sales by market outlet of domestically grown product by primary freezers in California and other U.S. freezers, and of foreign-grown product by all U.S. freezers, 1987

	Domestically grown product		
	Primary freezers in California	Other U.S. freezers	Foreign- grown product
<u>Frozen product and market outlet</u>			
<u>Asparagus:</u>			
Percent of total sales: <u>1/</u>			
Retail through major chain stores.....	40	17	-
Other retail outlets.....	-	1	-
Food service outlets.....	57	25	-
Reprocessors or manufacturers.....	-	-	50
Repackers.....	3	20	50
Distributors or jobbers.....	-	37	-
Quantity of total sales <u>2/</u> (million pounds).	<u>3/</u>	<u>3/</u>	<u>4/</u>
<u>Broccoli:</u>			
Percent of total sales: <u>1/</u>			
Retail through major chain stores.....	45	29	28
Other retail outlets.....	2	15	5
Food service outlets.....	30	24	12
Government purchases.....	3	5	1
Reprocessors or manufacturers.....	9	5	7
Repackers.....	5	2	9
Distributors or jobbers.....	5	20	38
Other sales outlets.....	1	<u>5/</u>	<u>5/</u>
Quantity of total sales <u>2/</u> (million pounds).	174.8	45.7	84.4
<u>Cauliflower:</u>			
Percent of total sales: <u>1/</u>			
Retail through major chain stores.....	47	20	25
Other retail outlets.....	4	14	6
Food service outlets.....	31	32	2
Government purchases.....	3	8	-
Reprocessors or manufacturers.....	2	14	8
Repackers.....	7	3	18
Distributors or jobbers.....	6	9	41
Other sales outlets.....	-	<u>5/</u>	<u>5/</u>
Quantity of total sales <u>2/</u> (million pounds).	45.5	19.6	25.6

1/ Weighted averages.

2/ As reported by respondents to this question.

3/ Unavailable for reasons of confidentiality.

4/ Less than 0.5 million pounds.

5/ Less than 0.5 percent.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-24.

Frozen vegetable stocks in cold storage warehouses, by selected vegetable and by year, 1978-87

(In thousands of pounds)										
Vegetable	As of December 31,--									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Broccoli:										
Spears.....	47	49	47	42	52	33	40	40	58	58
Chopped and cuts.....	47	54	50	42	56	38	53	40	48	57
Cauliflower....	86	82	72	58	70	71	76	81	81	80
Asparagus.....	5	11	7	6	9	6	6	9	11	12
Subtotal.....	186	197	176	147	186	148	174	169	198	207
Other:										
Green beans..	269	297	285	239	279	299	273	276	254	139
Brussels sprouts....	50	47	54	51	45	39	42	44	30	37
Carrots.....	164	176	140	150	212	186	164	181	209	214
Corn.....	482	443	358	353	558	543	475	511	491	566
Mixed vegetable tables.....	50	61	56	54	64	59	70	64	58	50
Okra.....	124	122	114	122	137	114	111	117	118	65
Onions.....	24	27	28	28	32	29	23	27	36	30
Peas.....	242	292	238	191	259	241	264	336	262	275
Squash.....	1/	31	32	37	45	43	42	47	48	58
Other.....	210	196	189	201	191	180	219	250	274	273
Subtotal...	1,614	1,694	1,496	1,427	1,823	1,734	1,683	1,852	1,780	1,708
Total, frozen vegetables...	1,800	1,891	1,672	1,574	2,008	1,882	1,857	2,022	1,978	1,915

1/ Included in other frozen vegetables.

Source: Cold Storage, U.S. Department of Agriculture.

Table 4-25.

Inventories of frozen broccoli and cauliflower, by primary freezers in California, by other U.S. freezers, and by type of pack, 1985-87 ^{1/}

(In thousands of pounds)									
Vegetable and type of pack	Primary freezers in California			Other U.S. freezers ^{2/}			Total		
	As of December 31,--			As of December 31,--			As of December 31,--		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Broccoli:									
Retail containers..	16,669	18,382	17,831	6,529	7,616	9,210	23,198	25,998	27,041
Food service containers (2 to 60 pounds).....	7,233	8,560	10,068	2,190	5,766	5,139	9,423	14,326	15,207
Bulk tote boxes (over 400 pounds).....	11,637	13,752	14,816	22,873	28,846	31,589	34,510	42,598	46,405
Total.....	35,539	40,694	42,715	31,592	42,228	45,938	67,131	82,922	88,653
Cauliflower:									
Retail containers..	11,134	11,299	10,942	7,284	3,054	3,894	18,418	14,353	14,836
Food service containers (2 to 60 pounds).....	5,977	5,855	6,486	606	820	1,257	6,583	6,675	7,743
Bulk tote boxes (over 400 pounds).....	12,837	13,831	12,382	21,867	21,839	21,049	34,704	35,670	33,431
Total.....	29,948	30,985	29,810	29,757	25,713	26,200	59,705	56,698	56,010

^{1/} Inventories are for domestic- and foreign-grown product held in the United States by processors. Data received on foreign-grown product are not shown separately for reasons of confidentiality.

^{2/} Primary freezers in States other than California and other respondents.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-26.

Income-and-loss experience of U.S. processors 1/ for their operations on frozen asparagus, accounting years 1985-87

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales.....	13,483	11,994	13,239
Cost of goods sold	10,410	9,162	10,831
Gross profit.....	3,073	2,832	2,408
Selling, general, and administrative expenses.....	2,259	2,285	2,372
Operating income.....	814	547	36
	Ratio to net sales (percent)		
Cost of goods sold	77.2	76.4	81.8
Gross profit.....	22.8	23.6	18.2
Selling, general, and administrative expenses.....	16.8	19.1	17.9
Operating income.....	6.0	4.6	0.3

1/ Includes data from 4 firms.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-27.

Income-and-loss experience of U.S. processors 1/ for their operations on frozen broccoli, accounting years 1985-87

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales.....	97,915	99,293	98,317
Cost of goods sold.....	80,004	79,300	81,335
Gross profit.....	17,911	19,993	16,982
Selling, general, and administrative expenses.....	15,002	15,412	14,028
Operating income.....	2,909	4,581	2,954
	Ratio to net sales (percent)		
Cost of goods sold.....	81.7	79.9	82.7
Gross profit.....	18.3	20.1	17.3
Selling, general, and administrative expenses.....	15.3	15.5	14.3
Operating income.....	3.0	4.6	3.0

1/ Includes data from 7 firms.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-28.

Income-and-loss experience of U.S. processors 1/ for their operations on frozen cauliflower, accounting years 1985-87

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales.....	23,969	25,109	22,683
Cost of goods sold.....	19,188	19,965	19,234
Gross profit.....	4,781	5,144	3,449
Selling, general, and administrative expenses.....	3,374	3,715	3,045
Operating income.....	1,407	1,429	404
	Ratio to net sales (percent)		
Cost of goods sold.....	80.1	79.5	84.8
Gross profit.....	19.9	20.5	15.2
Selling, general, and administrative expenses.....	14.1	14.8	13.4
Operating income.....	5.9	5.7	1.8

1/ Includes data from 7 firms.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-29.

Income-and-loss experience of U.S. processors 1/ for their operations on canned asparagus, accounting years 1985-87

Item	1985	1986	1987
	Value (1,000 dollars)		
Net sales.....	54,086	60,731	68,344
Cost of goods sold.....	39,515	44,513	49,782
Gross profit.....	14,571	16,218	18,562
Selling expenses.....	2,735	2,898	3,378
General and administrative expenses.....	2,003	2,313	2,702
Operating income.....	9,833	11,007	12,482
	Ratio to net sales (percent)		
Cost of goods sold	73.1	73.3	72.8
Gross profit.....	26.9	26.7	27.2
Selling expenses.....	5.1	4.8	4.9
General and administrative expenses.....	3.7	3.8	4.0
Operating income.....	18.2	18.1	18.3

1/ Includes data from 6 firms.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4-30.

Number of employees, hours worked, and hourly wage rates for broccoli and cauliflower freezing operations, 1985-87

Item	1985	1986	1987
Average number of persons employed in the establishments in which broccoli or cauliflower is frozen:			
All persons.....	14,627	14,630	16,295
Production and related workers employed in vegetable freezing operations:			
Broccoli:			
California.....	1,106	1,064	1,141
Other States.....	1,046	1,165	1,347
Total.....	2,152	2,229	2,488
Cauliflower:			
California.....	811	761	807
Other States.....	953	782	1,874
Total.....	1,764	1,543	2,681
	<hr/> 1,000 hours <hr/>		
Hours worked by production and related workers in:			
All operations.....	8,213	8,320	10,546
Vegetable freezing operations:			
Broccoli.....	2,445	2,375	2,649
Cauliflower.....	1,001	915	1,984
	<hr/> Dollars <hr/>		
Hourly wage rates paid to production and related workers processing:			
Broccoli:			
California.....	7.34	7.34	7.29
Other States.....	5.76	5.77	5.66
Cauliflower:			
California.....	7.48	7.23	7.22
Other States.....	5.48	5.52	6.79

Source: Compiled from data submitted in response to questionnaires of the U.S. International trade Commission

CHAPTER 5. MEXICAN INDUSTRY

General

From 1978 to 1987, foreign supplies of asparagus, broccoli, and cauliflower (combined) entering the U.S. market rose from 46 million pounds to 336 million pounds, an annual average increase of 42 percent. In 1987, broccoli accounted for 67 percent of total combined imports, cauliflower 21 percent, and asparagus the remaining 12 percent. Mexico has been the principal supplier of many fruits and vegetables to the United States for many years, and, according to a recent General Accounting Office report, the U.S. fruit and vegetable trade balance with Mexico during 1980-86 "was consistently negative [and] trended downward from a negative \$215 million ... to a negative \$742 million ..." 1/

Mexico, historically, has been the principal foreign supplier of fresh and frozen asparagus, broccoli, and cauliflower to the United States. 2/ In recent years, production of these vegetables in Mexico for export has increased dramatically, especially broccoli. According to a recent study, Mexico produced 141 million pounds of frozen vegetables in 1986; capacity utilization in Mexican processing plants was an estimated 66 percent that year. 3/ The estimated 1986 annual production capacity for frozen vegetables was 215 million pounds, most of which was accounted for by broccoli and cauliflower. Commission staff estimate that there are currently 23 firms processing frozen vegetables and fruit in Mexico, 4/ with broccoli the principal crop frozen by nearly all these firms. Frozen broccoli production in Mexico was estimated at 195 million pounds in 1987, up from 75 million in 1985. 5/

In 1987, Mexico accounted for 78, 95, and 51 percent (by value) of fresh, frozen, and canned asparagus, respectively, imported into the United States. Mexico also accounted for 98 and 81 percent of fresh and frozen broccoli, and 41 and 95 percent of fresh and frozen cauliflower, respectively. During 1983-87, the combined average unit customs value of imports of these vegetables from Mexico declined from 42 to 28 cents per pound.

Growing Sector

The main producing areas for asparagus, broccoli, and cauliflower are in the northwestern States of Baja California Norte and Sonora, the northeastern States of Nuevo Leon and Coahuila, and central Mexico. Most broccoli and cauliflower production in central Mexico is concentrated in the Bajío, a high

1/ U.S. General Accounting Office (GAO) report on Agricultural Trade, Trends in Imports of Fruits, Vegetables, and Other Agricultural Products, Fact Sheet for the Honorable Leon E. Panetta, U.S. House of Representatives, September 1987.

2/ Canada has been the principal supplier of fresh cauliflower in certain seasons and in some years.

3/ Kirby Moulton and David Runsten, The Frozen Vegetable Industry of Mexico, University of California Cooperative Extension Service, Dec. 9, 1986.

4/ See app. G for a list of Mexican vegetable and fruit freezers.

5/ Estimated by the Commission staff based on information gathered during the course of this investigation.

plains region with an elevation of 5,000 to 6,000 feet above sea level, covering parts of four States centered around the State of Guanajuato (figure 5-1). The Bajio is considered one of the most fertile growing areas in Mexico. In 1984, Guanajuato accounted for 79 percent of Mexico's frozen-vegetable production, with 10 and 9 percent, respectively, accounted for by the neighboring States of Michoacan and Aguascalientes, and a small percentage in Queretaro. By 1987, Nuevo Leon, especially near Monterrey, had become an important production area for broccoli and cauliflower. Baja California Norte now supplies most of the fresh market asparagus exported to the United States.

In central Mexico, the peak production period for broccoli and cauliflower is February to April, whereas the least production takes place in the rainy season from late May through September. Temperatures in this area are more moderate and slightly higher, based on yearly averages, than in California's principal broccoli and cauliflower growing regions. Since annual rainfall is insufficient in many years, and since most of it comes in the summer, irrigation has historically been used widely by growers in central Mexico. Wells provide water to 60 percent of the irrigated land in Guanajuato. According to Mexican Government information, all broccoli and cauliflower production in Guanajuato is on land irrigated with pumped well water.

The Government of Mexico prioritizes the use of reservoir irrigation water in central Mexico (where vegetable freezers are located). 1/ In recent years, the use of reservoir irrigation water for the production of basic food crops (i.e., corn, dry beans, rice, sorghum, and barley) has been given a substantially higher priority than the use of such water for the production of the subject vegetables. Thus, as of now it appears that vegetable growers depend on water from deep wells for their crops. However, a Government permit is required before a well can be drilled. Industry sources stated that no drilling requests for new wells have been approved in nearly 10 years.

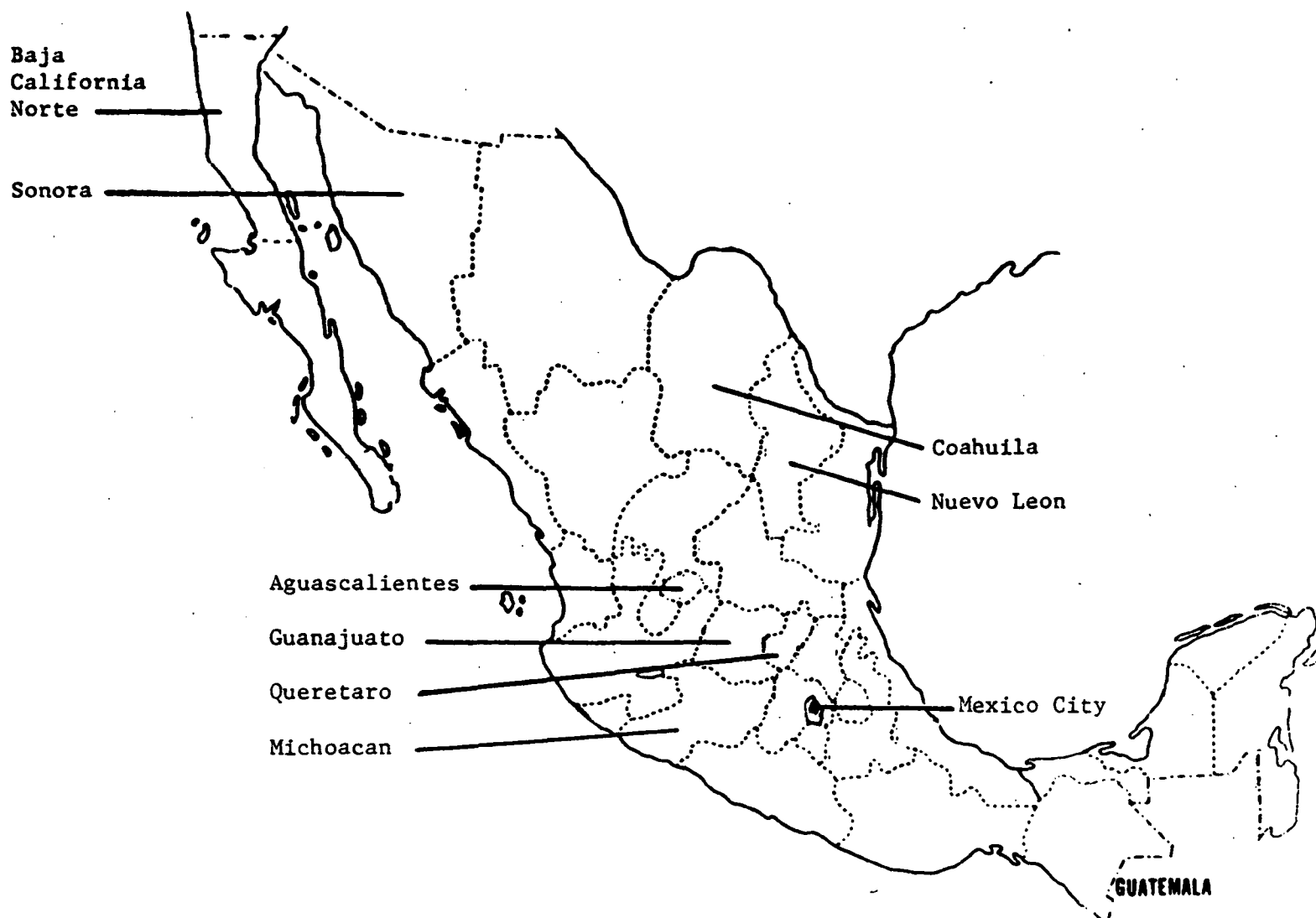
Such a policy could restrict the expansion of vegetable-crop production to farms with existing wells; however, potential expansion is substantial due to the fact that only about 10 percent of well-irrigation farmland is currently devoted to the production of the subject vegetables. There are about 200,000 acres of irrigated land in northern Guanajuato, mostly served by wells, and nearly 100,000 acres of irrigated land in Aguascalientes, about one-half irrigated from wells. Some of this land might be available for future broccoli and cauliflower production.

Mexico's reservoir capacity and available water supply, by region, as of June 20, 1988, are shown in the following tabulation: 2/

1/ On the basis of Commission staff conversations with Mexican growers and Government officials in Mexico, July 1988, and Commissioners' conversations with Mexican growers and Government officials in Mexico, May 1988. Additional information on water use regulations was requested but never received.

2/ U.S. Department of Agriculture, Foreign Agricultural Service, Mexico: Annual Agricultural Situation Report, FAS Report No. MX 8016, U.S. Embassy, Mexico City, Mexico, Feb. 29, 1988.

Figure 5-1.
Principal Mexican States producing asparagus, broccoli, and cauliflower, 1987



	<u>Reservoir water volume</u>		<u>Percentage available</u>	
	<u>Capacity</u>	<u>Availability</u>	<u>on July 20, --</u>	
	(millions of cubic meters)		<u>1987</u>	<u>1988</u>
Northwest.....	21,332	5,007	32.4	23.5
Northcentral.....	9,225	5,320	58.3	57.5
Northeast.....	8,956	4,526	64.4	50.5
Central.....	5,289	1,342	30.2	25.4
South.....	<u>1,213</u>	<u>382</u>	<u>22.1</u>	<u>31.5</u>
Total/average..	46,047	16,579	43.3	29.3

The share of reservoir water capacity represents water available for irrigation, industrial, human consumption, and other uses. In central Mexico, usable supplies in July 1988 were 25 percent of reservoir capacity, down from 30 percent a year earlier. 1/

Growers in Mexico are reported to have several disadvantages compared with California growers. For example, broccoli varieties have not been specifically developed for Mexican growing conditions as they have for conditions in California, 2/ suggesting that the varieties of broccoli used are not ideally suited to Mexican conditions. The Gem variety grown in the summer is of lower quality relative to the winter variety (because, for one thing, Gem has side shoots that lead to lower recovery). The winter variety, Green Duke, on the other hand, does not easily tolerate daily temperature extremes, and sometimes produces undesirable brown beads. However, according to Mexican growers and freezers, the availability of suitable varieties is not a problem. 3/ Climatic conditions in central Mexico vary considerably as a result of the large variations in elevation and rainfall, even within the same geographic region. One area in the region may be subject to freezing in the winter and a nearby area may not; extremely hot summer weather or heavy rainfall may affect one area but not another. This increases growing risks because it makes forecasting weather conditions for specific growers, as well as general recommendations or uniform application of technology, difficult.

Since broccoli and cauliflower are relatively new crops to Mexican growers and the infrastructure for agricultural research and information dissemination is not widely developed, farmers must be willing to accept a higher level of risk and uncertainty than with more traditional crops. For example, a cold spell in 1986 led to a major loss in production of broccoli and cauliflower in

1/ The Commission staff visited with a Mexican vegetable grower who grew broccoli and basic food crops using well water, although ditch-irrigation water was in the area. He had just improved his well-water supply by deepening his well to 250 feet under authority of a permit his farm had for an existing well. When such farms use well water, they do not need to arrange for the use of reservoir-fed irrigation water controlled by the Federal Government.

2/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 25-26.

3/ On the basis of Commission staff conversations with growers, freezers, and Government officials in Mexico, July 1988. When asked about varietal distinctions between headed broccoli and sprouting broccoli, distinctions found in the new Harmonized Tariff Schedule of the United States, sometimes at different rates, Mexican growers and freezers were unfamiliar with the terms. This may lead to U.S. import classification problems in the future, since Mexican producers use the best varieties available for their growing area, including hybrid varieties that are continually changing.

the Bajio. Yet in spite of the freeze, production increased over the previous year because of the great increase in acreage planted. Mexico experienced its worst drought in several years during the 1987/88 crop year. 1/

Average annual rainfall in the Bajio ranges from 30 inches in the southern areas to about 20 inches in northern areas (northern Guanajuato and Aguascalientes); most of this rainfall is concentrated in the summer months in both areas. Average monthly temperatures are relatively uniform throughout the year in central Mexico, but wide temperature fluctuations are likely from day to night in the summer. These wide daily temperature changes can cause poor color and development in broccoli, a crop that prefers cool growing conditions. May is the hottest month of the year in the Bajio; therefore, harvesting is curtailed in many parts of the region. During the summer, growers may also experience hail damage, heavy rains, and high humidity, which lead to problems getting machinery into the fields and greater insect damage.

Broccoli or cauliflower may be planted either by direct seeding (placing seeds directly in field rows), or by transplanting young plants (seedlings), grown from seed in a protected area, directly into the field. Direct seeding generally begins in November and continues through March, when fields are not wet, whereas transplanting can be done at any time and reduces in-field risks for up to 30 days. Transplanting is labor-intensive, whereas direct seeding is capital-intensive. In recent years, as real Mexican wage rates in U.S. dollar terms have decreased and real machinery costs have increased, transplanting has become less expensive and more common. Most growers currently use this planting method for summer broccoli and cauliflower production. Most firms growing raw product for processing are supplied transplants by the freezer who maintains greenhouse facilities to produce quality seedlings. This way, the freezer knows that the grower is raising the variety of plant best suited for processing, and the grower is generally assured of a good stand of plants from the beginning. Transplanting also reduces the growing time on the farms, and reduces rain damage, especially for cauliflower, which may be planted in the rainy season.

Insect and disease control are major concerns of Mexican growers; much of the risk viewed by Bajio broccoli growers centers around such problems. There is a tendency in Mexico to spray chemicals by schedule, rather than only when pest populations reach certain levels (such as may be determined under an integrated pest-management (IPM) program). 2/ Such pest-control practices were used in the United States for many years. However, a number of industry representatives mentioned that IPM techniques were used in their overall pest-management programs, along with their use of pesticides. 3/

1/ U.S. Department of Agriculture, Mexico: Annual Agricultural Situation Report.

2/ On the basis of Commissioners' conversations with Green Giant representatives in Mexico, May 1988; see also Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 26.

3/ On the basis of Commission staff conversations with Mexican growers, freezers, and Government officials in Mexico, July 1988.

Structure

In Mexico, broccoli and cauliflower are almost always supplied to freezers under grower contracts. Some freezing operations are integrated with farming operations either directly or through related companies, or the freezer may be owned by a group of growers. Many of these growers' farms range in size from 10 to 100 acres. Larger Mexican-owned growing operations may control 1,100 to 7,400 acres of crops, including broccoli, cauliflower, grain, corn, millet, or other crops, and a freezing plant. In general, grower-owned processors do not contract with nonmember growers for their supply of fresh vegetables for freezing.

Number, location, and industry concentration.--Nearly all broccoli and cauliflower growers in central Mexico are located in the same general region as freezers. Data on the exact number of asparagus, broccoli, and cauliflower growers are not available, but the largest of them may farm up to 7,000 acres of land, only a part of which would be in vegetables. 1/ The number of such large growers is small. There are also growers called ejidatarios, who farm tracts of 2 to 50 acres, which they were granted under the State land reform program. Only a small percentage of vegetable production, at present, comes from these ejidatarios, but they control about 40 percent of the irrigated land in the Bajio region.

Integration and diversification.--U.S.-owned companies played a large part in introducing broccoli and cauliflower production to Mexican growers and in helping growers gain technical experience producing these vegetables. As growers became more self-sufficient and acquired capital reserves, and as conflicts developed with the processors over pricing and grading, growers began marketing for themselves. For example, a group of Mexican growers originally growing for Del Monte are now major exporters of fresh asparagus from central Mexico to the United States. 2/ In contrast to growers that canned their own product and exported under their own labels, Mexican growers that initially built freezing plants sold most of their frozen product to U.S. companies in Mexico (for brand-name resale). Currently, most growers' production of fresh vegetables frozen by independent freezers is sold through brokers or sales agents in the United States.

Most Mexican broccoli and cauliflower growers are less diversified in the number of other crops grown than California growers. However, one Mexican broccoli grower reported harvesting carrots, peas, string beans, corn, and chili peppers, and packing vegetable mixtures, for the Mexican market.

One area in which integration appears to be taking place is in fresh-market sales to the United States. Fresh-market product is taken to a nearby facility, where it is precooled and packed for delivery to the U.S. market by a firm, or firms, sharing market information and sales with the grower. 3/ One advantage of this arrangement is that the grower can decide how much to send to a freezer and how much to ship to the fresh market on the basis of U.S. fresh-market prices at any given time.

1/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 25-26.

2/ Ibid., p. 12.

3/ On the basis of Commission staff conversations with growers and Government officials in Mexico, July 1988.

Production and harvested acreage

Asparagus, broccoli, and cauliflower production and harvested area in Mexico, from table 5-1, are summarized for 1982 and 1986 in the following tabulation: 1/

	<u>Harvested area</u> <u>(acres)</u>		<u>Yield</u> <u>(pounds/acre)</u>		<u>Production</u> <u>(1,000 pounds)</u>	
	<u>1982</u>	<u>1986</u>	<u>1982</u>	<u>1986</u>	<u>1982</u>	<u>1986</u>
Asparagus.....	2,122	4,997	11,787	10,618	24,751	53,059
Broccoli.....	4,231	9,253	9,815	9,458	41,530	87,516
Cauliflower...	10,707	11,666	4,551	4,907	48,728	57,251

Average yields for both asparagus and broccoli were lower in 1986 than in 1982, but the harvested area more than doubled for each vegetable. The cauliflower yield and harvested area both rose slightly between 1982 and 1986. Between 1982 and 1986, Mexican production of both asparagus and broccoli more than doubled, despite declining average yields; cauliflower production rose 17 percent from 1982 to 1986.

The advent of grower-owned freezing plants and the entry of U.S. processors into the production of frozen products in Mexico have intensified the demand for raw products in recent years, especially for broccoli. 2/ Some processors, faced with a shortage of raw product, expressed difficulty with convincing growers to plant broccoli because farmers are unfamiliar with it. Also, some freezers had not raised prices sufficiently to induce growers to produce more raw product. 3/ More recently, however, some Mexican processors, notably Green Giant, have stated that they have a long waiting list of farmers wishing to grow the subject vegetables for them. 4/

Costs, prices, and marketing

Costs.--In general, current production costs of growing vegetables in Mexico are lower than they are in the United States, including California and Arizona. The costs, per unit of agricultural output, of labor, land, fertilizers, water, and diesel fuel are reported to be lower in Mexico for asparagus, broccoli, and cauliflower. In contrast, the cost of credit (that is, interest rates) may be higher in Mexico.

In Mexico, the minimum wage rate that applies to agricultural workers is the same as that which applies to basic factory laborers in the same zone (geographic area). 5/ Whereas the minimum wage is observed by employers in processing plants, growers, who may rely on help from family members and others, may pay less than the minimum. Processors tend to pay more than the

1/ Exhibit submitted to the Commission by the Union Nacional de Organismos de Productores de Hortalizas y Frutas on May 17, 1988.

2/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico.

3/ Ibid.

4/ On the basis of Commissioners' conversations with Green Giant representatives in Mexico, May 1988.

5/ The following discussion is largely based on Moulton and Runsten, The Frozen Vegetable Industry of Mexico.

minimum wage (typically 50 percent more), but the labor they hire is reported to be very dependable and more productive. 1/ Since 1982, the minimum wage, adjusted for inflation, has been decreasing. For example, the minimum wage in June 1986 was 1,675 pesos for a 12-hour day, equivalent to US\$7.24; by October 1986, the same 1,675 pesos were equivalent to about US\$5.36, because of the falling value of the peso.

It is estimated that other employee benefits amount to an additional 35 percent over wages paid to Mexican laborers. 2/ It should be noted that this is approximately the same percentage accounted for by benefits for U.S. laborers, making wage rates alone the appropriate comparison.

In 1986, farm land values in Guanajuato ranged from US\$728 to US\$1,275 per acre for land with wells. 3/ This contrasts with the value of land in the principal broccoli producing area in California of about \$8,000 per acre. Industry sources have estimated that the rent for farm land in the Bajio is about US\$90 per acre for 6 months, as compared with \$350-\$600 per acre in California for the same length of time.

The inflation-adjusted cost of credit in Mexico may not necessarily be less than U.S. credit costs. Interest rates in Mexico are reported to be between 7 and 18 percent. There do not appear to be any Federal- or State-assisted credit terms or below-market interest rates in Mexico for vegetable crops. However, low-cost credit may be available from private sources. Much of the credit to growers is reported to come from U.S. interests including processing firms, which frequently advance credit for seeds, chemicals, fertilizers, and machinery-use; such advances are considered no-interest crop loans. Other credit sources to Mexican producers (or related business entities) may come from various sources outside Mexico, or from Mexican investors with private funds.

The total direct cost to grow, harvest, and deliver broccoli to a processing plant in central Mexico in June 1986 was estimated at US\$333.39 per acre, or 4.6 U.S. cents per pound. 4/ Average costs in California for the same operations were estimated at 13.6 cents per pound. 5/ A summary of the June 1986 total direct cost in central Mexico is shown in the following tabulation: 6/

1/ On the basis of staff conversations with processors in Mexico, July 1988.

2/ On the basis of data from the posthearing brief of the Mexican Growers/Processors of Broccoli and Cauliflower from the Celaya and Montemorelos Regions of Mexico, p. 8, and Commissioners' conversations with Mexican growers and Government officials in Mexico, May 1988.

3/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 50.

4/ The total costs per hectare to grow, harvest, and deliver broccoli to processing plants in central Mexico are shown in table 11 of Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 53. These unit costs were based on a 1982-83 farm survey of 10 contract broccoli growers in Guanajuato, Mexico, using the median values of the survey, and June 1986 prices for labor and other inputs.

5/ University of California Cooperative Extension Service, Monterey County, various sample cost studies.

6/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 53.

<u>Item</u>	<u>Dollars per acre</u>	<u>Cents per pound 1/</u>
Direct seeding.....	\$115.90	1.58
Chemicals.....	57.55	.79
Fertilization.....	38.74	.53
Land preparation.....	25.00	.34
Irrigation.....	17.81	.24
All cultivations.....	13.77	.19
Pre-harvest sub-total.....	268.77	3.68
Harvesting.....	28.20	.39
Transport to processing plant..	36.42	.50
Total.....	333.39	4.57

1/ Assuming a yield of 7,300 pounds per acre (8.2 metric tons per hectare).

After the costs of direct seeding, the most important growing costs were for pest-management chemicals and fertilizer. The price for seed (which is imported from the United States) is the U.S. price plus freight charges to Mexico. Processors sell seed to growers at cost. When growers use seedlings, they pay about 0.4-0.5 U.S. cents per broccoli seedling, or about US\$110 per acre, which is almost the same as the cost of seed. However, the cost to processors for producing seedlings was reported to be about 0.8 U.S. cents per seedling. 1/

The costs of applying chemicals for pest management varies considerably among growers. Moulton and Runsten found that the cost of applying chemicals (including cost of the chemicals, labor, and tractor time) varied between US\$17 and US\$88 per acre, with a median cost of US\$57 per acre.

Mexican growers use heavy amounts of fertilizers because virtually all the growing land in the Bajio is nitrogen- and phosphorus-deficient. The Mexican Government corporation FERTIMEX supplies most of the fertilizer. FERTIMEX buys much of its raw materials from other Government companies, such as PEMEX, at prices said to be well below market rates. 2/ Fertilizer prices in Mexico are also reported to be below world-market prices. For example, comparative costs of two widely used fertilizers, anhydrous ammonia and diammonium phosphate, show the price in Mexico as varying between 22 and 83 percent of the price in the United States. 3/

Prices.---Prices received by Mexican growers are those received under contract to freezers in Mexico or Texas, or through brokers selling fresh-market products in the United States or Canada. In June 1986, the prices paid to growers in Mexico for Grade 1 broccoli for processing ranged from about 6 to 12 cents per pound. 4/ This price range reflects the alleged tendency to pay growers on three scales. Small growers receive on average the lowest price, about 6 cents per pound, but receive the most in technical assistance, crop loans; and use of equipment; larger growers receive 8 to 9 cents; and, the highest price, about 12 cents, is received by the largest

1/ Ibid., p. 28.

2/ In response to Commission staff's inquiries, Mexican Government officials denied such a practice.

3/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, table 3, p. 31.

4/ Ibid., p. 57.

growers. Many freezers have initiated a summer-risk price premium to encourage summer production; for example, one plant paid a premium of 6.25 percent for such production. According to information gathered by the Commission staff during the investigation, the average annual prices received by growers in central Mexico during 1985-87 for broccoli ranged from 11.7 to 13.6 cents per pound, and for cauliflower from 11.8 to 12.7 cents per pound.

Marketing.--According to a published source, most California growers agree that Mexican exports of fresh produce are at, or above, minimum U.S. quality standards. 1/ This is attributed, in part, to the pre-entry inspection of Mexican fresh-market product for export at the U.S. border. With regard to pesticide residues, Mexican growers are aware of border inspections and "it is believed that the financial loss involved with having a load refused entry at the border offers strong disincentive to the deliberate misuse of agricultural chemicals." 2/

In 1985, Mexican exports of fresh asparagus, broccoli, and cauliflower were nearly all to the United States, as shown in the following tabulation (in thousands of pounds): 3/

<u>Market</u>	<u>Asparagus</u>	<u>Broccoli</u>	<u>Cauliflower</u>
United States.....	18,789	5,566	3,940
West Germany.....	212	0	0
United Kingdom.....	80	0	0
All other.....	93	0	5
Total.....	19,174	5,566	3,945

Asparagus, broccoli, and cauliflower exports from Mexico to the United States for crop year 1986/87 are shown in tables 5-2 to 5-4. For fresh or chilled asparagus, Baja California and Sonora accounted for 44 and 33 percent, respectively, of total exports; most of these exports (66 percent collectively) occurred in February and March (table 5-2). Guanajuato accounted for 20 percent of fresh or chilled asparagus exports, with shipments primarily in July and August. Nearly three-fifths of fresh, chilled, or frozen broccoli exports were from Guanajuato, mainly during February-April. Frozen broccoli was nearly all from Guanajuato and fresh or chilled broccoli mainly from Coahuila, Guanajuato, and Aguascalientes, peaking in January (table 5-3). For cauliflower, about one-half of the exports were in a fresh or chilled form, with Sonora and Guanajuato, together, accounting for three-fourths of the total (table 5-4). Most of the frozen cauliflower was from Guanajuato and shipped principally during December-March.

1/ Randy Treichler, Vegetables from Mexico, A Study of Fresh and Processed Imports, International Agricultural Development, University of California, January 1988, p. 22 (On the basis of data collected through 1987). There is no U.S. requirement that imported fresh asparagus, broccoli, or cauliflower meet minimum USDA quality standards.

2/ Ibid., p. 22.

3/ Source: Compiled by the Union Nacional de Organismos de Productores de Hortalizas y Frutas, from Anuario Estadístico del Comercio Exterior de los Estados Unidos Mexicanos, 1985, Instituto de Estadística.

Processing Sector

In the late 1950's and early 1960's, several U.S.-owned canning companies, including Gerber Products Co., Campbell Soup Co., and Del Monte Co., built canneries in the Bajio for sales of canned vegetable products to Mexican markets. The Bajio was chosen because of its location between Mexico's two largest cities, Mexico City and Guadalajara. The canners contracted with growers in the region to obtain raw vegetables. Several other large U.S. companies (e.g., General Foods Corp. and Green Giant Co.) built freezing plants for processing frozen vegetables in the late 1960's, primarily for export to the United States. Historically, the market in Mexico for frozen vegetables has not been large, since most Mexican consumers have not had freezer units in their homes. Recently, however, certain freezers have produced frozen products for sale in Mexican markets. ^{1/}

Structure

Export marketing of frozen vegetables developed in Mexico as a result of foreign investment by U.S. companies seeking to take advantage of increasing U.S. demand. General Foods introduced broccoli and cauliflower to the Bajio region and offered contracts and technical assistance to growers in the area. Under Mexican law, there are restrictions on foreign corporations owning and farming their own land; consequently, U.S.-owned corporations, such as General Foods, Inc., The Pillsbury Co., Campbell Soup Co., and J.R. Simplot Co., have traditionally been supplied raw product under contracts with Mexican growers. Later, several of the growers, such as Arteaga and Covemex, built their own freezing plants. Broccoli accounts for 75 percent of frozen vegetable exports, whereas cauliflower accounts for about 23 percent.

Number, location, and industry concentration.--At the present time, there are an estimated 23 firms in Mexico freezing vegetables and fruit, especially broccoli, cauliflower, and strawberries. ^{2/} Nearly all of these firms are in central Mexico, primarily in Guanajuato and Michoacan (figure 5-2). The Mexican vegetable- and fruit-freezing industry began with strawberry freezers located near Irapuato, Guanajuato. These plants began exporting frozen strawberries in 1950 and acreage in Guanajuato expanded until the early 1970's, then declined by the early 1980's to less than one-third of its 10,000-acre peak. Some of the freezing capacity for strawberry production shifted to the area of Zamora, Michoacan, and numerous freezing plants were eventually built in that region. Strawberry harvested area in Zamora peaked in the mid-1970's at about 9,000 acres, but declined by nearly one-half by 1982. By the mid-1980's, broccoli and cauliflower were being frozen in some of the freezing facilities formerly used for strawberries.

According to industry sources, ^{3/} the decline of the Mexican frozen strawberry industry is attributed to Mexican Government regulations imposed on the industry and to the high fees charged by the Mexican growers' union. The

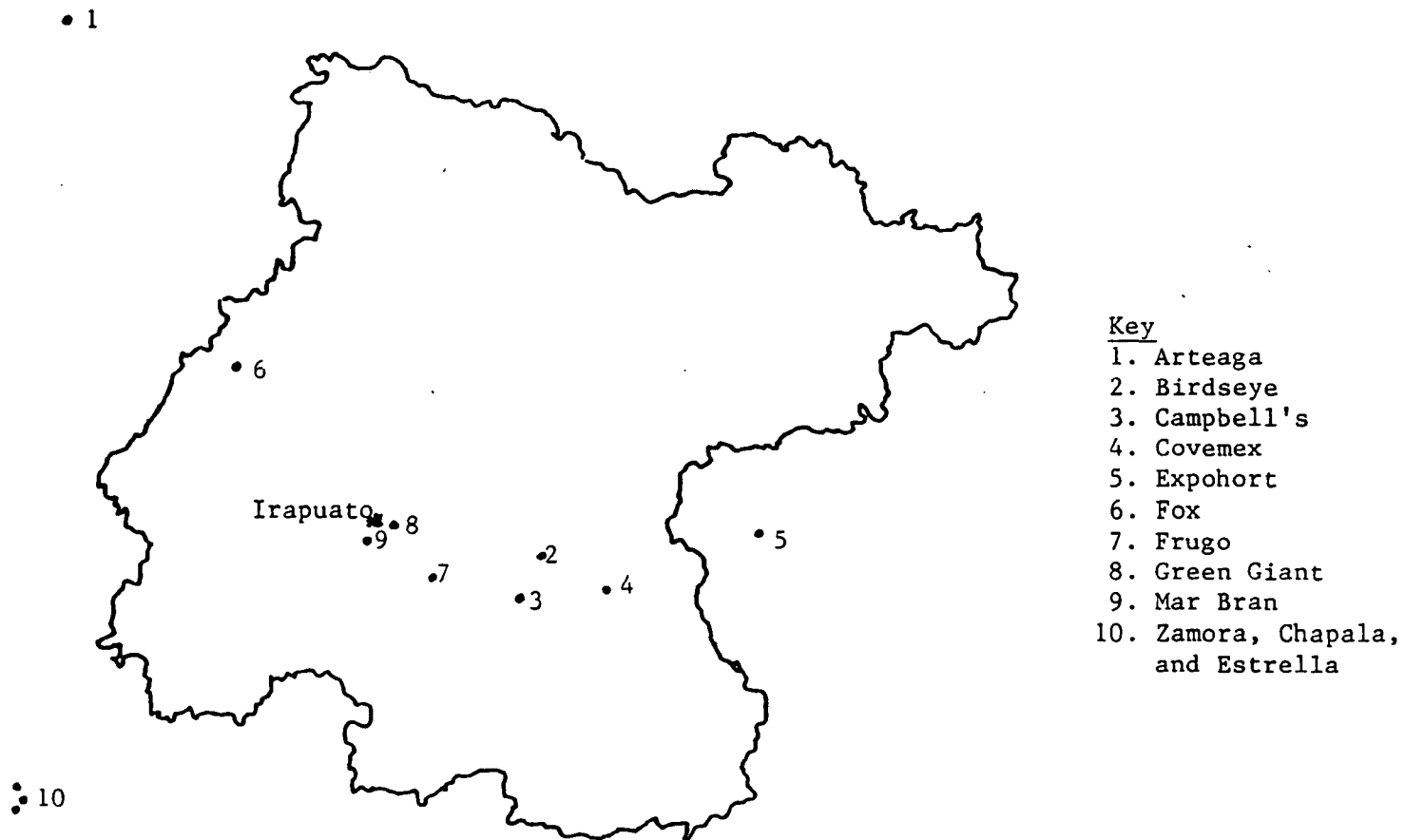
^{1/} On the basis of Commissioners' conversations with Mar Bran officials in Mexico, May 1988, and Commission staff conversations with Mexican growers, freezers, and Government officials in Mexico, July 1988.

^{2/} See app. G for a list of the companies.

^{3/} On the basis of Commission staff conversations with industry representatives in Texas, July 1988, and an article in Union Nacional de Productores de Hortalizas, Bimonthly Bulletin No. 49, 1986.

Figure 5-2.

Processing plant locations of principal vegetable freezers in and around Guanajuato, in central Mexico, 1987



Source: Commission staff interviews in 1988, and Moulton and Runsten, The Frozen Vegetable Industry of Mexico, December 1986.

union in the Zamora valley of Michoacan, formed on May 15, 1967, was financed from fees obtained principally from the production of strawberries for export. Mexican strawberry production is reported to have increased in recent years, with planted acreage up 50 percent from 9,880 acres in 1985/86 to 14,820 acres in 1987/88. 1/ During this period, frozen strawberry production rose 97 percent in central Mexico. 2/

In contrast to the frozen-strawberry industry, which was mostly started by Mexican-owned companies with U.S. financing, the vegetable- and fruit-canning industry in central Mexico was started mostly by U.S.-owned companies. Some of these canners later changed over to frozen-vegetable production. One company, Del Monte, reportedly moved to Mexico from California to export fresh and canned asparagus to U.S. markets. 3/ However, in spite of the lower wage rates in Mexico, however, Del Monte lost most of its market share in the United States for its Mexican-produced canned asparagus to Taiwan. As a result, Del Monte and other processors decided to concentrate on distributing canned product to the Mexican domestic market.

A number of other firms were involved in freezing operations in central Mexico. 4/ The Arteaga family, a grower in Aguascalientes, built a freezing plant and attempted to market frozen vegetables in Mexico by placing them in old ice cream freezers; they now sell on the export market. The Fox family, located outside of Leon, Guanajuato, built a vegetable-freezing plant in 1985; they had shifted from grain production to vegetables in the late 1960's. In 1970, they began to grow broccoli and cauliflower for Birds Eye; in 1974, they began shipping trimmed vegetables to processors in southern Texas; and in 1979, they began to freeze vegetables in rented facilities.

Covemex is a firm composed of growers that were Mexico's principal garlic exporters. They built a freezing plant near Celaya, Guanajuato, in 1978 and began growing broccoli and cauliflower in crop rotation with garlic. Mar Bran, in Irapuato, Guanajuato, started as a strawberry-freezing plant supported by U.S. business interests from Texas. It was purchased by Mexican growers and converted to vegetable freezing about 1980. 5/

Expohort is a Mexican grower cooperative which recently opened a freezing plant in Queretaro. Green Giant (Gigante Verde), a subsidiary of The Pillsbury Co., opened a plant in Irapuato, Guanajuato, in 1983 to help supply its U.S. customers with frozen broccoli and cauliflower. The Campbell Soup Co., faced with declining markets in Mexico for its canned products after 1982, converted a plant near Celaya, Guanajuato, from soup mixing for the Mexican market to vegetable freezing for the export market. Birds Eye, a subsidiary of General Foods Corp., also has a vegetable-freezing plant near Celaya for processing broccoli and cauliflower.

Integration and diversification.--The Mexican vegetable-processing industry is made up of both U.S. multinationals and Mexican independent freezers. For most firms, the U.S. market is of primary importance, and

1/ Horticultural Products Review, USDA-FAS, April 1988, FHORT 4-88.

2/ Ibid.

3/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 12.

4/ Ibid., and Commission staff interviews with Mexican growers, freezers, and Government officials, July 1988.

5/ Ibid., p. 15.

demand for Mexican-produced products from any other countries is secondary. Because of Mexican laws restricting farmland ownership by foreign entities, some U.S. multinational processors have combined processing and growing operations by contracting for fresh vegetables with Mexican growers and supplying them with some elements of raw-product production, such as planting and chemical spray programs.

Many freezers in Mexico are vertically integrated into raw-product production (or contracted procurement) and wholesale frozen processed-product sales. Whereas many of the firms are marketing only bulk food-service packs of frozen product, several firms, primarily multinational companies, are further integrated into retail packaged products as well. 1/ Presently, freezer plants in Mexico are not producing frozen breaded vegetables, frozen vegetables in sauces, or frozen dinners with vegetable mixtures for retail sales. 2/

Transportation of frozen product to the U.S. border is handled by independent trucking firms. Presently, most of the cold-storage capacity for frozen product is on the U.S. side of the border. Cold-storage space presently at processing facilities in Mexico generally is large enough for only a few days' or weeks' production, as producers count on shipping the frozen product shortly after processing. 3/ There appears to be no integration between production and transportation, or transportation and cold storage.

Costs, prices, and marketing

Costs.--Extensive data, at a detailed level and for a significant period of time, are not available. 4/ The average unit cost for processors in central Mexico to produce and deliver chopped frozen broccoli to the U.S. border in June 1986 was 22 U.S. cents per pound, with a calculated U.S. duty of 3.9 cents per pound, bringing the total delivered cost into the United States to 25.9 cents per pound, as shown in the following tabulation (in U.S. cents per pound): 5/

1/ On the basis of information from five U.S. firms with foreign production facilities. The share of their foreign frozen-broccoli output in retail-size containers was 39 and 28 percent in 1985 and 1987, respectively; for frozen cauliflower, the shares were 17 and 7 percent, respectively.

2/ On the basis of Commission staff conversations with Mexican freezers and Government officials in Mexico, July 1988.

3/ Observations of Commission staff from visits with five processing facilities in Mexico, July 1988.

4/ In response to Commission staff's inquiries, Mexican Government officials stated that cost data were not available on such a basis for the subject vegetables. In addition, Mexican industry representatives also said that such data were not available.

5/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 67.

<u>Item</u>	<u>Cost</u>
Raw broccoli.....	10.0
Plant costs for freezing.....	7.0
Packaging.....	2.0
Transport.....	2.5
Miscellaneous fees.....	.5
Subtotal (to U.S. border).....	22.0
Calculated U.S. duty at 17.5 percent ad valorem...	3.9
Total delivered cost to the United States.....	25.9

During the investigation, the Commission received 1985-87 data on the unit cost of producing frozen broccoli and cauliflower in central Mexico and shipping it to the U.S. border. The data are annual averages of production of all styles of pack, weighted according to the firm's overall production level, and inclusive of costs to the border and additional duty costs (table 5-5). The delivered cost per pound at the U.S. border (from table 5-5 plus U.S. duty) for Mexican-produced frozen broccoli and cauliflower has declined since 1985, as shown in the following tabulation (in U.S. cents per pound):

	<u>Unit costs to U.S. border</u>	<u>U.S. duty 1/</u>	<u>Total 2/</u>
Broccoli:			
1985.....	33.1	5.8	38.9
1986.....	26.6	4.7	31.3
1987.....	24.6	4.3	28.9
Cauliflower:			
1985.....	28.2	4.9	33.1
1986.....	26.8	4.7	31.5
1987.....	25.6	4.5	30.1

1/ 17.5 percent ad valorem.

2/ Does not include border-crossing costs other than the U.S. duty.

These data assume that the duty is based on the cost of production plus the cost of transportation to the U.S. border, to arrive at a total unit value at a U.S. (Texas) border entry point. 1/ Whereas the cost of transportation to the border (which averaged 2.8 cents per pound) is not dutiable, the tabulation does not include a per pound equivalent of other border-crossing costs, such as Mexican export broker fees, bridge-crossing fees, U.S. customs user fees, or the cost of transferring the product into U.S. registered vehicles and/or the cost of shipping to a local cold-storage facility.

Prices.--Actual wholesale-price quotations, by Mexican brokers or processing firms for frozen asparagus, broccoli, or cauliflower exported from Mexico to the United States, are not available. Prices Mexican producers receive from U.S. buyers are arranged through private contract for supplies to be delivered during a future specified time. 2/ Such prices, however, are also

1/ In actual practice, U.S. customs duties are calculated on the exporter's verifiable declared value of the frozen vegetable (which varies widely due to product differences) less allowances for costs of American goods returned (e.g., packaging) and transportation from the processing plant to the border.

2/ On the basis of Commission staff conversations with brokers, U.S. Customs officials, and freezers in Texas and Mexico, June and July, 1988.

not available. However, average annual unit values of imports from Mexico may be taken as representative of price levels, at least for trend analysis, although these averages are for all container sizes, grades, and styles of pack. The average unit values of such imports for 1983-1987 are shown in the following tabulation (in U.S. cents per pound): ^{1/}

<u>Year</u>	<u>Asparagus</u>	<u>Broccoli</u>	<u>Cauliflower</u>
1983.....	51	33	32
1984.....	41	32	33
1985.....	45	33	32
1986.....	49	29	29
1987.....	71	24	26

Asparagus import values fell 10 cents, or 20 percent, from 1983 to 1984, and then rose 30 cents through 1987. During 1983-85, price levels for frozen broccoli and cauliflower for export were relatively steady, ranging from 32 to 33 cents per pound. From 1985 to 1987, however, average prices were 24 cents and 26 cents per pound, respectively.

Marketing.--Frozen vegetables from Mexico are generally marketed in the United States one of two ways. U.S. multinational firms that freeze vegetables in Mexico generally market their product through their own parent firm (intra-company transfer) in the United States or sell product through brokers to other U.S. buyers, including U.S. freezers. Most of the other freezers in Mexico market their output through brokers or sales offices, usually located in Texas; these firms also process substantial quantities for the U.S. multinationals. Most of their product is shipped directly from their processing facility in Mexico to the buyer in the United States. Some product is shipped to South Texas for repackaging or warehousing before being shipped to institutional or retail consumers elsewhere in the United States.

Entry points in the United States are generally those closest to production areas in Mexico or on a direct route between Mexican freezers and U.S. buyers. Asparagus grown in Baja California, for example, enters through U.S. ports in California, whereas broccoli grown in Monterrey, Mexico, enters through South Texas. The entry point for frozen vegetables is not as critical as for fresh-market product, provided that transportation is by refrigerated trucks and freezing temperatures are properly maintained.

Generally, Mexican growers selling frozen vegetables directly to the United States may create their own processing and marketing firm and assume both growing and marketing risks (and any consequent profits or losses), or they may grow under contract to a U.S. firm at a stated price. ^{2/} It might appear that the integrated, grower-owned processing firm would have a profit advantage over those growers selling to processing plants under contracts, but

^{1/} Moulton and Runsten, The Frozen Vegetable Industry of Mexico, tables 2-13, 2-16, and 2-18.

^{2/} In May 1983, the U.S. Customs Service ruled, in a case involving asparagus imported by Green Giant through the port of Calexico, CA, that the transfer of product under its agreement (between the Company and Mexican growers for a specified unit price plus a specified percentage of profits) is equivalent to a bona fide sale for the purpose of establishing transaction value in the determination of duty assessment (CIE N-36/75, Internal Advice No. 30/82).

there are some offsetting benefits to growers who are contracting. Although they receive a lower product price than they might receive in the open market, growers under a service contract receive technical assistance. The contracting plant is reimbursed for any technical assistance or credit given to the grower.

Another advantage for the contracting grower is that the marketing risks are transferred to the processor. The processor, by setting its own grading standards and providing advice, relieves the grower of the need to make critical harvest and quality decisions. Some industry members claim that the lack of third-party grading has led to grower dissatisfaction in the past and may have led some growers to acquire their own processing plants. On the other hand, it may not matter as much to the multinational contracting firms, such as General Foods and Green Giant, which do the trimming and freezing themselves, as long as a large supply of low-cost quality product is available. Some of the Mexican-independent freezers are engaged in custom freezing for General Foods and Green Giant Co. 1/

As mentioned previously, Mexican growers and processors appear to be as concerned about product quality and pesticide residues as are U.S. firms. Commission staff visited five freezing facilities in Mexico and, at each facility, the stated procedure was to thoroughly test the raw product prior to processing. Many firms reported that testing was done at independent facilities. Quality controls appeared to be operating as effectively in Mexican plants as those observed in California, even down to the metal detectors used on each product line. In addition, some Mexican interests contract with marketing consultants for the purpose of inspecting the quality and packaging of Mexican produce in the U.S. retail market. 2/

Role of Government

Mexico recently became a member of the General Agreement on Tariffs and Trade (GATT), and thus did not participate as a member in the Tokyo Round of multilateral trade negotiations concluded in 1980. In August 1986, Mexico became a full member of GATT, which changes Mexico's posture and obligations on international trade issues.

Effective July 1, 1988, duty rates on imports of a number of fresh or chilled vegetables into Mexico declined from 25 to 10 percent ad valorem. The previous duty on frozen vegetables, 20 percent ad valorem, dropped to 15 percent. These reductions are a result, in part, of the Economic Solidarity Pact, a new economic program announced by the Government of Mexico in December 1987 as a result of worsening economic conditions in Mexico, including a 65-percent drop in the Mexican stock market in early October 1987.

Import license requirements for selected items, including certain vegetables, were removed in 1988. The Mexican import licensing system has been described as the greatest impediment to U.S. exports to Mexico, resulting in much uncertainty on the part of both Mexican importers and foreign suppliers. Also, effective January 1988, the minimum import prices for all categories of the Mexican tariff schedules were eliminated.

1/ Moulton and Runsten, The Frozen Vegetable Industry of Mexico, p. 18.

2/ On the basis of staff conversations with Mr. Donald R. Stokes, Mid-Atlantic representative, under the direction of Dr. Robert Bull, President, Food Business Associates, Inc.

The maquiladoras, established in 1965 under Mexico's Border Industrialization Program, are in-bond production facilities. In-bond plants were initially limited to the border zone, defined as land within 100 kilometers of the border or 50 kilometers of the coast. In 1972, however, authorization was given for the establishment of such plants throughout Mexico. Green Giant opened a maquiladora in Irapuato in 1983, to be able to have full ownership of a Mexican processing plant and enter equipment into Mexico under "in-bond" status. 1/

In 1986, about 90 percent of the maquiladoras were located in the border zone. 2/ Of the more than 750 maquiladoras listed, two were producers of food items, one of which was a freezer of broccoli and cauliflower. 3/

The maquiladora program definition as related to agriculture has requirements for in-bond operations and for whether it is a growing or transforming operation. There appeared to be some questions as to whether the exports of asparagus, broccoli, and cauliflower from Mexico can qualify as 806/807 U.S. imports. These questions concerned the substantial transformation of the seeds and packaging into a finished fresh or frozen vegetable product that would qualify as an 806/807 U.S. import, and whether U.S. duties should be levied on the portion of added value in Mexico or on the entire product. Under the PITEX program, 4/ processing firms were able to import packaging, seeds, and dedicated processing equipment duty free or under drawback provisions as long as the inputs were used for the production of exported commodities.

Since December 1982, the Mexican peso has been subject to two exchange rates: an official rate set by the Mexican Government every 90 days and an unofficial or market rate. The Government can influence exports and imports by setting the official rate above or below the market rate. If the official rate is set below the market rate, thereby undervaluing the peso, Mexican exports become more competitive and imports into Mexico less competitive. In recent years, the official valuation rate of the peso may have been over- or under-valued by as much as 40 percent, compared with the market rate.

Since 1982, Mexico has been under pressure to increase exports in order to open the Mexican economy to international trade, earn currency from exports to service its international debt, and create new jobs for the rapidly growing labor force. In April 1985, Mexico agreed to remove certain export subsidies, such as tax rebates and financial subsidies, and, in return, the United States agreed not to treat other remaining Mexican Government policies as export subsidies. 5/ This created an additional incentive for Mexico to stimulate exports by undervaluing the peso.

1/ Response of Mr. Don Norris, plant manager of the Green Giant processing facility in Irapuato, to question of Commissioner Rohr, transcript of Commission hearing in May 1988, p. 176.

2/ U.S. International Trade Commission, The Impact of Increased United States-Mexico Trade on Southwest Border Development, Report to the Senate Committee on Finance on Investigation No. 332-223, USITC Publication 1915, November 1986, pp. 20-25.

3/ Ibid., app. G and p. 252.

4/ The PITEX program is a temporary import program of the Mexican Government. See cable from the American Embassy in Mexico City, September 1987.

5/ Understanding Between the United States and Mexico Regarding Subsidies and Countervailing Duties, signed Apr. 23, 1985.

Table 5-1.

Asparagus, broccoli, and cauliflower: Harvested area and production in Mexico, 1978-86

Year	Area (acres)			Production (1,000 pounds)		
	Asparagus	Broccoli	Cauliflower	Asparagus	Broccoli	Cauliflower
1978.....	1,749	3,174	10,554	20,156	29,736	59,096
1979.....	2,786	3,310	9,885	24,980	34,259	45,279
1980.....	1,685	3,868	10,310	16,761	26,069	43,386
1981.....	2,233	4,505	11,295	24,786	48,960	47,677
1982.....	2,122	4,231	10,707	24,751	41,530	48,728
1983.....	2,458	4,742	14,363	26,316	49,087	62,799
1984.....	2,979	6,452	13,402	35,224	65,139	41,314
1985.....	5,310	10,100	12,656	55,631	100,960	54,254
1986.....	4,997	9,253	11,666	53,059	87,516	57,251

Source: Secretaria Agricultura y Recursos Hidraulicos. Agriculture Statistics 1978/86, elaborated by UNPH.

Table 5-2.

Asparagus, fresh or chilled: 1/ Mexican exports, by producing State and by month, 2/ crop year 1986/87

Month	State						Total	Share of total Percent
	Baja California	Sonora	Guana-juato	Coa-huila	Quere-taro	Baja Cali-fornia Sur		
	Quantity (metric tons)							
October....	0	1	0	0	33	0	34	0.3
November...	15	23	0	0	0	19	57	0.4
December...	34	33	235	0	0	46	348	2.6
January....	315	392	0	0	0	7	714	5.4
February...	1,700	1,566	0	0	0	0	3,266	24.7
March.....	3,279	2,144	0	0	0	0	5,423	41.0
April.....	465	235	0	0	0	0	700	5.3
June.....	0	0	268	0	0	0	268	2.0
July.....	0	0	835	33	0	0	868	6.6
August.....	0	0	925	106	28	0	1,059	8.0
September..	0	0	425	45	22	0	492	3.7
Year.....	5,808	4,394	2,688	184	83	72	13,229	
Percent of total....	43.9	33.2	20.3	1.4	.6	.6		

1/ Data on Mexican exports of frozen asparagus are not available.

2/ No data were reported for May.

Source: Union Nacional De Organismos de Productores de Hortalizas y Frutas, Boletín Anual Temporada 1986-87 (National Union of Producers of Horticultural Crops and Fruits of Mexico, Annual Statistical Bulletin, 1986/87).

Table 5-3.

Broccoli, fresh, chilled, or frozen: Mexican exports, by product type, by producing State, and by month, crop year 1986/87

Product type and State	Month												Total	Share of total Percent
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept		
Quantity (metric tons)														
Fresh or chilled:														
Guanajuato.....	0	6	634	1,714	315	525	1,156	143	29	32	14	19	4,587	12.1
Coahuila.....	0	100	768	350	370	594	174	21	21	723	1,485	1,331	5,937	15.6
Michoacan.....	0	120	6	29	175	35	89	22	0	145	27	0	648	1.7
Aguascalientes..	239	187	235	339	84	3	66	491	693	293	201	0	2,831	7.5
Nuevo Leon.....	0	0	15	60	9	46	0	0	0	0	23	14	167	.4
Baja Calif- ornia.....	2	18	139	470	260	40	11	0	0	0	0	0	940	2.5
Sonora.....	8	72	69	76	57	42	55	0	0	0	0	0	379	1.0
Tamaulipas.....	0	0	0	114	167	6	0	0	0	37	0	0	324	.9
All other.....	0	0	0	19	0	0	2	0	0	0	0	0	21	1/
Total.....	249	503	1,866	3,171	1,437	1,291	1,553	677	743	1,230	1,750	1,364	15,834	41.7
Frozen:														
Guanajuato.....	423	1,728	1,749	887	3,416	5,008	1,713	857	490	480	411	148	17,310	45.6
Coahuila.....	27	52	0	0	0	0	0	0	0	0	38	0	117	.3
Michoacan.....	6	4	51	123	246	231	313	630	695	364	409	184	3,256	8.6
Aguascalientes..	0	63	0	0	0	0	0	0	55	57	37	0	212	.6
Nuevo Leon.....	0	0	0	66	3	35	58	0	33	280	383	373	1,231	3.2
All other.....	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Total.....	456	1,847	1,800	1,076	3,665	5,274	2,084	1,487	1,273	1,181	1,278	705	22,126	58.3
All:														
Guanajuato.....	423	1,734	2,383	2,601	3,731	5,533	2,869	1,000	519	512	425	167	21,897	57.7
Coahuila.....	27	152	768	350	370	594	174	21	21	723	1,523	1,331	6,054	15.9
Michoacan.....	6	124	57	152	421	266	402	652	695	509	436	184	3,904	10.3
Aguascalientes..	239	250	235	339	84	3	66	491	748	350	238	0	3,043	8.0
Nuevo Leon.....	0	0	15	126	12	81	58	0	33	280	406	387	1,398	3.7
Baja Calif- ornia.....	2	18	139	470	260	40	11	0	0	0	0	0	940	2.5
Sonora.....	8	72	69	76	57	42	55	0	0	0	0	0	379	1.0
Tamaulipas.....	0	0	0	114	167	6	0	0	0	37	0	0	324	.9
All other.....	0	0	0	19	0	0	2	0	0	0	0	0	21	1/
Total	705	2,350	3,666	4,247	5,102	6,565	3,637	2,164	2,016	2,411	3,028	2,069	37,960	100.0
Percent of total:														
Fresh or														
chilled.....	1.6	3.2	11.8	20.0	9.1	8.1	9.8	4.3	4.7	7.8	11.0	8.6		
Frozen.....	2.1	8.3	8.1	4.9	16.6	23.8	9.4	6.7	5.8	5.3	5.8	3.2		
Average.....	1.9	6.2	9.6	11.2	13.4	17.3	9.6	5.7	5.3	6.4	8.0	5.4		

1/ Less than 0.05 percent.

Source: Union Nacional De Organismos de Productores de Hortalizas y Frutas, Boletín Anual Temporada 1986-87 (National Union of Producers of Horticultural Crops and Fruits of Mexico, Annual Statistical Bulletin, 1986/87).

Table 5-4.

Cauliflower, fresh, chilled, or frozen: Mexican exports, by product type, by producing State, and by month, crop year 1986/87

Product type and State	Month												Total	Share of total
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept		Percent
	Quantity (metric tons)													
Fresh or chilled:														
Guanajuato.....	0	0	654	870	19	0	0	0	255	64	237	88	2,187	18.4
Sonora.....	0	247	388	497	439	348	619	0	0	0	0	0	2,538	21.3
Michoacan.....	0	7	119	62	0	0	38	38	0	16	0	151	431	3.6
Aguascalientes....	124	122	140	244	104	8	9	12	35	4	0	0	802	6.7
Nuevo Leon.....	0	0	0	0	93	2	0	0	0	0	12	8	115	1.0
Tamaulipas.....	0	0	0	2	58	0	0	0	0	0	0	0	60	.5
Baja California...	1	1/	2	40	0	0	0	0	0	0	0	0	43	.4
All other.....	0	0	0	7	0	0	0	0	0	0	0	0	7	.1
Total.....	125	377	1,303	1,722	713	358	666	50	290	84	249	247	6,183	51.9
Frozen:														
Guanajuato.....	29	603	1,107	674	1,172	438	64	10	201	80	6	229	4,613	38.7
Michoacan.....	0	0	188	236	245	89	61	41	39	59	2	0	960	8.1
Aguascalientes....	0	0	0	0	0	19	0	6	0	0	0	0	25	.2
Nuevo Leon.....	0	0	0	0	113	19	3	0	0	0	0	0	135	1.1
All other.....	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Total.....	29	603	1,295	910	1,530	565	128	57	240	139	8	229	5,733	48.1
All:														
Guanajuato.....	29	603	1,761	1,544	1,191	438	64	10	456	144	243	317	6,800	57.1
Sonora.....	0	247	388	497	439	348	619	0	0	0	0	0	2,538	21.3
Michoacan.....	0	7	307	298	245	89	99	79	39	75	2	151	1,391	11.7
Aguascalientes....	124	122	140	244	104	27	9	18	35	4	0	0	827	6.9
Nuevo Leon.....	0	0	0	0	206	21	3	0	0	0	12	8	250	2.1
Tamaulipas.....	0	0	0	2	58	0	0	0	0	0	0	0	60	0.5
Baja California...	1	1/	2	40	0	0	0	0	0	0	0	0	43	0.4
All other.....	0	0	0	7	0	0	0	0	0	0	0	0	7	0.1
Grand total...	154	980	2,598	2,632	2,243	923	794	107	530	223	257	476	11,916	100.0
Percent of totals:														
Fresh or chilled..	2.0	6.1	21.1	27.9	11.5	5.8	10.8	0.8	4.7	1.3	4.0	4.0		
Frozen.....	0.5	10.5	22.6	15.9	26.7	9.9	2.2	1.0	4.2	2.4	0.1	4.0		
Average.....	1.3	8.2	21.8	22.1	18.8	7.7	6.7	0.9	4.4	1.9	2.2	4.0		

1/ Less than 0.5 metric tons.

Source: Union Nacional De Organismos de Productores de Hortalizas y Frutas, Boletín Anual Temporada 1986-87 (National Union of Producers of Horticultural Crops and Fruits of Mexico, Annual Statistical Bulletin, 1986/87).

Table 5-5.

Unit cost of producing frozen broccoli and cauliflower in central Mexico, by vegetable and by cost item, 1985-87

(U.S. cents per pound)			
Vegetable and cost item	1985	1986	1987
Broccoli:			
Fresh product delivered to plant.....	13.58	11.82	11.70
Direct labor in processing.....	2.92	2.30	2.07
Packaging.....	4.23	2.68	2.97
Overhead and other plant costs.....	9.55	6.97	5.03
Total production cost.....	30.28	23.77	21.77
Transportation to U.S. border.....	2.82	2.87	2.80
Total.....	33.10	26.64	24.57
Cauliflower:			
Fresh product delivered to plant.....	11.90	11.82	12.66
Direct labor in processing.....	3.43	2.61	2.58
Packaging.....	1.01	1.07	1.43
Overhead and other plant costs.....	9.38	8.58	6.24
Total production cost.....	25.72	24.08	22.92
Transportation to U.S. border.....	2.47	2.76	2.72
Total.....	28.19	26.84	25.63

Source: Compiled by Commission staff from data estimated to account for from 25 to 50 percent of Mexican production in recent years.

CHAPTER 6. STATUS OF U.S. COMPETITIVENESS

General

The U.S. fresh and frozen asparagus, broccoli, and cauliflower industries have been expanding for several decades. However, since the early 1980's, foreign suppliers, particularly Mexico, have penetrated the U.S. market, eroding the dominant position U.S. industries have traditionally held in the domestic market. These foreign suppliers have captured greater market shares because they have lower production costs and because of climatic differences that allow them to produce and market fresh vegetables during seasons when U.S. production and supply are at their lowest. Additionally, consumer preferences are shifting toward products the production of which is more labor intensive than traditional products; an example is the growing demand for broccoli florets over whole broccoli heads. Other important industry or market forces affecting U.S. competitiveness include technology transfer by U.S. multinationals and the U.S. Government, and U.S. and Mexican Government intervention in production and marketing.

This chapter summarizes the findings of the Commission regarding measures of competitiveness, comparative strengths of U.S. and foreign industries in the U.S. market, the nature of government programs affecting the U.S. and foreign industries, and competitive strategies undertaken by the U.S. industry.

Measures of Competitiveness

Market shares

A leading indicator of U.S. competitiveness in the markets for asparagus, broccoli, and cauliflower is the changing U.S. share of such markets. Market shares can be used with other performance indicators such as costs of production to compare the economic condition of the U.S. industry with that of its competitors. A set of measures of U.S. market share is presented in table 6-1.

During 1983-87, U.S. producers suffered a declining share of the U.S. markets for nearly all major asparagus, broccoli, and cauliflower products, as measured by the share of U.S. apparent consumption accounted for by domestic supply (production minus exports). The exception was fresh cauliflower, where the U.S. market share fluctuated only slightly during the period. The greatest declines in U.S. market share occurred in frozen broccoli and frozen cauliflower, where the U.S. producers' shares declined by 28 and 26 percentage points, respectively.

The major force behind the declining U.S. market share for frozen broccoli was a substantial increase in U.S. imports of frozen broccoli (up by nearly 500 percent, from 34 million to 195 million pounds, during 1983-87), which dwarfed the increase in U.S. production of 9 percent (from 285 million to 312 million pounds) during the same period. In the frozen cauliflower market, the declining market share during 1983-87 was the combined result of declining domestic production and increasing imports, as U.S. production declined by 23 percent, from 101 million to 78 million pounds, while imports increased by 178 percent, from 21 million to 59 million pounds.

A measure of Mexican competitiveness in the U.S. market is the share held by Mexico of U.S. imports. An increase in this share, combined with the increasing share of the U.S. market held by imports generally, would suggest an increase in Mexican competitiveness vis-a-vis U.S. producers in the U.S. market. In fact, the Mexican share of the U.S. import markets did rise for most of the subject products during 1983-87 (table 6-1). Such increases ranged from 12 percent for frozen cauliflower to 50 percent for canned asparagus. The Mexican share of U.S. imports declined in only two product markets: fresh asparagus (down by 7 percent) and frozen asparagus (down by 3 percent). For frozen broccoli, the Mexican share fluctuated only slightly during 1983-87.

Another basis for the measurement of market share is total production in the United States and Mexico. The following tabulation presents data on relative levels of U.S. and Mexican production (harvests) of asparagus, broccoli, and cauliflower between 1983 and 1986 (the latest year for which Mexican production data are available; data from chapters 2, 4 and 5, in thousands of pounds):

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Asparagus:				
U.S. production.....	<u>1/</u>	189,680	213,620	222,860
Mexican production.....	<u>26,316</u>	<u>35,224</u>	<u>55,631</u>	<u>53,059</u>
Total.....	<u>1/</u>	224,904	269,251	275,919
U.S. share of total (percent)..<	<u>1/</u>	84	79	81
Broccoli:				
U.S. production.....	832,640	1,028,180	1,062,720	1,152,900
Mexican production.....	<u>49,087</u>	<u>65,139</u>	<u>100,960</u>	<u>87,516</u>
Total.....	881,727	1,093,319	1,163,680	1,240,416
U.S. share of total (percent)..<	94	94	91	93
Cauliflower:				
U.S. production.....	541,420	668,820	666,280	752,720
Mexican production.....	<u>62,799</u>	<u>41,314</u>	<u>54,254</u>	<u>57,251</u>
Total.....	604,219	710,134	720,534	809,971
U.S. share of total (percent)..<	90	94	92	93

1/ Not available.

Asparagus production in the U.S.-Mexican region grew from 225 million pounds in 1984 to 276 million pounds in 1986, a two-year increase of 23 percent. During this time, despite an increase in the quantity of U.S. asparagus production, the U.S. share of total production declined from 84 to 81 percent. Similarly, U.S. broccoli production increased during 1983-86, but Mexican production increased faster, and the U.S. share of total production fell from 94 percent in 1983 and 1984 to 91 percent in 1985 before partially recovering to 93 percent in 1986. In region-wide cauliflower production, the U.S. share was volatile during 1983-87, ranging between a low of 90 percent in 1983 to a high of 94 percent in 1984, although U.S. cauliflower production generally increased during the period.

In general, the data in the above tabulation suggest that both nations benefited from the region-wide increase in production between 1983 and 1986, and the U.S. industry continues to enjoy the dominant role. However, the U.S. industry lost a small part of its large shares of region-wide production of asparagus and broccoli to a much more rapidly growing Mexican industry.

Profitability

Relative profitability is a familiar indicator of the competitiveness of an industry compared with its foreign rivals. An increase in profitability can be a sign, for example, of improved efficiency (which reduces costs) or marketing of higher quality products (which can increase revenues). Likewise, a decline in profitability may be attributable to a failure either to take full advantage of new technology or to produce and market products that consumers want. Although profitability can be measured in various ways, the available data restrict this analysis to an examination of net return on sales.

U.S. vegetable growers suffered negative returns on their sales of asparagus, broccoli, and cauliflower during 1985-87, according to questionnaire data submitted by a sample of such growers (tables 4-11 to 4-14). These data on net returns on sales are summarized in the following tabulation:

Item	1985	1986	1987	1985	1986	1987
	1,000 dollars			Percent		
U.S. growers of:						
Asparagus.....	-862	-1,090	-133	-10.9	-9.0	-0.9
Broccoli.....	-4,450	-1,413	-4,528	-9.4	-2.9	-8.8
Cauliflower...	-214	-1,517	-1,867	-0.6	-4.0	-4.5

In contrast, the limited data available on Mexican growers' net returns suggest more financially sound operations. For example, Mexican broccoli growers received in June 1986 prices ranging between 6 and 12 cents per pound, depending on the size of the farm and the extent of processors' technical assistance and other nonprice payments (see p. 5-15). At the same time, the costs of growing, harvesting, and transporting to the processing plant totaled 4.6 cents per pound (see tabulation on p. 5-13), providing a net return on sales ranging between 23 and 62 percent, depending on the price received.

On the processing side, operating income as a proportion of net sales earned by U.S. asparagus canners remained steady at 18 percent during 1985-87 (table 4-29). Whereas net sales (by reporting firms, not the entire industry) increased by 26 percent during the period, the cost of goods sold (the principal cost) increased by the same proportion. Although general and administrative expenses jumped sharply (by 35 percent) during 1985-87, they remained small in absolute terms, absorbing only 4 percent of net sales revenue in 1987, and so did not significantly depress operating income earned by the reporting asparagus canners.

The profitability of U.S. freezers of asparagus, broccoli, and cauliflower declined somewhat from 1985 to 1987 (tables 4-26 to 4-28). For all reporting freezers, the cost of goods sold represented the largest share of costs and increased over the period, with the largest increase of 4 percent for asparagus freezers. Although net sales rose slightly for broccoli freezers, both asparagus and cauliflower freezers experienced declines (the greater being

5 percent for cauliflower freezers). Operating income as a proportion of net sales for reporting freezers declined sharply for asparagus and cauliflower freezers, from 6 to 0.3 percent and 6 to 2 percent, respectively; for broccoli freezers, the share was 3 percent in 1985 and 1987, with an increase to 5 percent in 1986.

Available data on Mexican profitability are limited to unit-cost estimates (including transportation to the U.S. border) and the average annual unit value of U.S. imports. This information for frozen broccoli and frozen cauliflower are summarized in the following tabulation of data from table 5-5:

<u>Item</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Frozen broccoli:			
U.S. import unit value.....	33.00	29.00	24.00
Total production costs.....	30.28	26.64	24.57
Transport to U.S. border.....	2.82	2.87	2.80
Total costs.....	<u>33.10</u>	<u>26.64</u>	<u>24.57</u>
Net profit or (loss).....	(0.10)	2.36	(0.57)
Frozen cauliflower:			
U.S. import unit value.....	32.00	29.00	26.00
Total production costs.....	28.19	26.84	25.63
Transport to U.S. border.....	2.47	2.76	2.72
Total costs.....	<u>28.19</u>	<u>26.84</u>	<u>25.63</u>
Net profit.....	3.81	2.16	0.37

Comparative Strengths of U.S. and Foreign Industries

Overview

The comparative strengths of the U.S. and foreign (Mexican) industries that grow, harvest, and process asparagus, broccoli, and cauliflower lie in relative production costs and the ability to meet shifting consumer preferences for fresh and processed vegetable products. Additional issues of industry concern include product quality, particularly in the area of chemical residues, and the related concern of country-of-origin labeling of imported vegetable products.

As the following discussion demonstrates, the U.S. industries maintain comparative strengths in certain cost areas, notably water availability and transportation costs from some (but not all) producing States, and in the flexibility of U.S.-based multinational firms to meet changing consumer demand for new products (although these firms have also strengthened Mexican producers relative to exclusively domestic U.S. firms). In other cost areas, notably labor, the Mexican industry enjoys a clear comparative strength in the U.S. market. Finally, although product quality is an often-voiced concern among U.S. industry members, there is no evidence that chemical residues or any other perceived quality difference between U.S. and Mexican vegetable products are significant determinants of domestic or foreign comparative strengths in the U.S. marketplace.

Production costs

Farm-level costs.--The following tabulation presents data on broccoli growers' costs for a sample farm in the United States and in Mexico for 1986 (in dollars per acre):

<u>Cost item</u>	<u>United States 1/</u>	<u>Mexico 2/</u>
Seeding/planting.....	162.41	115.64
Fertilizer.....	169.65	38.44
Pesticides/herbicides....	185.00	56.45
Irrigation.....	120.00	14.32
Labor 3/.....	217.33	14.74
Other costs.....	367.95	57.37
Total.....	1,222.34	296.96

1/ Sample direct costs of California broccoli farming cited in Moulton and Runsten, The Frozen Vegetable Industry of Mexico, 1986, table 12. Labor costs in this sample were not broken out separately for fertilizer, pesticides, and herbicides, thus, these labor costs are included in the respective cost items.

2/ Mexican data from chapter 5 (original source: Moulton and Runsten, *Ibid.*, 1986, table 11), adjusted to break out labor costs.

3/ Exclusive of duplication with labor in other cost categories, except as noted in footnote 1.

In all of the above cost items, the expense incurred by U.S. growers exceeds that of Mexican growers. The greatest difference between annual costs for U.S. and Mexican growers is labor cost, a difference of \$202.59 per acre, or 93 percent of the U.S. growers' cost for labor. Although much of this difference is probably due to the double counting of labor costs in certain of these cost items, it is also probably attributable in part to a substantially lower wage rate in Mexican versus U.S. agriculture; farm wages in Mexico are on the order of \$0.45 to \$0.60 per hour (\$5.36 to \$7.24 per day), compared with \$3.35 per hour for California labor (based on U.S. and Mexican minimum wages). Insufficient evidence has been found to attribute the difference in labor costs to other possible causes, such as differences in labor productivity.

One notable item of farm-level costs missing in the above tabulation is land rent. Land rents in the Salinas Valley of California, the principal broccoli and cauliflower growing region in the United States, are estimated to range between \$150 and \$500 per acre. 1/ In contrast, Mexican land rents are estimated at \$90 per acre (see p. 5-12). While contributing substantially to overall growing costs, land rents do not contribute significantly to the difference in overall growing costs between the United States and Mexico.

Processor-level costs.--Data on relative costs in U.S. and Mexican broccoli and cauliflower freezing operations are presented in the following tabulation of data from p. 4-42 and table 5-5 (in cents per pound):

1/ Testimony of Mr. David Gill of Rio Farms and Gilco Produce Co., transcript of Commission hearing, p.70.

Item	United States			Mexico		
	1985	1987	percent change	1985	1987	percent change
Frozen broccoli:						
Raw material.....	18.6	18.2	-2	13.6	11.7	-14
Plant costs:						
Labor.....	9.4	9.5	1	2.9	2.1	-28
Other.....	13.0	14.1	8	13.8	8.0	-42
Subtotal.....	41.0	41.8	2	30.3	21.8	-28
Transportation 1/...	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2.8</u>	<u>2.8</u>	<u>0</u>
Total costs.....	41.0	41.8	2	33.1	24.6	-26
Frozen cauliflower:						
Raw material.....	23.7	24.6	4	11.9	12.7	-7
Plant costs:						
Labor.....	8.9	10.3	16	3.4	2.6	-24
Other.....	11.9	14.2	19	10.4	7.7	-26
Subtotal.....	44.5	49.1	10	25.7	23.0	-11
Transportation 1/...	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2.5</u>	<u>2.7</u>	<u>-8</u>
Total costs.....	44.5	49.1	10	28.2	25.7	-9

1/ Transportation cost to U.S. port of entry.

2/ Not applicable.

Transportation costs.--Two of the most significant determinants of transportation rates and costs that affect U.S. competitiveness are: the seasonality of vegetable production; and the varying distances between production areas in Mexico, California, and other States, and the markets they serve in New York, Chicago, and other metropolitan areas.

Production seasonality is important not only because during peak production periods vegetable prices are likely to be lower and the relative importance of transportation cost higher, but also because seasonality also affects the demand for truckers' services to transport vegetables relative to the supply of such services. When U.S. production is at its peak, as in June-August, truckers' services are in greatest demand and transportation rates increase (figures 4-6 to 4-8, and H-1 to H-12). In the U.S. growers' off-season, transportation rates are low; this is also the period when imports from Mexico are at their highest, allowing Mexican exporters to take advantage of lower truck rates than those paid by their U.S. rivals.

Such rate disparities occur regardless of the difference in distances to a given market from, for example, California's Imperial Valley, Nogales, Arizona, and Monterrey, Mexico. However, the combined effect of low truck rates and shorter distances between producing areas and markets gives certain Mexican producing areas an even greater advantage over California producing areas. For example, transporting a shipment from Monterrey, Mexico, to New York via the Laredo Customs District may cost less than transporting one from Imperial Valley, even if the time-of-year rate difference is eliminated, because the Monterrey to New York trip is shorter than the Imperial Valley to New York trip.

California producers suffer similar transportation disadvantages compared with other U.S. producing areas. For example, transporting a shipment from Imperial Valley to New York or Chicago may cost more than transporting one from

Texas' Lower Rio Grande Valley (or, in recent years, from Michigan or Maine) because of the shorter distances to New York and Chicago from Texas. Thus, California producers may suffer a competitive disadvantage in transportation cost not only vis-a-vis Mexican competitors, but also from their rivals in Texas, Michigan, and other States closer to major eastern markets.

Shifting consumer preferences

There has been a shift in consumer preferences, discussed in chapter 3, from canned and frozen vegetables to fresh, and from whole heads, spears, and other large cuts to small cuts such as tips and florets. This shift is pertinent to U.S. competitiveness because of its implications for processing costs. In particular, the question to be investigated is whether the specialized products, compared with traditional products, are more or less intensive in one or another input for which the U.S. industry has a cost advantage or disadvantage. For example, if florets require greater labor per pound than whole broccoli heads, the shift in consumer demand from heads to florets may increase the U.S. labor-cost disadvantage and thereby weaken U.S. competitiveness.

Detailed cost data at such disaggregated production levels as the processing of florets versus heads are not readily available. The principal source of such cost information available to the Commission has been written and oral testimony from U.S. and Mexican industry representatives. This information, although anecdotal in nature, can be assumed to be a qualitative characterization of such relative costs. As the following discussion indicates, there appears to be a significant disadvantage suffered by U.S. producers in the production of labor-intensive items such as florets, and labor-cost differentials are forcing U.S. firms to relocate production facilities outside the United States.

The following testimony regarding the effect of changes in consumer demand on processing costs was presented by a major U.S. processor and importer of fresh, frozen, and canned vegetables:

"Green Giant has witnessed enormous changes in the structure of the United States vegetable industry since beginning operations in 1903, and many of the most significant changes have happened in recent years. Some years ago, Green Giant and other American food processors concentrated on mass production and volume sales of bulk undifferentiated vegetable products. Today, the American consumer has developed an ever-increasing demand ... for fresh vegetables and frozen vegetables [that] are cleaned and trimmed and flash frozen and then quickly distributed to create products we call frozen-like-fresh.

"These trends have caused food producers such as Green Giant to seek new ways to meet the changing tastes and preferences of the American consumer. The effort has led to changes in how we source for our product, and in the location and operation of our food processing facilities.

"Each of our facilities produces a different line of product, different times of the year ... [In Mexico], Green Giant produces quick-frozen broccoli and cauliflower florets to supply its facilities in the United States, as well as a product known as frozen-like-fresh broccoli spears. This latter product, in particular, is unique to Green Giant's Mexican operations because it can only be produced by extensive hand cutting. No mechanical method of production has yet been found.

"Green Giant has found, as have other food processors, that on many products hand labor, regardless of cost, produces a higher quality product than generally is possible from a mechanized operation. This is particularly important in the cutting of broccoli and cauliflower. Consumers prefer whole florets in the finished vegetable product. Broccoli and cauliflower cut by hand, such as is done in Mexico at our Irapuato facility, produce such full florets because of the individual attention given the task. Machine cutting, such as is done in California in the Green Giant's Watsonville facility, oftentimes causes a scalping effect, or a squaring off of the florets. For the purpose of producing a high-quality product, hand cutting is preferable in the industry to machine cutting. Green Giant now is installing equipment at its Watsonville facility to improve the cutting process and the product quality. Even so, we have not yet found a means to produce broccoli florets or spears such as those that can be produced by hand cutting in Irapuato." 1/

From the point of view, however, of domestic processors and growers, the link between consumer demand and import competition is more problematic:

"(T)he importers are bringing in the product [fresh asparagus] in the most favorable market conditions ... We don't see them in the marginal production periods.

"Now, there are differences seasonally in production in Mexico and the U.S. They have a winter production period that--although when that product comes in the fresh form it displaces our frozen, it does not compete directly with our fresh. But when they start overlapping in February and March as they do, they directly compete with our fresh market production." 2/

Thus, California asparagus growers view the increasing imports of fresh vegetables from Mexico, particularly during the summer months, as a legitimate response to growing consumer demand, but one that takes the important spring/summer fresh market from U.S. producers, in addition to providing competition in the winter frozen market.

There is also this view on the seasonality question:

1/ Testimony of the Green Giant Division of the Pillsbury Company, transcript of Commission hearing, pp. 161-165.

2/ Testimony of the California Asparagus Growers Association, transcript of Commission hearing, pp. 125-126.

"Mexico is in direct competition with California and Arizona growers on a year round basis. Unlike other produce commodities wherein Mexico supplies the U.S. during periods of low production or off season, Mexico is in direct competition with U.S. producers." 1/

Thus, California broccoli and cauliflower growers are facing a year-round competition with no seasonal tendencies. So, there is not only an effect from increasing consumer demand for fresh vegetables on unit processing costs of various products, as testified to by Green Giant, but there is also the question of a growing share of the fresh market in general being lost to Mexican exporters year round and to those who had previously only supplied fresh-vegetable consumption in the winter when domestic producers supplied only frozen or canned product.

Product quality

Labeling.--Section 304 of the Tariff Act of 1930, as amended (19 U.S.C. 1304) requires country-of-origin labeling on most imported products, including foods that are not materially transformed before sale to the "ultimate purchaser" (defined as the last person in the United States who will receive the import in the same form in which it was imported). Proponents of country-of-origin labeling argue that the consumer has a right to know such facts about products, and opponents argue that labeling requirements provide little or no consumer benefits to offset the added packaging and marketing costs incurred because of such requirements.

U.S. vegetable growers and processors expressed to the Commission their support of conspicuous labeling of the country of origin on retail packages of frozen and canned vegetables. Some industry members interviewed by Commission staff would have such labeling extended to menus and signs in eating establishments, as well as fresh-produce departments of supermarkets. One industry viewpoint was expressed as follows:

Question: (I)n the event that imported- and domestic-produced [asparagus, broccoli, and cauliflower] is blended, how then does the label read?

Response: Presently there is no designation on the label as to country of origin when that happens.

Question: So there would be no mention of Mexico or Colombia or anything?

Response: That's correct.

Question: Even though 75 percent of it did originate in that country?

Response: That's possible.

1/ Brief of the Western Growers Association of California, p.3.

Question: What effect would the more vigorous labeling that you mentioned appearing on the front of the pack as compared to the back and perhaps in larger print, what effect would that have?

Response: If the country of origin is placed on the front panel of the package in a conspicuous manner, ... I certainly am of the opinion that in most cases, given the choice, the consumer will take the domestic product, particularly if it is priced essentially the same. 1/

Various industry groups, such as T.H.A.N.K.S. (Together Helping Americans Nationwide Keep Strong), have recommended the use of "100% U.S. Grown" labels and stated that the "public is interested in identifying the origin of their products." 2/ However, a 1986 report on consumer spending habits addressed a number of factors influencing purchases of fresh vegetables disputes this point. Although a majority of purchasers believe region-of-origin labeling is important, a relatively small share actually use such information in making their purchase decisions (see p. 3-13).

Chemical residues.--The use of chemical pesticides and herbicides by vegetable growers is a controversial issue in U.S.-Mexican trade in the subject vegetables. The Commission has uncovered no evidence of improper use of chemicals in either the U.S. or Mexican industries, and its roughly similar use in the two industries suggests that it is an unimportant influence on U.S. competitiveness. Nevertheless, considerable attention was paid to the issue of chemical pesticides and herbicides in written and oral testimony before the Commission, enough to warrant discussion here.

In particular, it has been alleged that

"questionable inspection procedures at [U.S.] borders leave American consumers open to contamination from illegal pesticide residues found on imported food products ... [Consumers] are not only faced with insecticide residues, there is undrinkable water which is used to wash the produce." 3/

Another U.S. industry member alleges that

"a significant amount of pesticide spraying in Mexico is done by schedule, rather than by need. Health and safety concerns are virtually nonexistent. There are no plant-back controls and field re-entry rules are widely ignored. The long term effects of this may be negative, but it does create some short term economic advantages." 4/

1/ Responses of Mr. Ray Walker of Norcal/Crosetti Foods, to questions of Commissioner Lodwick, transcript of Commission hearing, pp. 95-97.

2/ Prehearing statement of Richard A. Shaw, President, Richard A. Shaw Frozen Foods, Inc., May 18, 1988.

3/ Richard A. Shaw, testimony before Subcommittee on Domestic Marketing, Committee on Agriculture, U.S. House of Representatives, May 10, 1988.

4/ Testimony of Gene Mehlschau, Director, California Farm Bureau Federation, transcript of Commission hearing, p. 191.

Contrast these views with statements of Mexican industry representatives:

"Mexican growers use the same pesticides as do U.S. growers, and apply them in the same manner. Chemicals are purchased either directly from U.S. manufacturers, or alternatively from Mexican subsidiaries of major U.S. multinational firms ...

"Additionally, many Mexican growers sell to U.S. multinational food companies, which exercise close supervision over all aspects of pesticide and herbicide use." 1/

and

"With respect to the compliance of imported produce with U.S. pesticides, health, safety, and quality requirements ... there are three mechanisms in effect to assure that the exported products to the United States are safe and healthy, and that the pesticides are properly used.

"first ... is a mandatory regulation enforced by the Mexican Government through the Agricultural Secretariat (SARH). Every year before the new season starts ... SARH publishes complete lists of registered and authorized products which are permitted for use on every vegetable or fruit, including their tolerance levels.

"second ... the growers' organizations ... make sure that every grower is aware of the pesticide regulations and updated changes. The grower organizations also provide technical assistance and have their own laboratories for continuous checking on quality and tolerances for toxic residues.

"third ... is the growers' consciousness of the importance of offering the best possible product, so the grower can remain in business on a long-term basis." 2/

and the statement of a major U.S. vegetable processor and importer:

"With respect to fresh and frozen asparagus, broccoli, and cauliflower sourced in the United States, Green Giant to a large extent relies upon the individual domestic producer or packer to assure compliance with applicable standards and tolerances. Green Giant does perform quality and chemical analyses to assure itself of compliance, but generally has little control over crop production. Green Giant exercises much greater control over the use and application of agricultural chemicals in Mexico, where we deal directly with individual producers of vegetable crops ...

"In both the United States and Mexico, Green Giant purchases agricultural chemicals only from firms reputable in the chemical industry, such as Dow Chemical, duPont, FMC, and Union Carbide ...

1/ Prehearing brief of the Mexican Growers/Processors of Broccoli and Cauliflower from the Celaya and Montemorelos Regions of Mexico, May 6, 1988, pp. 5-6.

2/ Miguel Gonzalez, testimony before Subcommittee on Domestic Marketing, Committee on Agriculture, U.S. House of Representatives, May 10, 1988

"Green Giant finances much of the production costs for crops purchased in Mexico, and this includes the furnishing of agricultural chemicals to its growers in Mexico ...

"Green Giant provides technical assistance to its Mexican growers through the services of a field staff, (who) determine, in the case of any particular planting of a crop, when a chemical application is warranted ... Only chemicals approved for use on the label, and in Green Giant's approved list, for the crop to be treated are provided the grower." 1/

In 1986, the U.S. General Accounting Office completed an investigation on pesticides and imported food. 2/ Its purpose was to provide information on (1) how the Food and Drug Administration (FDA) selects samples of food for testing, (2) what pesticides FDA tests for, and (3) how FDA protects American consumers from consuming imported foods that contain illegal pesticide residues. GAO found, among other things, that FDA annually samples less than 1 percent of approximately 1 million imported food shipments, concentrating its efforts on "high-volume" imported foods. Of the subject vegetables, only broccoli ranked among the top 15 high-volume foods imported from Mexico through Dallas and Los Angeles. 3/ Of samples (of all foods) taken between 1979 and 1985, 6.1 percent contained illegal residues. 4/

In testimony before the Commission, officials from the Dallas and Los Angeles regional offices of FDA explained:

"it is most uncommon for us to find shipments that contain residues in excess of published tolerances or established tolerances. The more common violation involves a pesticide that has a tolerance established for a number of food commodities, but not for the particular commodity on which we find it." 5/

In samples of the subject vegetables carried out from fiscal years 1984 through 1988, zero out of a total of 109 shipments of asparagus from Mexico contained illegal pesticide residues, zero out of 223 samples of broccoli contained such residues, and zero out of 103 shipments of cauliflower contained such residues. Moreover, no violative residues were found in samples of either domestic or (non-Mexican) imported shipments of the subject vegetables during the same period. 6/

1/ Prehearing memorandum, Green Giant Division of the Pillsbury Company, May 6, 1988, pp. 25-26.

2/ GAO, "Pesticides: Better Sampling and Enforcement Needed on Imported Food," GAO/RCED-86-219, September 1986. Portions of this report are reproduced herein as appendix G.

3/ Ibid., pp. 52, 55.

4/ Ibid., p. 3.

5/ Testimony of Donald C. Healton, Dallas Regional Director for the FDA, transcript of Commission hearing, pp. 14-15.

6/ Testimony of Donald C. Healton, Dallas Regional Director for the FDA, transcript of Commission hearing, p. 17.

Industry sources in both the United States and Mexico agree that no company would jeopardize the health of U.S. consumers, nor risk the reputation of its brand-name products, by bringing in products contaminated with pesticides. ^{1/}

Nature and Source of Main Competitive Problems

Overview

The main competitive problems suffered by the U.S. industries producing asparagus, broccoli, and cauliflower stem from a variety of sources. Trade-related problems include the sharp difference between labor costs in the United States and Mexico, despite reported differences in labor productivity and the fact that much U.S. labor is actually "produced" by Mexican aliens (documented or otherwise), and the role played by U.S.-based multinational firms in the expansion of the Mexican industries. Macroeconomic problems are centered on the dollar/peso exchange rate, which has been affected by Mexican currency controls, Mexican external debt financing, and world petroleum prices. Finally, there are purely domestic problems: the U.S. industry of greatest concern here is actually the California-Arizona producing region--the traditional industry region--which has faced new competition from other States, such as rapidly growing producers in Texas, Michigan, New York, and other States closer to important metropolitan markets.

U.S. and Mexican relative cost trends

General.--Average costs of vegetable growing and processing in Mexico have been falling compared with those in the United States. The decline in Mexico's relative costs during the last several years has been attributable mainly to the depreciation of the Mexican peso relative to the dollar and to increases in Mexican investment that enabled growers and processors to realize decreases in the average cost of production.

Although processing is somewhat more capital intensive than harvesting, both use unskilled- and semiskilled-labor-intensive techniques. Processing is even more labor intensive in Mexico than in the United States. For many years, however, Mexican firms could not take full advantage of the relatively abundant and inexpensive labor because of a lack of essential infrastructure, plant and equipment, technical know-how, and marketing skills. This situation changed rapidly as U.S. processors financed direct investment in Mexican processing facilities and shared technical knowledge with local growers.

Currently, Mexico enjoys apparent cost advantages, particularly on labor. Capital costs, however, are somewhat higher in Mexico. However, because production is labor intensive, labor costs overshadow the capital component as a determinant of overall relative cost trends between the two countries.

Market effects on domestic producers.--The declining relative cost of Mexican production has caused the Mexican supply of the subject vegetables to increase more rapidly than U.S. production, leading, in turn, to a growing

^{1/} See testimony of William Ramsey, Mann Packing Co., transcript of Commission hearing, p. 60, and testimony of Gary Klingl, Green Giant Co., transcript at p. 169.

Mexican share of the expanding U.S. market. For instance, imports took 39 percent of the U.S. market for frozen broccoli in 1987, up from only 11 percent in 1983. However, the quantity, if not the proportion, of U.S. shipments has continued to rise as domestic consumption has increased.

The relatively fast growth in imports, particularly from Mexico, has probably depressed U.S. prices of the subject vegetables below what they would have been had import supplies grown at the same rate as domestic supply. The impact of depressed product prices has probably most adversely affected the incomes and capital value of production assets of U.S. growers and processors that are less able to move easily into and out of other agricultural or industrial uses. Thus, those that have probably been most hurt include unionized U.S. labor in processing and harvesting, and U.S. owners of land especially well suited to the production of asparagus, broccoli, or cauliflower; growers, laborers, and processing-plant owners that have ready alternatives for their labor or production facilities have probably been hurt less by the growth in imports of the subject vegetables.

Market structure

The structural aspects of the U.S. markets for asparagus, broccoli, and cauliflower that most significantly influence U.S. industry competitiveness are product differentiation and the presence of multinational enterprises in U.S.-Mexican trade in the subject vegetables.

Product differentiation is particularly important in the markets for frozen and canned vegetables, where brand promotion is an important competitive tool. Nationally advertised brands of such well-known firms as Green Giant, Birds Eye, and Del Monte account for a significant share of the U.S. supply of frozen and canned vegetables. The main competitive factors associated with brand-name marketing include, besides product differentiation, market entry, sales premiums, and consumer preferences, all of which are interrelated. Brand names are important, because consumers may base their purchase decisions, at least in part, on the brand. Market entry for a new brand of frozen broccoli or canned asparagus can be difficult, because the current brands have been established for a long period and have gained consumer acceptance and trust in their quality. Consumers apparently recognize well-known brands to be of higher (actual or perceived) quality, because national brands typically sell for a higher price than the local or private label. As a result, foreign processors attempting to break into the U.S. market will often sell their product to a domestic processor that has a well-known brand and established market channels.

The importance of brand competition and product differentiation is probably not as important in the institutional trade (restaurants, hospitals, and so forth), because the ultimate consumer rarely knows the brand of the vegetable, and so price competition may dominate over advertising and brand promotion. As a result, import penetration may be easier in such markets than in the retail trade. However, the Commission uncovered no information on the nature of competition in the retail versus institutional markets, and therefore cannot examine this issue further.

The presence of multinational enterprises (MNE's) in U.S.-Mexican vegetable trade is important for at least two reasons. First, MNE's can take advantage of economies of size in the procurement of raw material,

transportation, technological research and development, and the gathering of market information, among other activities. Second, such firms can diversify by both product line and geographic area, and thereby reduce the risks associated with fluctuating prices and costs in any one product line, market, or producing area.

MNE's probably have both positive and negative effects on U.S. competitiveness. On the positive side, the access of MNE's to greater market information than that available to small, exclusively domestic firms improves their marketing efficiency and reduces the waste of perishable products and other costs involved in matching supply with demand. The ability of MNE's to market a full line of products throughout the year has probably also benefited small processors by opening up new markets for fresh and frozen vegetables, such as salad bar-type retail outlets and microwave-ready convenience foods, which were not as common before the rapid expansion of imported vegetables, but which require domestic supplies as well as imports.

On the negative side, MNE's accelerate the international transfer of U.S. technology and reduce foreign production costs by providing low-cost credit and other assistance to foreign producers. U.S. technology in vegetable growing, harvesting, and processing is at least as good as, and perhaps better than, that found in competing countries. However, the U.S. technology developed by MNE's, by their suppliers of equipment or other inputs, or by Government sources such as the U.S. Department of Agriculture, is easily transferred by MNE's to subsidiaries or contracted growers or processors abroad, enabling these foreign producers to compete better with their U.S. rivals. In some cases, technology transfer by MNE's may even allow new technology to be introduced abroad before it is put in place in the United States. 1/

MNE's can reduce foreign production costs by providing low-cost credit and other assistance to foreign producers, a particular advantage to producers in developing countries with currency controls, high rates of inflation and nominal interest rates, or other monetary disturbances, such as has been the case in Mexico. Independent growers and processors are held back from expanding because of the high cost of capital and other necessary inputs; but the subsidiaries and contracted suppliers of fresh vegetables to MNE's are provided low-cost capital, technological advice, and other assistance that reduces their costs and increases the competitiveness of (their share of) the local industry.

Exchange rates and other macroeconomic factors

A number of factors affecting U.S. competitiveness in the subject vegetables are completely outside the control of the industry, and may indirectly yet substantially affect U.S. competitiveness. Among the most important of these are macroeconomic policies, including those concerning exchange rates, petroleum prices, and foreign debt.

1/ U.S. Congress, Office of Technology Assessment, A Review of U.S. Competitiveness in Agricultural Technology--A Technical Memorandum, OTA-TM-TET-29 (Washington, DC: U.S. Government Printing Office, October 1986). OTA notes that MNE's are not the only forces behind technology transfer. Government-sponsored agricultural technology may be transferred abroad by the U.S. Government, perhaps as part of a foreign aid program, with the same implications for U.S. competitiveness as MNE technology transfer.

The exchange rate between two countries is determined by several factors, ranging from a difference in the current account balance to differentials in real interest rates. However, in the long run the exchange rate is expected to reflect the difference in overall price levels between the two countries.

The following tabulation presents data on the exchange rate of U.S. dollars per Mexican peso, in both real (adjusted for inflation) and nominal (unadjusted) terms, indexed for the years 1975-87 (1975=100): 1/

<u>Year</u>	<u>U.S. Producer Price Index</u>	<u>Mexican Producer Price Index</u>	<u>Nominal Exchange Rate Index</u>	<u>Real Exchange Rate Index</u>
1975..	100.0	100.0	100.0	100.0
1976..	104.6	122.4	81.2	94.8
1977..	111.1	172.4	55.4	85.9
1978..	119.7	199.7	54.9	91.6
1979..	133.9	236.2	54.8	96.2
1980..	153.6	294.1	54.5	104.3
1981..	167.6	365.9	51.0	111.3
1982..	171.0	571.2	22.2	74.0
1983..	173.1	1,184.4	10.4	71.2
1984..	177.3	2,017.6	7.4	84.8
1985..	176.5	3,098.1	4.9	86.0
1986..	171.3	5,836.2	2.0	68.1
1987..	175.9	13,751.8	0.9	70.4

1/ Calculated from data of the International Monetary Fund

For many years prior to the mid-1970's, the Mexican Government pegged the exchange rate at 12.5 pesos to the dollar, a rate that became increasingly difficult to maintain as Mexican inflation rapidly outpaced U.S. inflation during the 1970's. The effect of the relatively rapid Mexican inflation was an overvalued peso, which allowed Mexican consumers to purchase more U.S. goods and services than would have been possible at an uncontrolled, market-determined peso/dollar exchange rate. The overvalued peso also kept U.S. imports of Mexican products lower than they would have otherwise been. Beginning in the mid-1970's, the Mexican Government devalued the peso in stages; by 1987, the nominal exchange rate (unadjusted for inflation) stood at 0.9 percent of its 1975 value. However, adjusted for Mexican and U.S. inflation rates, the real decline in the peso's value was closer to 30 percent.

Among the reasons for the peso devaluation in recent years were the fiscal effects on Mexico of declining petroleum prices and of foreign-debt obligations. In the 1970's and early 1980's, strong world markets for Mexico's petroleum exports and ready loans from foreign lenders allowed Mexico to support the peso in the face of continuing inflation. As petroleum prices fell and debt obligations grew burdensome, pressure grew on Mexico to remedy the trade imbalance and obtain foreign exchange to service the debt; a peso devaluation would have served both needs. However, rapid Mexican inflation widened the disparity between the controlled (official) exchange rate and the free market rate. For instance, foreigners needing to obtain pesos to do business in Mexico could get 15-30 more pesos per dollar by exchanging dollars for pesos before entering Mexico rather than once in the country. The pressure on Mexico since the early 1980's to sharply devalue the peso might have been

lessened had Mexico lifted the exchange-rate controls in earlier years and allowed steadier, market-influenced changes in the peso/dollar exchange rate. A steadier peso devaluation may have also checked the increase in Mexican exports of vegetable products to the U.S. market; however, a detailed statistical analysis of the impact of the peso devaluation on Mexican exports is outside the scope of this investigation.

In summary, the following indirect effects of macroeconomic policies and world economic conditions on U.S.-Mexican trade in the subject vegetable products may be supposed: first, the stagnant world economic growth in the early 1980's, particularly among developed countries, softened world demand for commodities in general and demand for petroleum in particular--a special problem for countries like Mexico that have been dependent on exports of petroleum. (Ironically, it seems likely that the 1981-83 world recession was caused by the petroleum price rise of 1979-80 and the resulting contractionary monetary policies of developed economies that were designed to arrest inflationary pressure caused by the petroleum price hikes.) To offset the trade imbalance caused by reduced petroleum prices and exports, the peso was devalued. Second, the debt crisis faced by many less-developed countries (LDC's), including Mexico, put pressure on such countries to adopt austerity measures (to prevent import growth) and promote exports to obtain foreign exchange to service the debt. Currency devaluation was the result in many debt-burdened LDC's, including Mexico, with a consequent increase in Mexican exports of vegetable products to the U.S. market.

New or expanding U.S. producing areas

This study of the U.S. industries producing asparagus, broccoli, and cauliflower concentrates on the competitiveness of one region in particular, the traditional growing areas of California and Arizona. One source of competitive pressure on producers in this region is not at all import related, it is the growth in output of the subject vegetables in other States. In recent years, several States in many regions of the country, have emerged as rapidly growing production areas, and their added supply, coupled with their shorter distances to important metropolitan markets, has created new competition for California and Arizona producers.

Broccoli and cauliflower provide the clearest examples of this new competition. As shown in tables 4-3 and 4-4, and described in chapter 4, the harvest of broccoli for processing in States other than California increased from an annual average of 12.7 million pounds during 1978-1982 to an annual average of 28.7 million pounds during 1983-87, an increase of 125 percent between the two 5-year periods. The States included in these broccoli production figures were Oregon and Texas. In the harvest of cauliflower for processing, U.S. production outside of California increased from an annual average of 36.2 million pounds during 1978-1982 to an annual average of 56.2 million pounds during 1983-87, an increase of 55 percent between the two 5-year periods. The States included in these cauliflower production figures were Michigan, New York, Oregon, and Texas.

U.S. and Mexican Government Programs

The Commission was requested to provide information on the nature of Federal and State government programs that are available to growers, processors, and marketers of the subject vegetables in the United States and Mexico. This information is provided in detail in chapter 4 (covering U.S. Government programs) and chapter 5 (covering Mexican Government programs), and is summarized below.

U.S. Government programs

Programs and policies of Federal and State governments do not specifically target the industries producing asparagus, broccoli, and cauliflower products; rather, they are directed at the agriculture sector in general (sometimes tailored, as in pesticide use, to fit the specific vegetables) or at industry as a whole. At the Federal level, the main regulatory agencies are the Occupational Safety and Health Administration (OSHA) of the Department of Labor, and the Food and Drug Administration (FDA) of the Department of Health and Human Services. OSHA safety and health regulations apply to vegetable growers, freezers, canners, and other facilities that employ labor and govern the provision of housing and sanitation facilities, among other things. The FDA, under the auspices of the Food, Drug, and Cosmetic Act, regulates the use of pesticides and herbicides in the production of domestic and imported foods. (See appendix E for excerpts of a U.S. General Accounting Office study of FDA enforcement of pesticide regulations and vegetable imports.) Pesticide use is also controlled by the Environmental Protection Agency, with which pesticides must be registered before they are authorized for use. Product quality, identification, and proper container size are regulated by mandatory FDA standards; these are supplemented with voluntary grading standards set by USDA guidelines.

Various pieces of legislation directly affect vegetable growers; important among these are the Immigration Reform and Control Act of 1986, which authorizes growers to hire only U.S. citizens or documented aliens as agricultural labor, and places upon the employer the burden of proof of worker identity and citizenship or immigration status. The minimum wage bill enacted on July 1, 1988, raises by increments the minimum wage payable to U.S. workers from the current \$3.35 per hour to \$5.05 per hour by 1992, a provision that affects some plant workers that are paid on an hourly, rather than piecework, basis.

Tariff protection is provided by the Federal Government to growers, processors, and marketers of the subject vegetables; current applicable tariff rates on U.S. imports are discussed in appendix D. Tariff rates on asparagus, for example, range from 5 to 25 percent ad valorem, those for broccoli and cauliflower range from 5.5 to 17.5 percent ad valorem.

Information on State government programs was collected only for California. There, State programs govern safety and health conditions, worker's compensation, and the supply and use of water. The California Occupational Safety and Health Administration (CalOSHA) sets similar--and in some cases conflicting--standards for working conditions. For example, one asparagus grower interviewed by Commission staff noted that the Federal OSHA requires growers to provide one toilet for every 20 workers, although CalOSHA

requires one toilet per 50 workers. Under the California Worker's Compensation Law, workers are provided coverage against financial loss attributable to job-related accidents and injuries. The California Department of Water Resources manages the State's water supplies, providing irrigated water to low-rainfall regions of the State to support growers.

Mexican Government programs

Programs and policies of the Mexican Government provide the vegetable industries with tariff protection, low-cost fuel, fertilizers, and other inputs, and assistance through currency and exchange-rate controls. The Mexican Government appears to have reduced significantly the levels of assistance provided by these programs. For example, tariff rates on Mexican imports of fresh or frozen vegetables declined during 1988, from 25 to 10 percent on fresh vegetables, and from 20 to 15 percent on frozen vegetables; in addition, import licensing restrictions were relaxed in 1988, reducing the burden of what some U.S. industry members interviewed by Commission staff have characterized as the greatest impediment to U.S. exports to Mexico.

The Mexican Government also affects the vegetable industry through its regulations concerning water and land use. All subsoil water rights are reserved to the Federal Government in Mexico. Water, whether pumped from wells or supplied by the government by irrigation, is subject to taxes and quotas set by the Ministry of Agriculture (MOA). The quotas for each region are established annually by regional committees under the direction of the MOA.

As noted in chapter 5, the allocation of water to Mexican vegetables reflects the MOA's priorities concerning particular vegetables. MOA officials insisted that the quota allocations have not reflected any desire on the part of the MOA to benefit export-marketed vegetables over any other vegetables. The quota amounts for each vegetable reflect the amount of water consumed by the particular vegetable, as well as the projected rainfall, the height of the local water table, and water levels in local reservoirs. If a grower wants to shift to new crops, he must register the crop with the MOA. Once registration is effected, the grower's water quota and tariff are adjusted. 1/

The Mexican peso has been subject to Government currency controls in the form of an official exchange rate, usually set below the market rate in order to stimulate exports and inhibit imports. As noted earlier, in the 1980's, world prices of petroleum, a major Mexican export, have been weak, which has put pressure on Mexico to further devalue the peso to boost exports and generate foreign exchange to finance its external debt. However, a recent short-term loan provided by the U.S. Government to Mexico is reportedly designed to tide Mexico over until it obtains new financing from the International Monetary Fund. 2/

1/ On the basis of Commissioners' conversations with Mexican Government officials, May 1988.

2/ "Mexico To Receive Up To \$3.5 Billion As Loan From U.S.," The New York Times, Oct. 18, 1988, p. A1.

Competitive Strategies

Strategic responses to foreign competition

Commission questionnaires sent to growers and processors of the subject vegetables asked respondents to address the issue of strategic responses to import competition by indicating the type of strategies they might employ in the hypothetical case of a reduction in the U.S. price of comparable imported product. Three hypothesized price reductions were offered, 5, 10, and 25 percent. The only responses to these questions were provided by asparagus canners.

In response to import price reductions of 5 and 10 percent, a majority of respondents indicated that they would cut their prices by no more than half the import price decline (and in some cases not at all), because of actual or perceived substandard quality of the imported product or because the respondents believed that such imports did not compete directly in important geographic markets.

In the face of a hypothetical import price reduction of 25 percent, however, a majority of responding asparagus canners indicated a greater willingness to meet the price reduction by an equal, or almost equal price cut of their own, while simultaneously stepping up their advertising and promotional activities. Some respondents indicated a willingness to begin distributing such lower priced imported canned asparagus themselves, at the expense of a reduction in their own output levels, whereas a small number reported that they would even cease domestic production altogether, turning completely to importing activities.

Cost reduction and capital expenditures

Packers of canned asparagus were asked in Commission questionnaires to report actions their firms had taken since January 1, 1985, to become more competitive with foreign suppliers in the U.S. market. Information requested included the nature of the action, the date taken, the expense, and an explanation of how such action might increase competitiveness. Specifically, asparagus canners were asked to report on the following actions: investment in plant and equipment; reduction of cost with existing plant and equipment; research and development; organizational changes; and marketing.

Respondents reported an aggregate expenditure of nearly \$4 million in these areas, with the bulk of the investment taken in new plant and equipment or cost reduction with existing plant and equipment. Examples of investment in new plant and equipment included conveyors, storage tanks, automated cutters, coolers, and fillers. Activities designed to reduce costs with existing plant and equipment commonly took the form of pre-heating boiler feed water, using hydraulic drives and spear orientors, and reducing the number of workers and/or the amount of overtime worked. Smaller levels of funding were allocated to (unspecified) areas of research and development and organizational changes.

Freezers of broccoli and cauliflower were requested in Commission questionnaires to report their practical annual production capacity and estimated rate of capacity utilization. As noted in chapter 4, capacity utilization data are meaningless. The following tabulation summarizes the questionnaire responses concerning production capacity (in millions of pounds):

Practical annual production capacity:	<u>1985</u>	<u>1986</u>	<u>1987</u>
Broccoli:			
California freezers.....	355	361	345
Other U.S. freezers.....	<u>130</u>	<u>133</u>	<u>192</u>
Total.....	485	494	537
Cauliflower:			
California freezers.....	145	150	149
Other U.S. freezers.....	<u>86</u>	<u>70</u>	<u>84</u>
Total.....	231	220	233

Considerable investment by broccoli freezers has gone into expansion of their production capacity, raising aggregate capacity (that held by responding firms) from 485 million pounds in 1985 to 537 million pounds in 1987, an increase of 11 percent in 2 years. This entire increase, plus some, took place outside California, as respondents in other States increased their share of total reported capacity to 36 percent in 1987, up from 27 percent in 1985.

Among responding cauliflower freezers, little significant change took place in total capacity or the distribution between capacity in California and elsewhere. Production capacity in 1987 totaled 233 million pounds, only 2 million pounds below the 235 million pounds of capacity in place in 1985. 1/

U.S. Industry Views on Competitiveness

At the public hearing held in Monterey, California, in connection with this investigation (see appendix C), a total of 26 witnesses appeared, including 20 industry members or their representatives who presented testimony on, among other things, their views on U.S. competitiveness. Those industry views are summarized here, grouped by occupation of witness.

Farm groups and individual growers

Several growers' associations, including the Western Grower's Association, the Washington Asparagus Grower's Association, and both the American and the California farm bureaus, lamented the increase in imports of fresh and processed vegetables, placing much of the blame on cost advantages enjoyed by foreign producers. These cost advantages result from lower standards of living

1/ The production capacity of broccoli and cauliflower freezers is in reality significantly greater than the data reported above indicates. Nearly all freezers freeze a variety of vegetables and fruits in the same establishment; therefore, it should be noted that a firm's ability to obtain actual production levels at or near maximum physical capacity for any one vegetable is dependent on management decisions concerning the output goals of the other frozen items in the establishment. Thus, in frozen-vegetable industries, market demand constraints are at least as likely (and probably more so) to limit a firm's output as is physical production capacity.

(and, therefore, lower wages), less restrictive regulations on chemical use, health/safety conditions, and product quality, and low-cost fuel and other inputs. In Mexico, in particular, climatic conditions allow Mexican growers to produce and export in months when U.S. production is low and prices would otherwise be high, forcing U.S. producers to depend more on the revenues earned during the low-price, peak-production months.

California growers are concerned mainly by rising imports of fresh vegetables, whereas growers in other States, such as Michigan, are concerned more by imports of frozen and canned vegetables, reflecting the relative importance of such markets for the growers in these States. Several farmers and farm workers testified that the dependence of agricultural labor on vegetable growers means that the rapid growth in imports at the expense of U.S. production places their jobs in jeopardy, because there are few employment alternatives during the peak season for the subject vegetables.

Labor union representatives

Representatives of vegetable truckers and line workers in processing plants testified that 32,000 jobs have been lost in vegetable processing (of all types, including the subject vegetables), 1,700 of which have been lost in processing facilities in the Watsonville, California, area as a direct result of imports from Mexico of the subject vegetables. Wages are falling as a result of pressure from import competition; wages declined by 18 percent following a strike in one plant that was allegedly suffering losses because of import competition. According to labor union representatives, when such losses in income and employment are multiplied throughout the local economy supporting such producers, the total job loss may be as high as 4 to 5 jobs that indirectly support the vegetable industry for every one job directly involved in the industry.

The solution offered by a Teamsters representative is a higher tariff on processed vegetables, that is, a tariff structure more representative of the labor-cost differential between fresh and frozen vegetables. Because the main cost advantage to Latin America is labor, and both harvesting and processing is labor intensive, processed vegetables that benefit from low labor costs in both stages should be dutiable at a higher rate than fresh vegetables that benefit only from labor-cost advantages in harvesting. As the tariff structure now stands, a higher tariff is applied to fresh vegetables than to processed. (As the data in appendix D indicate, this is not strictly true; a tariff of 5 percent ad valorem is applied on, for example, fresh whole asparagus entering by air during September 15-November 15 of any year, whereas imports entering by other means or at other times of the year are subject to a 25-percent ad valorem tariff, as are imports of frozen whole asparagus entering at any time. The tariffs on canned or fresh or frozen cut asparagus amount to 17.5 percent ad valorem.)

Freezers and distributors

Firms involved in freezing and shipping vegetables testified that although U.S. consumption of such products is rising, because of health concerns and other factors behind consumer demand, the growth in imports prevents the U.S. industry from fully benefiting from growing consumer demand. As a result,

U.S. market share is slipping, prices are not rising as fast as costs, and firms are forced to cut back, merge with their competitors, or exit the industry altogether, all of which force cutbacks in employment. Consumers are not getting the full benefit of low-cost production in foreign countries, it was asserted, because imports are sold in the U.S. market at the same prices as domestic product. According to the testimony of these freezers and distributors, labeling of country of origin would help the U.S. industry as well as consumers; moreover, it should be extended to "blended" products (mixes of imported and domestic vegetables in the same package), which are not now required to be labeled as such a mix. Consumers should be made aware of improper pesticide practices in other countries, it was claimed by an official of one freezer firm, so that they will reject the imported product; otherwise, reports of pesticide residues on vegetables cause consumers to reject vegetables of both domestic and foreign origin.

Mexican industry representatives

Representatives of Mexican growers and freezers presented their views that the U.S. perception of the Mexican industry is based on misinformation on several points. The share of the U.S. market held by Mexican supply is still very small, although growing fast in percentage terms. Future growth in Mexican production of the subject vegetables is not unlimited; rather, it will be constrained by, among other things, the limited availability of high quality land and water supplies, and by competing demands to use such resources to produce food for internal Mexican consumption. In addition to Latin America, other U.S. producing regions also put competitive pressure on the traditional California and Arizona growing regions because of their recent rapid growth in acreage and production. Not all costs of production and transportation are lower in Mexico than in the United States: for example, high nominal interest rates prevent some firms from financing land, machinery and equipment; fertilizer, seed, and transportation are in many cases higher for Mexican growers than for U.S. growers; and, in addition, Mexican exporters must incur certain expenses that U.S. producers do not, notably customs brokers' fees.

It was claimed that the decline in U.S. producers' shares of the U.S. markets for the subject vegetables reflects not unfair cost advantages, but an inability of U.S. producers to compete effectively in new market segments created by demographic changes, marketing trends, and changing consumer tastes. To compete in these market segments, U.S. marketers are obtaining their supplies increasingly from abroad because, among other things, U.S. growers cannot supply sufficient quantities of vegetables year-round.

Table 6-1.

Asparagus, broccoli, and cauliflower: Selected measures of U.S. market share

Product	Ratio of U.S. domestic supply to U.S. apparent consumption 1/					Percentage- point change 1983-87
	1983	1984	1985	1986	1987	
Fresh asparagus.....	2/	85	84	84	79	-6
Fresh broccoli.....	2/	99	99	98	96	-3
Fresh cauliflower.....	96	97	96	98	97	1
Frozen asparagus.....	92	97	96	87	78	-14
Frozen broccoli.....	89	85	82	73	61	-28
Frozen cauliflower.....	83	77	72	70	57	-26
Canned asparagus.....	95	91	93	93	93	-2

Product	Mexican share of total U.S. imports 1/					Percentage- point change 1983-87
	1983	1984	1985	1986	1987	
Fresh asparagus.....	92	87	86	81	85	-7
Fresh broccoli.....	64	97	87	96	99	35
Fresh cauliflower.....	16	21	17	28	57	41
Frozen asparagus.....	99	91	80	83	96	-3
Frozen broccoli.....	83	85	82	83	84	1
Frozen cauliflower.....	83	89	89	91	95	12
Canned asparagus.....	6	14	48	22	56	50

1/ Percentages derived from production and trade measured in quantities. U.S. domestic supply includes U.S. production minus U.S. exports.

2/ Not available.

Source: Derived from tables 2-6 to 2-12, and 3-2 to 3-8.

APPENDIX A

Copy of Letter to Chairman Liebeler from
the United States Trade Representative

DOCKET
NUMBER

A-3

Industries
SG

THE UNITED STATES TRADE REPRESENTATIVE
WASHINGTON
20506

November 10, 1987

OFFICE OF THE SECRETARY
DOCKET/USITC

87 NOV 16 P 4: 28

RECEIVED

Office of the
Secretary
Int'l Trade Commission

The Honorable Susan Liebeler
Chairman
U.S. International Trade Commission
701 E Street NW
Washington, D.C. 20436

Dear Madam Chairman:

Members of the California and Arizona vegetable growing industry have brought to my attention a number of problems they are experiencing. They are concerned about the competitive factors affecting their industry, including strong competition from imports.

In order to assess more fully the nature and extent of these problems, more information is required concerning the economic, technological, and competitive conditions that the industry faces. To provide this information, I request, at the direction of the President and pursuant to Section 332 of the Tariff Act of 1930, as amended, that the Commission conduct an investigation and report to me all significant competitive, technological, and economic factors that are affecting the performance of the California and Arizona vegetable industry producing broccoli, cauliflower, and asparagus. The study should include the growing, processing, and marketing sectors and concentrate on the competitive position of supplies of these vegetables from Mexico, California, and Arizona in major U.S. markets.

Specifically, the Commission's study should cover, to the extent possible:

1. Measures of the current competitiveness of the California and Arizona industry in the U.S. market;
2. Comparative strengths of California and Arizona and major foreign competitors in the U.S. market;
3. Nature and source of the main competitive problems facing the California and Arizona industry;
4. Nature of Federal and State government programs that are available to growers, processors, or marketers of these vegetables in the United States and Mexico;
5. Competitive strategies: what steps or actions the respective industries are taking to increase their competitiveness.

I request that the Commission provide an opportunity for industry

The Honorable Susan Liebeler
November 10, 1987
Page Two

representatives and other interested persons to present their views through a public hearing in California or Arizona.

The Commission's report on this investigation should be submitted to the United States Trade Representative (USTR) within 12 months of receipt of this request. Recognizing that the data and information desired in this request are not readily available and will require the cooperation of the industries involved, please apprise this Office of any significant delays encountered in the course of the investigation so that any required adjustment in the date for submission of the report to USTR can be considered.

Thank you once again for your assistance.

Sincerely,


for Clayton Yeutter

CY:tmab

APPENDIX B

Notice of Institution of Investigation No. 332-253

INTERNATIONAL TRADE COMMISSION

(332-253)

Competitive Conditions in the U.S. Market for Asparagus, Broccoli, and Cauliflower

AGENCY: United States International Trade Commission.

ACTION: Institution of investigation and scheduling of public hearing.

EFFECTIVE DATE: February 18, 1988.

SUMMARY: As requested by the United States Trade Representative, at the direction of the President, the Commission has instituted investigation No. 332-253 under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), for the purpose of reporting on the significant competitive, technological, and economic factors affecting the performance of the California and Arizona vegetable industries producing asparagus, broccoli, and cauliflower, in major U.S. markets.

FOR FURTHER INFORMATION CONTACT: David L. Ingersoll (202-252-1309) or Timothy P. McCarty (202-252-1324), Agriculture, Fisheries, and Forest Products Division, U.S. International Trade Commission, Washington, DC 20436. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-252-1000.

Background and Scope of Investigation: As requested by the United States Trade Representative, the Commission in its report will seek to cover:

(A) Measures of the current competitiveness of the California and Arizona industries in the U.S. market.

(B) Comparative strengths of California, Arizona, and major foreign competitors in the U.S. market.

(C) Nature and source of the main competitive problems facing the California and Arizona industries.

(D) Nature of Federal and State government programs available to growers, processors, or marketers of the specified vegetables in the United States and Mexico.

(E) Competitive strengths: what steps or actions the respective industries are taking to increase their competitiveness.

The USTR requested that the Commission report the results of its investigation within 12 months of receipt of the request, or by November 16, 1988.

Public Hearing: A public hearing in connection with the investigation will be held May 17, 1988, in California, at a time and place to be announced. All persons will have the opportunity to appear by counsel or in person, to present information and to be heard. Requests to appear at the public hearing and prehearing briefs (original and 14 copies) should be filed with the Secretary, United States International Trade Commission, 500 E. Street SW., Washington, DC 20436, not later than May 8, 1988. Post-hearing briefs are required by May 31, 1988.

Written submissions: Interested persons are invited to submit written statements concerning the investigation, in lieu of, or in addition to, appearances at the public hearing. Commercial or financial information which a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of §201.6 of the Commission's *Rules of Practice and Procedure* (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by the public. To be assured of consideration by the Commission, written statements should be received at the earliest practicable date, but not later than May 31, 1988. All submissions should be addressed to the Secretary at the Commission's office in Washington, DC.

By order of the Commission.
Kenneth R. Mason,
Secretary.

Issued: February 19, 1988.
[FR Doc 88-3816 Filed 2-23-88; 8:45 am]
BILLING CODE 7020-26-0

[Investigations Nos. 731-TA-379 and 380 (Final)]

Certain Brass Sheet and Strip From Japan and the Netherlands

AGENCY: United States International Trade Commission.

ACTION: Institution of final antidumping investigations and scheduling of a hearing to be held in connection with the investigations./

SUMMARY: The Commission hereby gives notice of the institution of final antidumping investigations Nos. 731-TA-379 (Final) (Japan) and 731-TA-380 (Final) (Netherlands) under section 735(b) of the Tariff Act of 1930 (19 U.S.C. 1673d(b)) to determine whether an industry in the United States is

materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan and the Netherlands of certain brass sheet and strip,¹ provided for in item 812.39 of the Tariff Schedules of the United States, that have been found by the Department of Commerce, in preliminary determinations, to be sold in the United States at less than fair value (LTFV). Unless the investigations are extended, Commerce will make its final LTFV determinations on or before April 11, 1988, for Japan and April 18, 1988, for the Netherlands. The Commission will conduct investigations Nos. 731-TA-379 and 380 (Final) concurrently and make its final injury determinations by May 31, 1988, (see sections 735(a) and 735(b) of the Act (19 U.S.C. 1673d(a) and 1673d(b))).

For further information concerning the conduct of these investigations, hearing procedures, and rules of general application, consult the Commission's *Rules of Practice and Procedure*, Part 207, subparts A and C (19 CFR Part 207), and Part 201, Subparts A through E (19 CFR Part 201).

EFFECTIVE DATE: February 1, 1988.

FOR FURTHER INFORMATION CONTACT: Tedford Briggs (205-252-1181), Office of Investigations, U.S. International Trade Commission, 500 E. Street SW., Washington, DC 20436. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-252-1000.

SUPPLEMENTARY INFORMATION

Background

These investigations are being instituted as a result of affirmative preliminary determinations by the

¹ For purposes of these investigations the term "certain brass sheet and strip" refers to brass sheet and strip, other than leaded brass and tin brass sheet and strip, of solid rectangular cross section over 0.076 inch but not over 0.188 inch in thickness, in coils or cut to length, whether or not corrugated or crimped, but not cut, pressed, or stamped to nonrectangular shape, provided for in items 812.3901, 812.3902, and 812.3906 of the *Tariff Schedules of the United States Annotated* (TSUSA). The chemical compositions of the products under investigation are currently defined in the Copper Development Association (CDA) 200 series or the Unified Numbering System (UNS) C20000 series. Products whose chemical compositions are defined by other CDA or UNS series are not covered by these investigations.

APPENDIX C

Notice of Time and Place of Hearing

necessary modifications will be made in the plan to negate such impacts.

Monitoring or Enforcement Program

An impact/mitigation matrix has been prepared to guide the construction specifications for the project and to assist in monitoring the implementation phase to ensure that the prescribed mitigation is carried out. The matrix identifies each expected impact of the project with its prescribed mitigation measure(s) and parties responsible for implementation.

Conclusion

The above factors and considerations justify the selection of Alternative 1, identified as the preferred alternative in the draft EIS, and as modified in the final EIS, for the Grant Grove/Redwood Mountain Development Concept Plan, Sequoia-Kings Canyon National Park, Fresno County, California.

Approved:

Date: March 16, 1988.

Stanley T. Albright,

Regional Director, Western Region, National Park Service.

[FR Doc. 88-6940 Filed 3-29-88; 8:45 am]

BILLING CODE 4310-70-M

(A18 (GUIS-S))

Gulf Islands National Seashore; Advisory Commission Meeting

March 7, 1988.

AGENCY: National Park Service, Interior.

ACTION: Notice of advisory commission meeting.

SUMMARY: Notice is hereby given in accordance with the Federal Advisory Commission Act that a meeting of the Gulf Islands National Seashore Advisory Commission will be held at 10:00 a.m., at the following location and date.

DATE: May 14, 1988.

ADDRESS: Visitor Center and Administration Building, 1801 Gulf Breeze Parkway, Gulf Breeze, FL 32561.

FOR FURTHER INFORMATION CONTACT: Mr. Jerry Eubanks, Superintendent, Gulf Islands National Seashore, 1801 Gulf Breeze Parkway, Gulf Breeze, Florida 32561, Telephone: (904) 934-2004.

SUPPLEMENTARY INFORMATION: The purpose of the Gulf Islands National Seashore Advisory Commission is to consult and advise with the Secretary of the Interior or his designee on matters of planning and development of Gulf Islands National Seashore. The members of the Advisory Commission are as follows:

Mrs. Courtney Blossman, Chairman (Mississippi)

Mr. Gorden D. Allen (Mississippi)
Mr. George Byars (Mississippi)
Mr. Lloyd Caillavet (Mississippi)
Dr. Ed Cake (Mississippi)
Mr. William H. Creel, Sr. (Mississippi)
Mr. Bill Davis (Mississippi)
Mr. Paul Delcambre, Sr. (Mississippi)
Ms. Betty S. Goodwin (Mississippi)
Mrs. Leewynn Hodges (Mississippi)
Mrs. Sara McGehee (Mississippi)
Mr. James E. Walker, Sr. (Mississippi)
Mrs. Lois Anderson (Florida)
Mr. Sherman Barnes (Florida)
Mr. J. Earle Bowden (Florida)
Mr. Lamar B. Cobb (Florida)
Mr. Paul A. Daniel (Florida)
Mrs. Betty Gerritz (Florida)
Mr. Michael Mitchell (Florida)
Mrs. Dianne Rittenhouse (Florida)
Mr. Roger Taylor Robinson (Florida)
Mr. Walter Francis Spence (Florida)
Mr. Britton Stamps (Florida)
Mr. Vince Whibbs (Florida)

The matters to be discussed at this meeting will include:

- 5(1) Status of Park Activities
- (2) Review of Naval Live Oaks facilities
- (3) Report on Resource Management Activities.

The meeting will be open to the public. However, facilities and space for accommodating members of the public are limited and it is expected that not more than 25 persons will be able to attend. Any member of the public may file with the commission a written statement concerning the matters to be discussed. Written statements may also be submitted to the Superintendent at the address above. Minutes of the meeting will be available at Park Headquarters for public inspection approximately 4 weeks after the meeting.

Date: March 17, 1988.

Frank Catroppa,

Acting Regional Director, Southeast Region.

[FR Doc. 88-6942 Filed 3-29-88; 8:45 am]

BILLING CODE 4310-70-M

INTERNATIONAL TRADE COMMISSION

(332-253)

Competitive Conditions in the U.S. Market for Asparagus, Broccoli, and Cauliflower

AGENCY: International Trade Commission.

ACTION: Notice of time and place of public hearing.

EFFECTIVE DATE: March 24, 1988.

FOR FURTHER INFORMATION CONTACT: David L. Ingearson (202-252-1309) or Timothy P. McCarty (202-252-1324).

Agriculture, Fisheries, and Forest Products Division, U.S. International Trade Commission, Washington, DC 20438. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810.

SUPPLEMENTARY INFORMATION: On February 18, 1988, the Commission instituted the subject investigation and announced that a public hearing would be held at a time and place to be announced (53 FR 5474, Feb. 24, 1988). The public hearing is scheduled to begin at 9:30 a.m., Pacific Daylight Time, Tuesday, May 17, 1988, at the Monterey Sheraton, 350 Calle Principal, Monterey, California 93940. All persons shall have the right to appear in person or by counsel, to present information and to be heard. Persons wishing to appear at the public hearing should file requests to appear and should file prehearing briefs (original and 14 copies) with the Secretary, United States International Trade Commission, 500 E Street SW., Washington, DC 20438, not later than noon, May 6, 1988.

By order of the Commission.

Kenneth R. Mason,
Secretary.

Issued: March 25, 1988.

[FR Doc. 88-6967 Filed 3-29-88; 8:45 am]

BILLING CODE 7020-02-M

(Investigations Nos. 731-TA-379 and 380 (Final))

Certain Brass Sheet and Strip From Japan and The Netherlands

AGENCY: International Trade Commission.

ACTION: Revised schedule for the subject investigations.

EFFECTIVE DATE: March 21, 1988.

FOR FURTHER INFORMATION CONTACT: Tedford Briggs (202-252-1181), Office of Investigations, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20438. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-252-1000.

SUPPLEMENTARY INFORMATION: Effective February 1 (Japan) and February 8 (Netherlands), 1988, the Commission instituted the subject investigations and established a schedule for their conduct (53 FR 5474, February 24, 1988).

APPENDIX D

A discussion of product classifications of U.S. imports, rates of duty, and customs treatment relating to asparagus, broccoli, and cauliflower, including excerpted pages from the Tariff Schedules of the United States Annotated (1987) and the proposed Harmonized Tariff Schedule of the United States

U.S. Tariff Treatment

Product classification and rates of duty under the TSUS

Under the Tariff Schedules of the United States (TSUS), vegetables are classified according to the form of preparation or preservation, if any, of the product at the time of entry. Fresh, chilled, or frozen vegetables are classified in part 8, subpart A, Schedule 1 of the TSUS, provided that they are not further prepared or preserved (subpart C). In addition, fresh, chilled, or frozen vegetables are grouped as to whether they are cut, sliced, or otherwise reduced in size (termed "cut") or are not (termed "whole"). Individual vegetables are separately named, as set out in the TSUS, for purposes of duty provisions or statistical compilations.

Whether an imported fresh, chilled, or frozen vegetable is classified as whole or cut depends upon the nature of commercial trade for that particular vegetable. Customs practices, based on court decisions and other information, have determined that the phrase "reduced in size" means reduced beyond the point that such vegetables are ordinarily reduced as an incident of placing them in marketable condition as a fresh vegetable. 1/ Due to technical requirements of blanching prior to freezing operations, and previous Customs classification practices, virtually all of the imported asparagus, broccoli, and cauliflower that is classified in the subgroup for whole vegetables are fresh or chilled products, and few, if any, are frozen products. 2/ Conversely, virtually all of the imported frozen (but not further prepared or preserved) asparagus, broccoli, and cauliflower are dutiable in the subgroup for fresh, chilled, or frozen cut vegetables. Cut, fresh or chilled vegetables are also dutiable and statistically reported in this same subgroup. If further prepared or preserved, other than blanching and freezing, a frozen vegetable will be classified under the TSUS provisions for "otherwise prepared or preserved" vegetables (part 8, subpart C, Schedule 1); these are believed to include such products as vegetables packed in a sauce and frozen, cooked and frozen, and battered or breaded and frozen.

The various tariff provisions and applicable item numbers, under both the TSUS and the proposed Harmonized Tariff Schedule of the United States (HTS), for asparagus, broccoli, and cauliflower are shown in tables D-1 through D-3. Each of the duty rates is an ad valorem rate. These rates are applicable to imports from Mexico, unless the item has duty-free eligibility under the

1/ U.S. Customs Service Legal Determination No. 3611-149, File 052777 CM, Jan. 23, 1978. Customs Service practices for classifying asparagus, broccoli, and cauliflower are believed to be as follows: fresh or frozen asparagus spears, shorter than 7 inches in length, are considered reduced in size; broccoli spears (with outer leaves removed) less than, or smaller than, the entire stalk are considered reduced in size; and, a head of cauliflower is considered whole whether or not part or all of the outer leaves are trimmed to shape or entirely removed, and cauliflower is considered reduced in size if the curds are separated.

2/ This principal does not hold for every vegetable; for example, green peas, when separated from their pods, are considered not reduced in size in both fresh and frozen conditions.

GSP. 1/ The only TSUS item for which Mexico receives duty-free GSP benefits is fresh or chilled whole cauliflower entered during the period from June 5 to October 15; this period is when most imports are supplied by Canada (subject to the column 1 rate).

Special rates of duty and column 2 duty rates are shown in the pages excerpted from the TSUSA (1987). Duty-free treatment is granted to imports from beneficiary countries designated under the Caribbean Basin Economic Recovery Act (CBERA) in the "Special" rate of duty column. From the 21 countries or areas so designated for preferential treatment under the CBERA (General Headnote 3(vii) of the TSUS), U.S. imports of the subject vegetables have been insignificant except from Guatemala and El Salvador.

Product classification and rates of duty under the HTS

Under the HTS, 2/ vegetables are classified first by the form of processing (or absence thereof), second by the kind of vegetable, and thirdly, if specially provided for, by whether or not the vegetable is whole or reduced in size. This third characteristic is significantly different from the TSUS in that the action of whether or not a vegetable is reduced in size takes precedence over the type of vegetable in the TSUS, whereas in the HTS the reverse is the case.

In the HTS, fresh or chilled vegetables are classified separately from frozen vegetables. Fresh or chilled broccoli and cauliflower are classified in heading 0704 for edible brassicas; fresh or chilled asparagus is classified under heading 0709 for "Other vegetables, fresh or chilled;" and simply frozen asparagus, broccoli, and cauliflower are classified under heading 0710 for "Vegetables (uncooked or cooked by steaming or boiling in water), frozen." Preparations of vegetables are classified in chapter 20. Frozen asparagus, broccoli, and cauliflower that are not dutiable in chapter 7 are classified in chapter 20 under heading 2004 for "Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, frozen." Canned asparagus is classified under the HTS heading 2005 for "Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen."

In the HTS, an 8-digit number is a rate-of-duty provision and a 10-digit number provides classification for statistical purposes. Any 8-digit or 10-digit numbers in brackets indicate that vegetables other than asparagus,

1/ A description of tariff and trade agreement terms concerning rates of duty, the Generalized System of Preferences, and the Caribbean Basin Economic Recovery Act is attached in this appendix.

2/ The Harmonized Commodity Description and Coding System, also known as the Harmonized System or HS, is intended to serve as the single modern product nomenclature for use in classifying products for customs tariff, statistical, and transport documentation purposes. It is based on the international Customs Cooperation Council Nomenclature. Parties to the HS Convention agree to base their customs tariffs and statistical programs upon the HS nomenclature. Legislation to replace the TSUS with an HS-based tariff schedule, known as the Harmonized Tariff Schedule of the United States (HTS), is before the U.S. Congress.

broccoli, or cauliflower are also provided for under that heading. Each of the proposed HTS duty rates is an ad valorem rate. The proposed HTS descriptions, heading numbers, and all applicable rates of duty, are shown in the excerpted pages from the proposed HTS.

Comparison of HTS and TSUS rates of duty

A comparison of the proposed U.S. rates of duty under the HTS, for asparagus, broccoli, and cauliflower, with those currently in effect under the TSUS may be made by examining like categories in tables D-1 through D-3. Several differences from the TSUSA rates are noted in the proposed HTS rates. 1/ For asparagus, the rate of duty for fresh or chilled, cut or reduced-in-size articles increases to 25 percent ad valorem in the HTS, as compared with 17.5 percent ad valorem in the TSUS. The duty rate for frozen whole asparagus in the HTS also increases to 25 percent from 17.5 percent ad valorem in the TSUS; in the HTS, however, the product heading becomes eligible for GSP treatment with Mexico excluded from such benefits. This means that GSP beneficiary countries will have duty-free access for not-reduced-in-size frozen asparagus (heading 0710.807060) under the proposed HTS, including such traditional asparagus exporting countries as Taiwan.

Under the HTS, fresh or chilled whole sprouting broccoli has the same 25 percent ad valorem rate of duty as in the TSUS; but when cut or reduced-in-size, the duty rate for sprouting broccoli increases from 17.5 to 25 percent ad valorem with a loss of GSP eligibility. Headed broccoli in the proposed HTS is dutiable at the same rates as cauliflower. 2/ For whole headed broccoli, this means a reduction from 25 percent ad valorem and no GSP eligibility to 12.5 or 5.5 percent ad valorem (depending on the season) with GSP eligibility in both cases. For fresh or chilled headed broccoli and cauliflower cut or reduced in size, the duty drops from 17.5 percent ad valorem and GSP eligibility (excluding Mexico) to 5.5 percent ad valorem and GSP eligibility (including Mexico) for imports entered during June 5 to October 15. There is no duty-rate change for cut fresh or chilled headed broccoli and cauliflower if entered other than during June 5 to October 15. For frozen broccoli, the HTS does not distinguish between sprouting broccoli and headed broccoli. Whereas cut or reduced-in-size frozen broccoli and

1/ Duty-rate differences are discussed only for product categories believed to have a potential for trade under the HTS and not for products of likely nil or negligible trade, such as whole frozen cauliflower.

2/ The different rates of duty for fresh or chilled sprouting broccoli (*Brassica oleracea* var. *Italica*) and headed broccoli (*Brassica oleracea* var. *Botrytis*) may well lead to future classification disputes and Customs Court Decisions because some individual broccoli varieties used in commercial production are hybrids between the two groups and it is believed that distinguishing characteristics may be lost when the broccoli is reduced in size. In the development of the HTS schedule, the United States placed headed broccoli and sprouting broccoli in separate tariff classes because under the Harmonized System (HS) adopted by the international community (and European based), headed broccoli was specified with cauliflower at a six-digit heading level, and individual countries are not permitted to amend six-digit HS descriptions.

cauliflower in the TSUS is GSP eligible, with Mexico currently excluded from the benefits, such broccoli and cauliflower is not GSP eligible under the HTS. The loss of GSP eligibility for frozen broccoli and cauliflower is expected to inhibit duty-free imports from such GSP-beneficiary countries as Guatemala and El Salvador, since they are also CBERA-beneficiary countries.

Other Import Requirements

In addition to tariff classification and duty assessment determinations by the Customs Service, asparagus, broccoli, and cauliflower imports must meet other requirements. These include plant health and quarantine regulations of the U.S. Department of Agriculture, food safety and product description labeling requirements, including chemical residue questions, of the Food and Drug Administration, and documentation and labeling requirements of the Customs Service. There are no quality grades required for entry of imported vegetables. Plant health, food safety, and product grades are discussed elsewhere in this report.

The U.S. Customs Service administers country-of-origin requirements and appropriate labeling for imported products. Importers seeking duty-free treatment for eligible products from beneficiary countries under the GSP, CBERA, and U.S.-Israel preferential-duty-rate programs must supply supporting documentation with the entry papers for evidence of country of origin. There are additional country-of-origin regulations that affect labeling requirements for these vegetables.

Regulations on the marking of imported articles and containers are enumerated in 19 U.S.C. 1304. Basically, such regulations state that every article of foreign origin (or its container) imported into the United States, except those specifically excluded, shall be marked in a conspicuous place as legibly, indelibly, and permanently as the nature of the article (or container) will permit in such manner as to indicate to an ultimate purchaser in the United States the English name of the country of origin of the article. ^{1/} The list of articles excluded from marking requirements include the J-List exceptions, which name, among other things, articles described as "natural products, such as vegetables, fruits, nuts, berries, and live or dead animals, fish and birds; all the foregoing which are in their natural state or not advanced in any manner further than is necessary for their safe transportation" (19 U.S.C. 1304(a)(3)(J) and 19 CFR 134.33).

On June 25, 1986, the U.S. Customs Service provided a ruling to the Customs district Director in Laredo, Texas concerning the country-of-origin marking requirements applicable to broccoli imported in bulk raw form and processed in the United States (C.S.D. 86-28). This ruling held that foreign produce which is imported into the United States in bulk raw form for purposes of further processing does not ultimately result in an article which has been substantially transformed into a new and different article for country-of-origin marking purposes. Therefore, domestically repackaged foreign produce must be marked to indicate the country of origin.

^{1/} See app. F for a reply from the Customs Service to a Commission request for information concerning these issues.

Table D-1.

Asparagus: Tariff Schedules of the United States Annotated item numbers and Harmonized Tariff Schedules of the United States Annotated subheading numbers, including duty rates, applicable to imports by product form

Product Form	TSUSA	HTS sub-	Column 1 duty 1/	
	item number	heading number	TSUSA	HTS
Fresh or chilled:				
Whole:				
Entered 9/15-11/15 by air.....	135.0300	0709.20.1000	5	5
Other than 9/15-11/15 by air.....	135.0520	0709.20.9000	25	25
Cut or reduced in size.....	[138.4610]	0709.20.9000	17.5	25
In a mixture of two or more vegetables.	[138.4610]	[0709.90.4080]	17.5	25
Frozen: <u>2/</u>				
Whole.....	135.0540	[0710.80.7060]	25	25A*
Cut or reduced in size.....	138.4640	0710.80.8010	17.5	17.5
In a mixture of two or more vegetables.	[138.4650]	[0710.90.9000]	17.5	17.5
Otherwise prepared or preserved: <u>3/</u>				
Frozen.....	[141.8900]	[2004.90.9080]	17.5	17.5
Other than frozen <u>4/</u>	141.9300	2005.60.0000	17.5	17.5
In a mixture of two or more vegetables.	[141.8900]	[2004.90.9080]	17.5	17.5
	[141.9840]	[2005.90.9000]	17.5A	17.5A

1/ Percent ad valorem. Duty-free eligibility under the Generalized System of Preferences (GSP) is indicated by an "(A)" or "(A*)" following the rate of duty; "A*" means that Mexico is currently not eligible for GSP benefits owing to exclusion under competitive need criteria.

2/ Frozen, but not further prepared or preserved.

3/ Includes canned and other prepared or preserved vegetables not elsewhere provided for. Under the TSUSA, these provisions do not include vegetables dried, desiccated, or dehydrated, reduced to flour, or packed in salt, in brine, or pickled. Under the HTS, these provisions do not include vegetables provisionally preserved, dried, reduced to flour, or preserved by vinegar or acetic acid.

4/ Primarily canned. Under the HTS, excludes infant or dietetic food in containers of less than 250 grams each as provided for under heading 2005.1000.

Note.—TSUSA item numbers and HTS subheading numbers in brackets also provide for vegetables other than asparagus.

Source: Compiled by Commission staff from the Tariff Schedules of the United States Annotated and the Harmonized Tariff Schedules of the United States, Annotated for Statistical Reporting Purposes, First Edition.

Table D-2.

Broccoli: Tariff Schedules of the United States Annotated item numbers and Harmonized Tariff Schedules of the United States subheading numbers, including duty rates, applicable to imports by product form

Product form	TSUSA	HTS sub-	Column 1 duty 1/	
	item number	heading number	TSUSA	HTS
Fresh or chilled:				
Whole:				
All types, entered at any time.....	137.9730	-	25	-
Headed types, entered 6/5-10/15.....	-	[0704.10.2000]	-	5.5A
Headed types, other than 6/5-10/15....	-	[0704.10.4000]	-	12.5A*
Sprouting types, entered at any time..	-	0704.90.4020	-	25
Cut or reduced in size:				
All types, entered at any time.....	[138.0520]	-	17.5A*	-
Headed types, entered 6/5-10/15.....	-	[0704.10.2000]	-	5.5A
Headed types, other than 6/5-10/15....	-	[0704.10.6000]	-	17.5A*
Sprouting types, entered at any time..	-	0704.90.4020	-	25
In mixtures of two or more vegetables...	[138.4610]	[0704.90.4040]	17.5	25
		[0709.90.4080]	-	25
Frozen: 2/				
Whole.....	[137.9780]	[0710.80.7060]	25	25A*
Cut or reduced in size:				
Spears.....	138.0535	0710.80.8022	17.5A*	17.5
Other, containers over 3 lbs. (1.4kg).	138.0545	0710.80.8024	17.5A*	17.5
Other.....	138.0555	0710.80.8026	17.5A*	17.5
In a mixture of two or more vegetables..	[138.4650]	[0710.90.9000]	17.5	17.5
Otherwise prepared or preserved: 3/				
Frozen.....	[141.8900]	[2004.90.9080]	17.5	17.5
Other than frozen 4/.....	[141.9840]	[2005.90.9000]	17.5A	17.5A
In mixtures of two or more vegetables...	[141.8900]	[2004.90.9080]	17.5	17.5
	[141.9840]	[2005.90.9000]	17.5A	17.5A

1/ Percent ad valorem. Duty-free eligibility under the Generalized System of Preferences (GSP) is indicated by an "(A)" or "(A*)" following the rate of duty. An "A" means that all GSP beneficiary countries, including Mexico, are eligible for GSP benefits; "A*" means that Mexico is currently not eligible for GSP benefits owing to exclusion under competitive need criteria.

2/ Frozen, but not further prepared or preserved.

3/ Includes prepared or preserved vegetables not elsewhere provided for. Under the TSUSA, these provisions do not include vegetables dried, desiccated, or dehydrated, reduced to flour, or packed in salt, in brine, or pickled. Under the HTS, these provisions do not include vegetables provisionally preserved, dried, reduced to flour, or preserved by vinegar or acetic acid.

4/ Under the HTS, excludes infant or dietetic food in containers of less than 250 grams each as provided for under heading 2005.1000.

Note.--TSUSA item numbers and HTS subheading numbers in brackets also provide for vegetables other than broccoli.

Source: Compiled by Commission staff from the Tariff Schedules of the United States Annotated and the Harmonized Tariff Schedules of the United States, Annotated for Statistical Reporting Purposes, First Edition.

Table D-3.

Cauliflower: Tariff Schedules of the United States Annotated item numbers and Harmonized Tariff Schedules of the United States subheading numbers, including duty rates, applicable to imports by product form

	TSUSA	HTS sub-	Column 1 duty 1/	
Product Form	item number	heading number	TSUSA	HTS
Fresh or chilled:				
Whole:				
Entered 6/5-10/15.....	135.5000	[0704.10.2000]	5.5A	5.5A
Other than 6/5-10/15.....	135.5100	[0704.10.4000]	12.5A*	12.5A*
Cut or reduced in size:				
Entered 6/5-10/15.....	-	[0704.10.2000]	-	5.5A
Other than 6/5-10/15.....	-	[0704.10.6000]	-	17.5A*
Entered at any time.....	[138.0520]	-	17.5A*	-
In mixtures of two or more vegetables...	[138.4610]	[0704.90.4040]	17.5	25
		[0709.90.4080]	-	25
Frozen: 2/				
Whole:				
Entered 6/5-10/15.....	135.5000	-	5.5A	-
Other than 6/5-10/15.....	135.5100	-	12.5A*	-
Entered at any time.....	-	[0710.80.7060]	-	25A*
Cut or reduced in size.....	138.0560	0710.80.8030	17.5A*	17.5
In a mixture of two or more vegetables..	[138.4650]	[0710.90.9000]	17.5	17.5
Otherwise prepared or preserved: 3/				
Frozen.....	[141.8900]	[2004.90.9080]	17.5	17.5
Other than frozen 4/.....	[141.9840]	[2005.90.9000]	17.5A	17.5A
In mixtures of two or more vegetables...	[141.8900]	[2004.90.9080]	17.5	17.5
	[141.9840]	[2005.90.9000]	17.5A	17.5A

1/ Percent ad valorem. Duty-free eligibility under the Generalized System of Preferences (GSP) is indicated by an "(A)" or "(A*)" following the rate of duty. An "A" means that all GSP beneficiary countries, including Mexico, are eligible for GSP benefits; "A*" means that Mexico is currently not eligible for GSP benefits owing to exclusion under competitive need criteria.

2/ Frozen, but not further prepared or preserved.

3/ Includes prepared or preserved vegetables not elsewhere provided for. Under the TSUSA, these provisions do not include vegetables dried, desiccated, or dehydrated, reduced to flour, or packed in salt, in brine, or pickled. Under the HTS, these provisions do not include vegetables provisionally preserved, dried, reduced to flour, or preserved by vinegar or acetic acid.

4/ Under the HTS, excludes infant or dietetic food in containers of less than 250 grams each as provided for under heading 2005.1000.

Note.--TSUSA item numbers and HTS subheading numbers in brackets also provide for vegetables other than cauliflower.

Source: Compiled by Commission staff from the Tariff Schedules of the United States Annotated and the Harmonized Tariff Schedules of the United States, Annotated for Statistical Reporting Purposes, First Edition.

TARIFF AND TRADE AGREEMENT TERMS

The rates of duty in rate column 1 of the TSUS are most-favored-nation (MFN) rates and in general represent the final stage of the reductions granted in the Tokyo Round of the Multilateral Trade Negotiations. Column 1 duty rates are applicable to imported products from all countries except those Communist countries and areas enumerated in general headnote 3(d) to the TSUS, whose products are dutied at the rates set forth in column 2; the People's Republic of China, Hungary, Poland, Romania, and Yugoslavia are the only Communist countries eligible for MFN treatment. Among articles dutiable at column 1 rates, particular products of enumerated countries may be eligible for reduced rates of duty or for duty-free treatment under one or more preferential tariff programs. Such tariff treatment is set forth in the special rates of duty column.

The Generalized System of Preferences (GSP) affords nonreciprocal tariff preferences to developing countries to aid their economic development and to diversify and expand their production and exports. The U.S. GSP, enacted in title V of the Trade Act of 1974 and renewed in the Trade and Tariff Act of 1984, applies to merchandise imported on or after January 1, 1976, and before July 4, 1993. Indicated by the symbol "A" or "A*" in the special rates column, the GSP provides duty-free entry to eligible articles the product of and imported directly from designated beneficiary developing countries.

The Caribbean Basin Economic Recovery Act (CBERA) affords nonreciprocal tariff preferences to developing countries in the Caribbean Basin area to aid their economic development and to diversify and expand their production and exports. The CBERA, enacted in title II of Public Law 98-67 and implemented by Presidential Proclamation 5133 of November 30, 1983, applies to merchandise entered, or withdrawn from warehouse for consumption, on or after January 1, 1984; it is scheduled to remain in effect until September 30, 1995. Indicated by the symbol "E" or "E*" in the special rates column, the CBERA provides duty-free entry to eligible articles the product of and imported directly from designated Basin countries.

Preferential rates of duty in the special rates column followed by the code "I" are applicable to products of Israel under the United States-Israel Free Trade Area Implementation Act of 1985, as provided in general headnote 3(e)(viii) of the TSUS. Where no rate of duty is provided for products of Israel in the special rates column for a particular tariff item, the rate of duty in column 1 applies.

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TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1987)

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SCHEDULE 1. - ANIMAL AND VEGETABLE PRODUCTS
Part 8. - Vegetables1 - 8 - A
135.50 - 136.93

Item	Stat. Suf- fix	Articles	Units of Quantity	Rates of Duty		
				1	Special	2
		Vegetables, fresh, chilled, or frozen, etc. (con.):				
		Cauliflower:				
135.50	00	If entered during the period from June 5 to October 15, inclusive, in any year.....	Lb.....	5.5% ad val.	Free (A,E,I)	50% ad val.
135.51	00	Other.....	Lb.....	12.5% ad val.	Free (A*,E) 4% ad val. (I)	50% ad val.
		Celery:				
135.60	00	If imported and entered during the period from April 15 to July 31, inclusive, in any year.....	Lb.....	0.25c per lb.	Free (A,E,I)	2c per lb.
135.61	00	Other.....	Lb.....	1c per lb.	Free (E,I)	2c per lb.
135.70	00	Chickpeas or garbanzos.....	Lb.....	1c per lb.	Free (A,E,I)	2c per lb.
135.75	00	Corn-on-the-cob.....	Lb.....	25% ad val.	Free (E,I)	50% ad val.
		Cowpeas:				
135.80	00	Black-eye.....	Lb.....	3.5c per lb.	Free (A,E,I)	3.5c per lb.
135.81	00	Other.....	Lb.....	Free		Free
		Cucumbers:				
135.90	00	If entered during the period from December 1 in any year to the last day of the following February, inclusive.....	Lb.....	2.2c per lb.	Free (A*,E) 0.7c per lb. (I)	3c per lb.
135.91		If products of Cuba.....	.....	1c per lb. (s)		
135.95	00	If entered during the period from March 1 to April 30, inclusive, in any year.....	Lb.....	3c per lb.	Free (A*,E) 1c per lb. (I)	3c per lb.
135.96		If products of Cuba.....	.....	2.4c per lb. (s)		
135.97	00	If entered during the period from May 1 to June 30, inclusive, or the period from September 1 to November 30, inclusive, in any year.....	Lb.....	3c per lb.	Free (E) 1c per lb. (I)	3c per lb.
135.98		If products of Cuba.....	.....	2.4c per lb. (s)		
135.99	00	If entered during the period from July 1 to August 31, inclusive, in any year.....	Lb.....	1.5c per lb.	Free (A,E) 0.5c per lb. (I)	3c per lb.
136.00	00	Dasheens.....	Lb.....	5% ad val.	Free (A,E,I)	50% ad val.
136.10	00	Endive, including Witloof chicory.....	Lb.....	0.15c per lb.	Free (A,E,I)	2c per lb.
		Eggplant:				
136.20	00	If entered during the period from April 1 to November 30, inclusive, in any year.....	Lb.....	1.5c per lb.	Free (A*,E,I)	1.5c per lb.
136.21		If products of Cuba.....	.....	1.2c per lb. (s)		
136.22	00	Other.....	Lb.....	1.1c per lb.	Free (A*,E,I)	1.5c per lb.
136.23		If products of Cuba.....	.....	0.5c per lb. (s)		
136.30	00	Garlic.....	Lb.....	0.75c per lb.	Free (A*,E,I)	1.5c per lb.
136.40	00	Horseradish.....	Lb.....	1.1c per lb.	Free (A,E,I)	3c per lb.
136.50	00	Lentils.....	Lb.....	0.1c per lb.	Free (A,E,I)	0.5c per lb.
		Lettuce:				
136.60	00	If entered during the period from June 1 to October 31, inclusive, in any year.....	Lb.....	0.4c per lb.	Free (A,E,I)	2c per lb.
136.61	00	Other.....	Lb.....	2c per lb.	Free (A*,E,I)	2c per lb.
136.70	00	Lupines.....	Lb.....	0.25c per lb.	Free (E,I)	0.5c per lb.
		Okra:				
136.77	00	If entered during the period from July 1 to October 31, inclusive, in any year.....	Lb.....	25% ad val.	Free (A*,E) 8% ad val. (I)	50% ad val.
136.79	00	Other.....	Lb.....	25% ad val.	Free (A,E) 8% ad val. (I)	50% ad val.
136.81		If product of Cuba and entered during the period from December 1 in any year to the following May 31, inclusive.....	.....	15% ad val. (s)		
		Onions:				
136.90	00	Onion sets.....	Lb.....	0.6c per lb.	Free (A,E,I)	2.5c per lb.
136.92	00	Pearl onions not over 10/16 inch in diameter.....	Lb.....	0.7c per lb.	Free (A,E,I)	2.5c per lb.
136.93	00	Other.....	Lb.....	1.75c per lb.	Free (E,I)	2.5c per lb.

(s) = Suspended. See general headnote 3(b).

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TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1987)

Page 1-46 ⑦

SCHEDULE 1. - ANIMAL AND VEGETABLE PRODUCTS
Part 8. - Vegetables1 - 8 - A
137.30 - 137.97

Item	Stat. Suf- fix	Articles	Units of Quantity	Rates of Duty		
				1	Special	2
137.30		Vegetables, fresh, chilled, or frozen, etc. (con.): Potatoes, white or Irish (con.): Other than such certified seed (con.): If products of Cuba and entered during the period from December 1 in any year to the last day of the following February, both dates inclusive.....		30c per 100 lbs. (s)		
137.40	00	Radishes.....	Lb.....	6% ad val.	Free (A,E,I)	50% ad val.
137.50	00	Squash.....	Lb.....	1.1c per lb.	Free (A*,E,I)	2c per lb.
137.51		If product of Cuba.....		0.8c per lb.(s)		
137.60	00	Tomatoes: If entered during the period from March 1 to July 14, inclusive, or the period from September 1 to November 14, inclusive, in any year.....	Lb.....	2.1c per lb.	Free (E,I)	3c per lb.
137.61		If products of Cuba.....		1.8c per lb.(s)		
137.62	00	If entered during the period from July 15 to August 31, inclusive, in any year.....	Lb.....	1.5c per lb.	Free (E,I)	3c per lb.
137.63	00	If entered during the period from Novem- ber 15, in any year, to the last day of the following February, inclusive.....	Lb.....	1.5c per lb.	Free (A*,E,I)	3c per lb.
137.64		If products of Cuba.....		1.2c per lb.(s)		
137.66	00	Turnips or rutabagas.....	Cwt.....	Free		25c per 100 lbs.
137.71		Other:				
	20	Brussels sprouts.....		25% ad val.	Free (A*,E,I)	50% ad val.
	40	Fresh or chilled.....	Lb.			
		Frozen.....	Lb.			
137.75	00	Chayote (<i>Sechium edule</i>).....	Lb.....	12.5% ad val.	Free (A,E), 4% ad val. (I)	50% ad val.
137.78	00	Fiddlehead ferns.....	Lb.....	10% ad val.	Free (E) 4% ad val. (I)	50% ad val.
137.79	00	Jicamas, fresh or chilled.....	Lb.....	25% ad val.	Free (A,E) 8% ad val. (I)	50% ad val.
137.80	00	Parsnips.....	Lb.....	12.5% ad val.	Free (E) 4% ad val. (I)	50% ad val.
137.84	00	Water chestnuts, frozen.....	Lb.....	Free		50% ad val.
137.88	00	Yams and sweet potatoes: Yams, fresh or chilled.....	Lb.....	10% ad val.	Free (A,E) 4% ad val.(I)	50% ad val.
137.89		Other.....		10% ad val.	Free (A,E,I)	50% ad val.
	10	Yams, frozen.....	Lb.			
	30	Sweet potatoes.....	Lb.			
137.93	00	Pumpkins and breadfruit.....	Lb.....	25% ad val.	Free (A,E,I)	50% ad val.
137.97		Other.....		25% ad val.	Free (E,I)	50% ad val.
	30	Fresh or chilled:				
	75	Broccoli.....	Lb.			
	85	Other.....	Lb.			
		Frozen.....	Lb.			

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(s) = Suspended. See general headnote 3(b).

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TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1987)

SCHEDULE 1. - ANIMAL AND VEGETABLE PRODUCTS
Part 8. - Vegetables

Page 1-47 ②

1 - 8 - A
138.05 - 138.46

Item	Stat. Suf- fix	Articles	Units of Quantity	Rates of Duty		
				1	Special	2
138.05	20	Vegetables, fresh, chilled, or frozen, and cut, sliced, or otherwise reduced in size (but not otherwise prepared or preserved): Broccoli, cauliflower and okra.....	Lb.	17.5% ad val.	Free (A*,E,I)	35% ad val.
		Fresh or chilled.....	Lb.			
		Frozen:				
	35	Broccoli:				
		Spears.....	Lb.			
	45	Other:				
		In containers greater				
		than 3 pounds.....	Lb.			
	55	Other.....	Lb.			
	60	Cauliflower.....	Lb.			
	80	Okra.....	Lb.			
138.25	00	Kidney beans, frozen.....	Lb.....	9% ad val.	Free (E,I)	35% ad val.
138.30	20	Rutabagas.....	Lb.....	7% ad val.	Free (E,I)	35% ad val.
	40	Fresh or chilled.....	Lb.			
		Frozen.....	Lb.			
138.35	00	Yucca.....	Lb.....	17.5% ad val.	Free (A,E) 5.6% ad val. (I)	35% ad val.
		Other:				
138.40	00	Bamboo shoots or water chestnuts, frozen.....	Lb.....	Free		35% ad val.
138.41	00	Mixtures of pea pods and water chestnuts, frozen.....	Lb.....	17.5% ad val.	Free (A,E) 5.6% ad val. (I)	35% ad val.
		Other.....		17.5% ad val.	Free (E) 5.6% ad val. (I)	35% ad val.
138.46	10	Fresh or chilled.....	Lb.			
	40	Frozen:				
		Asparagus.....	Lb.			
	50	Other.....	Lb.			

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TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1987)

SCHEDULE 1. - ANIMAL AND VEGETABLE PRODUCTS
Part 8. - Vegetables

Page 1-49

1 - 8 - C
141.05 - 141.55

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty		
				1	Special	2
		Subpart C. - Vegetables, Packed in Salt, in Brine, Pickled, or Otherwise Prepared or Preserved				
		Subpart C headnotes:				
		1. For the purposes of this subpart -- (a) the term "in brine" means provisionally preserved by packing in a preservative liquid solution such as water impregnated with salt or sulphur dioxide, but not specially prepared for immediate consumption; and (b) the term "pickled" means prepared or preserved in vinegar or acetic acid whether or not packed in oil or containing sugar, salt, or spices.				
		2. Candied, crystallized, or glacé vegetables are covered in part 9 of schedule 1.				
		Vegetables (whether or not reduced in size), packed in salt, in brine, pickled, or otherwise prepared or preserved (except vegetables in subpart B of this part):				
141.05	00	Beans:				
		Soybeans.....	Lb.....	8.5% ad val.	Free (A,E,I)	35% ad val.
		Other:				
141.10	00	In brine or packed in salt.....	Lb.....	Free		3c per lb.
141.15	00	Pickled.....	Lb.....	9% ad val.	Free (E,I)	35% ad val.
141.20	00	Other.....	Lb.....	1.5c per lb. on entire contents of container	Free (A,E,I)	3c per lb. on entire contents of container
		Cabbage:				
141.25	00	Sauerkraut.....	Lb.....	7.5% ad val.	Free (E,I)	50% ad val.
141.30	00	Other.....	Lb.....	4% ad val.	Free (A,E,I)	35% ad val.
141.35	00	Chickpeas or garbanzos.....	Lb.....	0.75c per lb. on entire contents of container	Free (A,E,I)	2c per lb. on entire contents of container
141.40	00	Black-eye cowpeas.....	Lb.....	1.5c per lb. on entire contents of container	Free (E,I)	3c per lb. on entire contents of container
		Onions:				
141.45	00	Packed in salt, in brine, or pickled.....	Lb.....	8% ad val.	Free (A,E,I)	35% ad val.
141.50	00	Other.....	Lb.....	7% ad val.	Free (A,E,I)	35% ad val.
141.55	00	Peas.....	Lb.....	Free		2c per lb. on entire contents of container

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1987)

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SCHEDULE 1. - ANIMAL AND VEGETABLE PRODUCTS

Part 8. - Vegetables

1 - 8 - C

141.60 - 141.98

Item	Stat. Suf- fix	Articles	Units of Quantity	Rates of Duty		
				1	Special	2
141.60		Vegetables (whether or not reduced in size), etc. (con.):				
		Pimientos.....		9.5% ad val.	Free (E) 3.8% ad val.(1)	38.5% ad val.
	20	In containers holding 8 oz. or less.....	Lb.			
	40	Other.....	Lb.			
141.61		If products of Cuba.....		3.6c per lb.(e)		
		Tomatoes:				
141.65		Paste and sauce.....		13.6% ad val.	Free (E)	50% ad val.
	20	Paste.....	Lb.			
	40	Sauce (including pulp).....	Lb.			
141.66	00	Other.....	Lb.	14.7% ad val.	Free (E)	50% ad val.
141.70		Waterchestnuts.....		Free		35% ad val.
	10	Sliced.....	Lb.			
	20	Whole.....	Lb.			
		Other:				
		Packed in salt, in brine, or pickled:				
141.76	00	Artichokes.....	Lb.	12% ad val.	Free (E) 6% ad val.(1)②	35% ad val.
141.77		Other.....		12% ad val.	Free (A,E,I)	35% ad val.
	20	Cucumbers.....	Lb.			
	60	Other.....	Lb.			
		Other:				
141.78	00	Bamboo shoots in airtight containers.....	Lb.	Free		35% ad val.
141.82	00	Carrots in airtight containers.....	Lb.	10% ad val.	Free (A,E) 4% ad val.(1)	35% ad val.
141.83	00	Corn in airtight containers.....	Lb.	12.5% ad val.	Free (E,I)	35% ad val.
141.85	00	Palm hearts.....	Lb.	3.4% ad val.	Free (A,E,I)	35% ad val.
141.86		Potatoes.....		10% ad val.	Free (E) 4% ad val.(1)	35% ad val.
	10	Frozen.....	Lb.			
	20	Dehydrated.....	Lb.			
	30	Other.....	Lb.			
141.87	00	Sweet ginger.....	Lb.	9% ad val.	Free (A,E,I)	35% ad val.
		Other:				
141.89	00	Frozen.....	Lb.	17.5% ad val.	Free (E,I)	35% ad val.
		Other:				
141.92	00	Artichokes.....	Lb.	17.5% ad val.	Free (E) 8.8% ad val.(1)②	35% ad val.
141.93	00	Asparagus.....	Lb.	17.5% ad val.	Free (E) 5.6% ad val.(1)	35% ad val.
141.98		Other.....		17.5% ad val.	Free (A,E,I)	35% ad val.
	20	Prepared/preserved peppers.....	Lb.			
	40	Other.....	Lb.			

(s) = Suspended. See general headnotes 3(b) and 3(e)(iv).

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11/2/87)

HARMONIZED TARIFF SCHEDULE of the United States

Annotated for Statistical Reporting Purposes

CHAPTER 7

EDIBLE VEGETABLES AND CERTAIN ROOTS AND TUBERS

II
7-1Notes

1. This chapter does not cover forage products of heading 1214.
2. In headings 0708, 0710, 0711 and 0712 the word "Vegetables" includes edible mushrooms, truffles, olives, capers, marrows, pumpkins, eggplants (aubergines), sweet corn (Zea mays var. saccharata), fruits of the genus Capsicum (peppers) or of the genus Pimenta (e.g., allspice), fennel, parsley, chervil, tarragon, cress and sweet marjoram (Marjorana hortensis or Origanum marjorana).
3. Heading 0712 covers all dried vegetables of the kinds falling in headings 0701 to 0711, other than:
 - (a) Dried leguminous vegetables, shelled (heading 0713);
 - (b) Sweet corn in the forms specified in headings 1102 to 1104;
 - (c) Flour, meal and flakes of potatoes (heading 1105);
 - (d) Flour and meal of the dried leguminous vegetables of heading 0713 (heading 1106).
4. However, dried or crushed or ground fruits of the genus Capsicum (peppers) or of the genus Pimenta (e.g., allspice) are excluded from this chapter (heading 0904).

Additional U.S. Notes

1. Unless the context requires otherwise, the provisions of this chapter cover the named products whether or not reduced in size.
2. In the assessment of duty on any kind of vegetables, any foreign matter or impurities mixed therewith shall not be segregated nor shall any allowance therefor be made.
3. Articles of a kind covered by this chapter that can be used either for food or for sowing or planting (e.g., onions, onion sets, shallots, garlic, potatoes, and potato eyes) remain classified in this chapter even if rendered inedible as the result of treatment with insecticides, fungicides or similar chemicals.
4. In subheading 0701.10, the expression "seed" covers only seed potatoes which are certified by a responsible officer or agency of a foreign government in accordance with official rules and regulations to have been grown and approved especially for use as seed, in containers marked with the foreign government's official seed potato tags and imported for use as seed.

HARMONIZED TARIFF SCHEDULE of the United States

Annotated for Statistical Reporting Purposes

II
7-2

Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		2
				General	Special	
0701		Potatoes, fresh or chilled:				
0701.10.00	20 6	Seed.....	kg	0.77¢/kg	Free (E,I)	1.7¢/kg
		In immediate containers of not over 45 kg net weight.....	kg			
	40 2	Other.....	kg			
0701.90.00		Other.....		0.77¢/kg	Free (E,I)	1.7¢/kg
		In immediate containers of not over 45 kg net weight:				
	10 1	Russet or netted gem varieties.....	kg			
	20 8	Other.....	kg			
		Other:				
	30 7	Russet or netted gem varieties.....	kg			
	40 5	Other.....	kg			
0702.00		Tomatoes, fresh or chilled:				
0702.00.20	00 7	If entered during the period from March 1 to July 14, inclusive, or the period from September 1 to November 14, inclusive, in any year.....	kg.....	4.6¢/kg	Free (E,I)	6.6¢/kg
0702.00.40	00 3	If entered during the period from July 15 to August 31, inclusive, in any year.....	kg.....	3.3¢/kg	Free (E,I)	6.6¢/kg
0702.00.60	00 8	If entered during the period from November 15, in any year, to the last day of the following February, inclusive.....	kg.....	3.3¢/kg	Free (A*,E,I)	6.6¢/kg
0703		Onions, shallots, garlic, leeks and other alli- aceous vegetables, fresh or chilled:				
0703.10		Onions and shallots:				
0703.10.20	00 4	Onion sets.....	kg.....	1.3¢/kg	Free (A,E,I)	5.5¢/kg
		Other:				
0703.10.30	00 2	Pearl onions not over 16 mm in diameter.....	kg.....	1.5¢/kg	Free (A,E,I)	5.5¢/kg
		Other.....	kg.....	3.9¢/kg	Free (E,I)	5.5¢/kg
0703.10.40	00 0		kg.....	1.7¢/kg	Free (A*,E,I)	3.3¢/kg
0703.20.00	00 6	Garlic.....	kg.....	25%	Free (E,I)	50%
0703.90.00	00 1	Leeks and other alliacious vegetables.....	kg.....			
0704		Cabbages, cauliflower, kohlrabi, kale and similar edible brassicas, fresh or chilled:				
0704.10		Cauliflower and headed broccoli (<i>Brassica</i> <i>oleracea</i> var. <i>botrytis</i>):				
0704.10.20	00 3	If entered during the period from June 5 to October 15, inclusive, in any year.....	kg.....	5.5%	Free (A,E,I)	50%
		Other:				
0704.10.40	00 9	Not reduced in size.....	kg.....	12.5%	Free (A*,E) 4% (I)	50%
0704.10.60	00 4	Cut, sliced or otherwise reduced in size.....	kg.....	17.5%	Free (A*,E,I)	35%
0704.20.00	00 5	Brussels sprouts.....	kg.....	25%	Free (A*,E,I)	50%
0704.90		Other (including sprouting broccoli (<i>Brassica</i> <i>oleracea</i> var. <i>italica</i>)):				
0704.90.20	00 8	Cabbage.....	kg.....	1.2¢/kg	Free (A,E,I)	4.4¢/kg
0704.90.40	20 8	Other.....	kg	25%	Free (E,I)	50%
	40 4	Broccoli.....	kg			
		Other.....	kg			

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Annotated for Statistical Reporting Purposes

II
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Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		2
				General	Special	
0708		Leguminous vegetables, shelled or unshelled, fresh or chilled:				
0708.10		Peas (<i>Pisum sativum</i>):				
0708.10.20	00 9	If entered during the period from July 1 to September 30, inclusive, in any year.....	kg.....	1.1¢/kg	Free (A,E,I)	8.6¢/kg
0708.10.40	00 5	Other.....	kg.....	4.4¢/kg	Free (A*,E,I)	8.6¢/kg
0708.20		Beans (<i>Vigna</i> spp., <i>Phaseolus</i> spp.):				
0708.20.10	00 9	Lima beans, if entered during the period from November 1 in any year to the following May 31, inclusive.....	kg.....	5.2¢/kg	Free (A,E,I)	7.7¢/kg
0708.20.20	00 7	Cowpeas (other than black-eye peas).....	kg.....	Free		Free
0708.20.90	00 2	Other.....	kg.....	7.7¢/kg	Free (E,I)	7.7¢/kg
0708.90		Other leguminous vegetables:				
0708.90.05	00 1	Chickpeas (garbanzos).....	kg.....	2.2¢/kg	Free (A,E,I)	4.4¢/kg
0708.90.15	00 9	Lentils.....	kg.....	0.22¢/kg	Free (A,E,I)	1.1¢/kg
0708.90.25	00 7	Pigeon peas: If entered during the period from July 1 to September 30, inclusive, in any year.....	kg.....	Free		8.6¢/kg
0708.90.30	00 0	Other.....	kg.....	1.8¢/kg	Free (A,E,I)	8.6¢/kg
0708.90.40	00 8	Other.....	kg.....	7.7¢/kg	Free (E,I)	7.7¢/kg
0709		Other vegetables, fresh or chilled:				
0709.10.00	00 2	Globe artichokes.....	kg.....	25%	Free (E,I)	50%
0709.20		Asparagus:				
0709.20.10	00 8	Not reduced in size; entered during the period from September 15 to November 15, inclusive, in any year; and transported to the United States by air.....	kg.....	5%	Free (E,I)	50%
0709.20.30	00 1	Other.....	kg.....	25%	Free (E,I)	50%
0709.30		Eggplants (aubergines):				
0709.30.20	00 4	If entered during the period from April 1 to November 30, inclusive, in any year...	kg.....	3.3¢/kg	Free (A*,E,I)	3.3¢/kg
0709.30.40	00 0	Other.....	kg.....	2.4¢/kg	Free (A*,E,I)	3.3¢/kg
0709.40		Celery other than celeriac:				
0709.40.20	00 2	Reduced in size.....	kg.....	17.5%	Free (E) 5.6% (I)	35%
0709.40.40	00 8	Other: If imported and entered during the period from April 15 to July 31, inclusive, in any year.....	kg.....	0.55¢/kg	Free (A,E,I)	4.4¢/kg
0709.40.60	00 3	Other.....	kg.....	2.2¢/kg	Free (E,I)	4.4¢/kg
0709.51.00	00 2	Mushrooms and truffles: Mushrooms.....	kg.....	11¢/kg + 25%	Free (E) 3.5¢/kg + 8% (I)	22¢/kg + 45%
0709.52.00	00 1	Truffles.....	kg.....	Free		Free
0709.60.00		Fruits of the genus <i>Capsicum</i> (peppers) or of the genus <i>Pimenta</i> (e.g., allspice).....	kg.....	5.5¢/kg	Free (A*,E,I)	5.5¢/kg
	20 7	Chili.....	kg			
	40 3	Other.....	kg			
0709.70.00	00 9	Spinach, New Zealand spinach and orache spinach (garden spinach).....	kg.....	25%	Free (E,I)	50%

HARMONIZED TARIFF SCHEDULE of the United States
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II
7-5

Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		
				General	Special	2
0709 (con.) 0709.90 0709.90.05	00 0	Other vegetables, fresh or chilled (con.): Other: Jicamas, pumpkins and breadfruit.....	kg.....	25%	Free (A,E) 8% (I)	50%
0709.90.10	00 3	Chayote (<u>Sechium edule</u>).....	kg.....	12.5%	Free (A,E) 4% (I)	50%
0709.90.13	00 0	Okra: If entered during the period from July 1 to October 31, inclusive, in any year.....	kg.....	25%	Free (A*,E) 8% (I)	50%
0709.90.16	00 7	Other.....	kg.....	25%	Free (A,E) 8% (I)	50%
0709.90.20	00 1	Squash.....	kg.....	2.4¢/kg	Free (A*,E,I)	4.4¢/kg
0709.90.30	00 9	Fiddlehead greens.....	kg.....	10%	Free (E) 4% (I)	20%
0709.90.35	00 4	Olives.....	kg.....	11¢/kg	Free (E,I)	11¢/kg
0709.90.40	70 2 80 0	Other: Sweet corn..... Other.....	kg kg	25%	Free (E,I)	50%
0710		Vegetables (uncooked or cooked by steaming or boiling in water), frozen:				
0710.10.00	00 9	Potatoes.....	kg.....	17.5%	Free (E) 5.6% (I)	35%
0710.21		Leguminous vegetables, shelled or unshelled:				
0710.21.20	00 2	Peas (<u>Pisum sativum</u>): If entered during the period from July 1 to September 30, inclusive, in any year.....	kg.....	2.2¢/kg	Free (A,E,I)	8.6¢/kg
0710.21.40	00 8	Other.....	kg.....	4.4¢/kg	Free (A*,E,I)	8.6¢/kg
0710.22		Beans (<u>Vigna</u> spp., <u>Phaseolus</u> spp.):				
0710.22.10	00 3	Not reduced in size: Lima beans, if entered during the period from November 1 in any year to the following May 31, inclusive.....	kg.....	5.2¢/kg	Free (A,E,I)	7.7¢/kg
0710.22.20	00 1	Cowpeas (other than black-eye peas).....	kg.....	Free		Free
0710.22.30	00 9	Other.....	kg.....	7.7¢/kg	Free (E) 2.4¢/kg (I)	7.7¢/kg
0710.22.40	00 7	Reduced in size.....	kg.....	17.5%	Free (E,I)	35%

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Annotated for Statistical Reporting Purposes

II
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Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		2
				General	Special	
0710 (con.)		Vegetables (uncooked or cooked by steaming or boiling in water), frozen (con.): Leguminous vegetables, shelled or unshelled (con.): Other:				
0710.29		Chickpeas (garbanzos).....	kg.....	2.2¢/kg	Free (A,E,I)	4.4¢/kg
0710.29.05	00 3	Lentils.....	kg.....	0.22¢/kg	Free (A,E,I)	1.1¢/kg
0710.29.15	00 1	Pigeon peas:				
0710.29.25	00 9	If entered during the period from July 1 to September 30, inclusive, in any year.....	kg.....	Free		8.6¢/kg
0710.29.30	00 2	Other.....	kg.....	1.8¢/kg	Free (A,E,I)	8.6¢/kg
0710.29.40	00 0	Other.....	kg.....	7.7¢/kg	Free (E,I)	7.7¢/kg
0710.30.00	00 5	Spinach, New Zealand spinach and orache spinach (garden spinach).....	kg.....	17.5%	Free (E) 5.6% (I)	35%
0710.40.00	00 3	Sweet corn.....	kg.....	17.5%	Free (E,I)	35%
0710.80		Other vegetables:				
0710.80.10	00 2	Bamboo shoots or water chestnuts.....	kg.....	Free	Free (E)	35%
0710.80.20	00 0	Mushrooms.....	kg.....	7.1¢/kg + 10%	2.2¢/kg + 3.2% (I)	22¢/kg + 45%
0710.80.40	00 6	Tomatoes: If entered during the period from March 1 to July 14, inclusive, or the period from September 1 to November 14, inclusive, in any year.....	kg.....	4.6¢/kg	Free (E,I)	6.6¢/kg
0710.80.45	00 1	If entered during the period from July 15 to August 31, inclusive, in any year.....	kg.....	3.3¢/kg	Free (E,I)	6.6¢/kg
0710.80.50	00 3	If entered during the period from November 15 in any year to the last day of the following February, inclusive.....	kg.....	3.3¢/kg	Free (A*,E,I)	6.6¢/kg
0710.80.60	00 1	Other: Not reduced in size: Fiddlehead greens.....	kg.....	10%	Free (E) 4% (I)	50%
0710.80.70	20 5 40 1 60 6	Other: Brussels sprouts..... Carrots..... Other.....	kg kg kg	25%	Free (A*,E,I)	50%
0710.80.80	10 5 22 1 24 9 26 7 30 1 40 9 50 6	Reduced in size: Asparagus..... Broccoli: Spears..... Other: In containers each holding more than 1.4 kg..... Other..... Cauliflower..... Okra..... Other.....	kg kg kg kg kg kg kg kg kg kg kg	17.5%	Free (E,I)	35%
0710.90		Mixtures of vegetables:				
0710.90.10	00 0	Mixtures of pea pods and water chestnuts.....	kg.....	17.5%	Free (A,E) 5.6% (I)	35%
0710.90.90	00 3	Other.....	kg.....	17.5%	Free (E) 5.6% (I)	35%
0711		Vegetables provisionally preserved (for example, by sulfur dioxide gas, in brine, in sulfur water or in other preservative solutions), but unsuitable in that state for immediate consumption:				
0711.10.00	00 8	Onions.....	kg.....	8%	Free (A,E,I)	35%
0711.20		Olives:				
0711.20.20	00 2	Not pitted.....	kg.....	7.7¢/kg	Free (E)	7.7¢/kg
0711.20.40	00 8	Pitted or stuffed.....	kg.....	11.3¢/kg	Free (E)	11.3¢/kg
0711.30.00	00 4	Capers.....	kg.....	16%	Free (A,E) 5.1% (I)	20%
0711.40.00	00 2	Cucumbers including gherkins.....	kg.....	12%	Free (A,E,I)	35%

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II
7-7

Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		
				General	Special	2
0711 (con.)		Vegetables provisionally preserved (for example, by sulfur dioxide gas, in brine, in sulfur water or in other preservative solutions), but unsuitable in that state for immediate consumption (con.):				
0711.80		Other vegetables; mixtures of vegetables:				
0711.80.20	00 7	Leguminous vegetables.....	kg.....	Free	Free (E)	6.6¢/kg
0711.80.40	00 3	Mushrooms.....	kg.....	7.1¢/kg on drained weight + 10%	2.2¢/kg on drained weight + 3.2% (I)	22¢/kg on drained weight + 45%
0711.80.60	00 8	Other vegetables; mixtures of vegetables.....	kg.....	12%	Free (A*,E,I)	35%
0712		Dried vegetables, whole, cut, sliced, broken or in powder, but not further prepared:				
0712.10.00	00 7	Potatoes whether or not cut or sliced but not further prepared.....	kg.....	2.9¢/kg	Free (E,I)	6¢/kg
0712.20		Onions:				
0712.20.20	00 1	Powder or flour.....	kg.....	35%	Free (E)	35%
0712.20.40	00 7	Other.....	kg.....	25%	Free (E)	35%
0712.30		Mushrooms and truffles:				
0712.30.10	00 1	Mushrooms:				
		Air dried or sun dried.....	kg.....	2.9¢/kg + 4%	Free (A,E,I)	22¢/kg + 45%
0712.30.20	00 9	Other.....	kg.....	2.9¢/kg + 4%	Free (E,I)	22¢/kg + 45%
0712.30.40	00 5	Truffles.....	kg.....	Free		Free
0712.90		Other vegetables; mixtures of vegetables:				
0712.90.10	00 8	Carrots.....	kg.....	5.2%	Free (A,E,I)	35%
0712.90.15	00 3	Olives:				
		Not ripe.....	kg.....	11¢/kg	Free (A,E,I)	11¢/kg
0712.90.20	00 6	Ripe.....	kg.....	5.5¢/kg	Free (E,I)	11¢/kg
0712.90.40	20 8	Garlic.....	kg.....	35%	Free (E)	35%
	40 4	Powder or flour.....	kg.....			
		Other.....	kg.....			
		Fennel, marjoram, parsley, savory and tarragon:				
0712.90.60	00 7	Crude or not manufactured.....	kg.....	Free		Free
		Other:				
0712.90.65	00 2	Parsley.....	kg.....	6%	Free (A,E,I)	20%
0712.90.70	00 5	Other.....	kg.....	7.5%	Free (A,E,I)	25%
0712.90.75	00 0	Tomatoes.....	kg.....	13%	Free (E)	35%
0712.90.80		Other vegetables; mixtures of vegetables.....		13%	Free (A,E,I)	35%
	50 2	Sweet corn seeds of a kind used for sowing.....	kg.....			
	80 4	Other.....	kg.....			

HARMONIZED TARIFF SCHEDULE of the United States

Annotated for Statistical Reporting Purposes

CHAPTER 20

PREPARATIONS OF VEGETABLES, FRUIT, NUTS
OR OTHER PARTS OF PLANTSIV
20-1Notes

1. This chapter does not cover:
 - (a) Vegetables, fruit or nuts, prepared or preserved by the processes specified in chapter 7, 8 or 11;
 - (b) Food preparations containing more than 20 percent by weight of sausage, meat, meat offal, blood, fish or crustaceans, molluscs or other aquatic invertebrates, or any combination thereof (chapter 16); or
 - (c) Homogenized composite food preparations of heading 2104.
2. Headings 2007 and 2008 do not apply to fruit jellies, fruit pastes, sugar-coated almonds or the like in the form of sugar confectionery (heading 1704) or chocolate confectionery (heading 1806).
3. Heading 2001, 2004 and 2005 cover, as the case may be, only those products of chapter 7 or of heading 1105 or 1106 (other than flour, meal and powder of the products of chapter 8), which have been prepared or preserved by processes other than those referred to in note 1(a).
4. Tomato juice the dry weight content of which is 7 percent or more is to be classified in heading 2002.
5. For the purposes of heading 2009 the expression "juices, unfermented and not containing added spirit" means juices of an alcoholic strength by volume (see note 2 to chapter 22) not exceeding 0.5 percent vol.

Subheading Notes

1. For the purposes of subheading 2005.10, the expression "homogenized vegetables" means preparations of vegetables, finely homogenized, put up for retail sale as infant food or for dietetic purposes, in containers of a net weight content not exceeding 250 g. For the application of this definition no account is to be taken of small quantities of any ingredients which may have been added to the preparation for seasoning, preservation or other purposes. These preparations may contain a small quantity of visible pieces of vegetables. Subheading 2005.10 takes precedence over all other subheadings of heading 2005.
2. For the purposes of subheading 2007.10, the expression "homogenized preparations" means preparations of fruit, finely homogenized, put up for retail sale as infant food or for dietetic purposes, in containers of a net weight content not exceeding 250 g. For the application of this definition no account is to be taken of small quantities of any ingredients which may have been added to the preparation for seasoning, preservation or other purposes. These preparations may contain a small quantity of visible pieces of fruit. Subheading 2007.10 takes precedence over all other subheadings of heading 2007.

Additional U.S. Notes

1. For the purposes of heading 2009:
 - (a) The term "liter" in the "Rates of Duty" column of the provisions applicable to fruit juices means liter of natural unconcentrated fruit juice or liter of reconstituted fruit juice;
 - (b) The term "reconstituted fruit juice" means the product which can be obtained by mixing the imported concentrate with water in such proportion that the product will have a Brix value equal to that found by the Secretary of the Treasury from time to time to be the average Brix value of like natural unconcentrated juice in the trade and commerce of the United States; and
 - (c) The term "Brix value" means the refractometric sucrose value of the juice, adjusted to compensate for the effect of any added sweetening materials, and thereafter corrected for acid.
2. In determining the number of liters of reconstituted fruit juice which can be obtained from a concentrate, the degree of concentration shall be calculated on a volume basis to the nearest 0.5 degree, as determined by the ratio of the Brix value of the imported concentrated juice to that of the reconstituted juice, corrected for differences of specific gravity of the juices. Any juice having a degree of concentration of less than 1.5 (as determined before correction to the nearest 0.5 degree) shall be regarded as a natural unconcentrated juice.
3. In determining the degree of concentration of mixed fruit juices, the mixture shall be considered as being wholly of the component juice having the lowest Brix value.

Statistical Note

1. For the purposes of statistical reporting in heading 2009, the term "liters" in the "Units of Quantity" column of the provisions applicable to fruit juices means liters of natural unconcentrated juice or liters of reconstituted juice (as defined in additional U.S. note 1(b) above).

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Annotated for Statistical Reporting Purposes

IV
20-2

Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		
				General	Special	2
2001		Vegetables, fruit, nuts and other edible parts of plants, prepared or preserved by vinegar or acetic acid:				
2001.10.00	00 3	Cucumbers including gherkins.....	kg.....	12%	Free (A*,E,I)	35%
2001.20.00	00 1	Onions.....	kg.....	8%	Free (A,E,I)	35%
2001.90		Other:				
		Capers:				
2001.90.10	00 4	In immediate containers holding more than 3.4 kg.....	kg.....	16%	Free (A,E) 5.1% (I)	20%
2001.90.20	00 2	Other.....	kg.....	18%	Free (E) 5.1% (I)	20%
		Other:				
		Vegetables:				
2001.90.25	00 7	Artichokes.....	kg.....	12%	Free (E) 6% (I)	35%
2001.90.30	00 0	Beans.....	kg.....	8%	Free (E,I)	35%
2001.90.35	00 5	Pimientos (<i>Capiscum annuum</i>).....	kg.....	9.5%	Free (E) 3.8% (I)	38.5%
2001.90.40	00 8	Other.....	kg.....	12%	Free (A*,E,I)	35%
2001.90.42	00 6	Chestnuts.....	kg.....	7.7¢/kg	Free (A,E,I)	55¢/kg
2001.90.45	00 3	Mangoes.....	kg.....	3.3¢/kg	Free (A,E,I)	33¢/kg
2001.90.50	00 5	Walnuts.....	kg.....	11¢/kg	Free (A,E,I)	33¢/kg
2001.90.60	00 3	Other.....	kg.....	17.5%	Free (E) 5.6% (I)	35%
2002		Tomatoes prepared or preserved otherwise than by vinegar or acetic acid:				
2002.10.00		Tomatoes, whole or in pieces.....		14.7%	Free (E)	50%
	20 8	In containers holding less than 1.4 kg...	kg			
	40 4	Other.....	kg			
2002.90.00		Other.....		13.6%	Free (E)	50%
		Paste:				
	10 3	In containers holding less than 1.4 kg.....	kg			
	20 1	Other.....	kg			
		Puree:				
	30 8	In containers holding less than 1.4 kg.....	kg			
	40 7	Other.....	kg			
	50 4	Other.....	kg			
2003		Mushrooms and truffles, prepared or preserved otherwise than by vinegar or acetic acid:				
2003.10.00		Mushrooms.....		7.1¢/kg on drained weight + 10%	Free (E) 2.2¢/kg on drained weight + 3.2% (I)	22¢/kg on drained weight + 45%
	09 2	Staw mushrooms.....	kg			
		Other:				
		In containers each holding not more than 255 g:				
	27 0	Whole (including buttons).....	kg			
	31 4	Sliced.....	kg			
	37 8	Other.....	kg			
		In containers each holding more than 255 g:				
	43 0	Whole (including buttons).....	kg			
	47 6	Sliced.....	kg			
	53 7	Other.....	kg			
2003.20.00	00 9	Truffles.....	kg	Free		Free

HARMONIZED TARIFF SCHEDULE of the United States

Annotated for Statistical Reporting Purposes

IV
20-3

Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		
				General	Special	2
2004		Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, frozen:				
2004.10.00		Potatoes.....	kg	10%	Free (E) 4% (I)	35%
	20 6	French fries.....	kg			
	40 2	Other.....	kg			
2004.90		Other vegetables and mixtures of vegetables:				
2004.90.10	00 1	Antipasto.....	kg	5%	Free (A,E,I)	30%
2004.90.80	00 6	Beans.....	kg	3.3¢/kg on entire contents of container	Free (A,E,I)	6.6¢/kg on entire contents of container
		Other.....		17.5%	Free (E,I)	35%
2004.90.90		Carrots.....	kg			
	20 0	Sweet corn.....	kg			
	40 6	Peas.....	kg			
	60 1	Other, including mixtures.....	kg			
	80 7					
2005		Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen:				
2005.10.00	00 9	Homogenized vegetables.....	kg	17.5%	Free (A,E,I)	35%
2005.20.00		Potatoes.....		10%	Free (E) 4% (I)	35%
	20 3	Potato chips.....	kg			
	40 9	Potato granules.....	kg			
	60 4	Other.....	kg			
2005.30.00	00 5	Sauerkraut.....	kg	7.5%	Free (E,I)	50%
2005.40.00	00 3	Peas (<i>Pisum sativum</i>).....	kg	Free		4.4¢/kg on entire contents of container
		Beans (<i>Vigna</i> spp., <i>Phaseolus</i> spp.):				
2005.51		Beans, shelled:				
2005.51.20		Black-eye cowpeas.....		3.3¢/kg on entire contents of container	Free (E,I)	6.6¢/kg on entire contents of container
	20 1	Canned dried.....	kg			
	40 7	Other.....	kg			
2005.51.40		Other.....		3.3¢/kg on entire contents of container	Free (A,E,I)	6.6¢/kg on entire contents of container
	20 7	Canned dried.....	kg			
	40 3	Other.....	kg			
2005.59.00	00 1	Other.....	kg	3.3¢/kg on entire contents of container	Free (A,E,I)	6.6¢/kg on entire contents of container
		Asparagus.....	kg	17.5%	5.6% (I) Free (E)	35%
2005.60.00	00 8					

HARMONIZED TARIFF SCHEDULE of the United States

Annotated for Statistical Reporting Purposes

IV
20-5

Heading/ Subheading	Stat. Suf. & cd	Article Description	Units of Quantity	Rates of Duty		
				General	Special	2
2005 (con.)		Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen (con.):				
2005.80.00	00 4	Sweet corn (<i>Zea mays</i> var. <i>saccharata</i>)	kg.....	12.5%	Free (E,I)	35%
2005.90		Other vegetables and mixtures of vegetables:				
2005.90.10	00 0	Carrots in airtight containers	kg.....	10%	Free (A,E)	35%
2005.90.20	00 8	Onions	kg.....	7%	4.2% (I)	35%
2005.90.40		Water chestnuts	kg.....	Free	Free (A,E,I)	35%
	10 2	Sliced	kg			
	20 0	Whole	kg			
		Fruits of the genus <i>Capsicum</i> (peppers) or of the genus <i>Pimenta</i> (e.g., allspice):				
2005.90.50		Pimientos (<i>Capsicum annuum</i>)	.....	9.5%	Free (E)	38.5%
	20 7	In containers each holding not more than 227 g.	kg		3.8% (I)	
	40 3	Other	kg			
2005.90.55	00 6	Other	kg.....	17.5%	Free (A,E,I)	35%
2005.90.60	00 9	Bamboo shoots in airtight containers	kg.....	Free		35%
2005.90.80	00 5	Artichokes	kg.....	17.5%	Free (E)	35%
					8.8% (I)	
2005.90.85	00 0	Chickpeas (garbanzos)	kg.....	1.7¢/kg on entire contents of container	Free (A,E,I)	4.4¢/kg on entire contents of container
2005.90.90	00 3	Other	.....	17.5%	Free (A,E,I)	35%
2006.00		Fruit, nuts, fruit-peel and other parts of plants, preserved by sugar (drained, glacé or crystallized):				
2006.00.20	00 6	Cherries	kg.....	15.4¢/kg + 10%	Free (E)	20.8¢/kg + 40%
					4.8¢/kg + 3.2% (I)	
2006.00.30	00 4	Ginger root	kg.....	5.4%	Free (A,E,I)	20%
2006.00.40	00 2	Pineapples	kg.....	3.4%	Free (E,I)	35%
		Other, including mixtures:				
2006.00.50	00 9	Mixtures	kg.....	20%	Free (E,I)	20%
		Other:				
2006.00.60	00 7	Citrus fruit; peel of citrus or other fruit	kg.....	7.5¢/kg	Free (E,I)	17.6¢/kg
2006.00.70	00 5	Other fruit and nuts	kg.....	10%	Free (A,E,I)	40%
2006.00.80	00 1	Other	kg.....	20%	Free (A,E)	20%
					6.4% (I)	

APPENDIX E

Selected pages from the GAO Report Pesticides, Better Sampling
and Enforcement Needed on Imported Foods, September 1986

GAO

United States General Accounting Office

**Report to the Honorable Frank Horton
House of Representatives**

September 1986

PESTICIDES

Better Sampling and Enforcement Needed on Imported Food



GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-222128

September 26, 1986


The Honorable Frank Horton
Ranking Minority Member
Committee on Government Operations
House of Representatives

Dear Mr. Horton:

As requested in your June 3, 1985, letter and subsequent discussions with your office, we have reviewed the Food and Drug Administration's (FDA) activities to protect the public from exposure to illegal pesticide residues in imported food under the Federal Food, Drug, and Cosmetic Act. The report discusses the extent of FDA's coverage of food imported for domestic consumption; the factors FDA uses to select samples of imported foods for pesticide analysis; FDA's capabilities to test pesticides potentially used on imported food; and FDA's ability to deter the marketing of imported food containing illegal pesticide residues.

As arranged with your office, unless you publicly release its contents earlier, we plan no distribution of this report until 30 days after the date of this letter. At that time we will send copies to other appropriate congressional committees; the Commissioner, FDA; the Secretary, Department of Health and Human Services; the Director, Office of Management and Budget; and other interested parties upon request.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

Pesticides are used extensively in worldwide food production and residues of these chemicals may remain in foods imported into the United States. The Food and Drug Administration (FDA) is responsible for protecting the public by monitoring imported foods—both fresh and processed fruits and vegetables—for illegal pesticide residues. Illegal pesticide residues are those that are not allowed to be present on food or are present in greater concentrations than that authorized by the Environmental Protection Agency.

The Ranking Minority Member, House Committee on Government Operations, asked GAO to provide information on (1) how FDA selects samples of food for testing, (2) what pesticides FDA tests for, and (3) how FDA protects American consumers from consuming imported foods that contain illegal pesticide residues.

Background

The Federal Food, Drug, and Cosmetic Act gives FDA responsibility for prohibiting the importation of adulterated foods (including those that contain illegal pesticide residues). Under its pesticide monitoring program, FDA collects and analyzes samples of shipments of imported food to determine whether illegal residues are present. FDA works in cooperation with the Customs Service to take action against importers of shipments containing illegal pesticide residues. If illegal residues are found, FDA notifies Customs which in turn directs the importer to either destroy or export the shipment or take other action to bring the food into compliance with the act. Customs is to impose and collect monetary damages from importers who fail to comply unless FDA recommends otherwise.

Results in Brief

FDA samples only a very small percentage of imported food shipments, and the selection of which foods and shipments to sample are left to the individual judgment of FDA inspectors. GAO found that sampling tends to focus on foods imported in large quantities, leaving many other foods unsampled. GAO selected 40 foods to determine the sampling coverage nationwide and found that shipments from many of the countries exporting these foods were not being sampled even though they are being imported year after year.

FDA laboratories generally rely on one of five analytical methods to test imported food samples for illegal pesticide residues. Although these methods are capable of testing for most pesticides banned for use in the United States, cumulatively they can detect less than half the pesticides potentially available in world markets. FDA is limited in its ability to

Executive Summary

better target testing because it lacks knowledge about which pesticides are being used in foreign countries.

Removing adulterated food shipments from the marketplace and assessing liquidated damages (monetary payments) where removal is not accomplished are key elements in FDA's monitoring program. If used effectively, these elements should serve to protect consumers and deter future violations. FDA has been unable to prevent the marketing of about half of the imported fresh fruits and vegetables that it has determined contain illegal pesticide residues. Further, liquidated damages for the distribution of such food in the United States are usually not assessed.

Principal Findings

**Limited Sampling
Performed**

Given the large number of food shipments entering the United States each year that could contain illegal pesticide residues and the limited number of samples taken, FDA's pesticide monitoring program provides limited protection against public exposure to illegal residues in food. FDA annually samples less than 1 percent of approximately 1 million imported food shipments.

FDA's general sample selection criteria include (1) high-volume imports, (2) foods of high dietary significance, and (3) products with past pesticide residue problems. The extent to which these factors are applied depends on the individual knowledge and judgment of FDA inspectors at the various ports of entry.

Between fiscal years 1979 and 1985, FDA collected and analyzed 33,687 imported food samples and found that 2,066 (6.1 percent) contained illegal residues. A review of the samples taken in fiscal year 1984 indicates that a large percentage of these samples were high-volume imported foods, while many lower volume imported foods were not sampled. In addition, foods imported from many countries are not being sampled. For example, shipments from only 9 of 27 countries exporting cucumbers to the United States from 1983 through 1985 have been sampled. The country exporting the second largest volume of cucumbers to the United States as well as 16 other countries had not had their cucumber shipments sampled since at least 1978, according to available records. (See ch. 2.)

 Executive Summary

**Lack of Pesticide Use
Knowledge Hinders FDA**

FDA generally uses multiresidue tests that can detect many pesticides on a single sample rather than single residue tests that can only detect one pesticide on a sample. FDA has five multiresidue tests that individually can detect from 24 to 123 pesticides. In combination these tests can detect 203 pesticides, less than one-half of the pesticide chemicals available for use worldwide. FDA laboratories normally use only one multiresidue method for each sample.

To select the proper test, FDA should have information on pesticides actually used on food produced in foreign countries. Little such information is currently available. Better information could be obtained from (1) U.S. manufacturers who export pesticides to countries that export food to the United States, (2) importers of food, if required to certify which pesticides were applied during food production, (3) a commercially available data source, and (4) cooperative agreements with foreign countries that export food to the United States. FDA is now in the process of obtaining commercially available data but will not know the impact of this data until later. (See ch. 3.)

**Deterrents Against
Adulterated Shipments Not
Used**

FDA's policy requires importers to maintain all sampled shipments intact until the agency determines that the product is free of illegal pesticide residues. In practice, however, FDA permits importers to release the majority of sampled shipments to U.S. markets to allow consumers to receive fresh fruits and vegetables before they spoil. FDA is to notify Customs if illegal residues are later found in the sample and Customs in turn is to notify the importer to return the shipment. If the shipment is not returned, Customs is required to assess liquidated damages unless FDA recommends otherwise. FDA usually recommends against assessing damages in those cases where it has not found previous violations by the grower during the current growing season.

Of 164 adulterated samples that GAO reviewed, 73 were not recovered and are presumed to have been consumed by the public. FDA recommended against damages in 52 of the 73 cases.

GAO was able to document only eight cases where importers were assessed damages. Damages in six cases had not been collected a year after being assessed. Thus about 45 percent of the adulterated shipments are reaching consumers with few importers paying damages. The irony is that the importer that recovers and disposes of the adulterated shipment incurs an economic loss while those that do not, incur no economic loss.

Executive Summary

In order for the public to be protected from adulterated shipments and for the monitoring program to be an effective deterrent against such shipments, GAO believes that all importers of shipments determined to be adulterated should be assessed damages when the adulterated food is not removed from the marketplace. (See ch. 4.)

Recommendations

GAO recommends that the Secretary, Department of Health and Human Services, direct the FDA Commissioner to

- redirect sampling coverage to a wider range of imported foods and countries (see p. 30) and
- consider several options for obtaining additional information on pesticides actually used in foreign food production and to test for these pesticides (see p. 38).

In order to provide a deterrent against adulterated food shipments, GAO recommends that

- the Secretary, Department of Health and Human Services, direct the Commissioner, FDA, to stop recommending against liquidated damages on the importers of food shipments containing illegal pesticide residues that are not recovered (see p. 48) and
- the Secretary, Department of the Treasury, direct the Commissioner, U.S. Customs Service, to either recover the shipment or assess and collect damages from importers in all cases when FDA determines food has been adulterated with illegal pesticide residues (see p. 48).

Agency Comments

The views of responsible officials were obtained during our work and are incorporated in this report where appropriate. As requested, GAO did not obtain official agency comments on a draft of this report.

Chapter 1

Introduction

Pesticides are extensively used in food production worldwide to destroy or control weeds, insects, fungi, and other pests. While pesticides enhance agricultural productivity, human exposure can cause adverse health effects. Some pesticides have been shown to cause cancer or birth defects and may persist in the environment for long periods of time, accumulating in the tissues of plants, animals, and humans. Many pesticides used in food production remain on food and are ingested along with the food. Exposure to residue levels above certain amounts may create health risks to humans. The Environmental Protection Agency (EPA) determines the pesticide residue levels allowed on food grown and/or sold in the United States, and the Food and Drug Administration (FDA) monitors the food supply to enforce those levels.

The monitoring of pesticide residues in imported foods is a concern because such food is a significant portion of U.S. domestic food consumption. U.S. Bureau of Census data indicate that 21.7 million tons of food, valued at \$19.8 billion, was imported into the United States in fiscal year 1986. This quantity included 7.3 million tons of fresh fruits and vegetables valued at \$6.3 billion. Imported fresh fruits have increased from 21.8 percent of the total U.S. supply in fiscal year 1970 to 26.7 percent in fiscal year 1984. Imported fresh vegetables increased from 6.3 percent of total U.S. supply in fiscal year 1970 to 6.2 percent in fiscal year 1980, but declined to 5.6 percent in 1981—the last year for which comparable data were available.

The regulation of pesticide use in the United States is governed by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. 136 *et seq.*) which assigns responsibility for federal registration of pesticides and their use to EPA. The regulation of the amount of pesticides allowed in food is governed by the Federal Food, Drug, and Cosmetic Act (FFDCA) (21 U.S.C. 301 *et seq.*) which assigns responsibility to (1) EPA for determining the amount of individual pesticide residues (referred to as pesticide tolerances¹) that are allowed to be present in specific foods without causing the food to be considered legally adulterated and (2) FDA to enforce the pesticide residue tolerances established by EPA for all food products except for meat, poultry, and eggs. The U.S. Department of Agriculture (USDA) monitors meat, poultry, and eggs for illegal pesticide residues under the Federal Meat Inspection Act (21 U.S.C. 601 *et*

¹A pesticide residue tolerance represents an amount of the pesticide residue that EPA has concluded can be consumed without presenting an unreasonable health risk and that should not be exceeded on the crops for which it is registered when it is used as specified in its federal registration.

Chapter I
Introduction

seq.), the Poultry Products Inspection Act (21 U.S.C. 451 *et seq.*), and the Egg Products Inspection Act (21 U.S.C. 1031 *et seq.*).

The use of pesticides on food in other countries is not governed by U.S. regulation, but rather by the laws of the country where the food is grown. These laws vary among the many countries that export food to the United States. However, the food that is imported into the United States is subject to U.S. regulations concerning what chemical residues are allowed on specific food crops and in what amounts.

FDA's Role in Monitoring Imported Food for Illegal Pesticide Residues

The purpose of FFDCA is to protect the public from unsafe foods and other products. Section 801 of the act authorizes FDA to examine samples of foods being offered for import into the United States. The U.S. Customs Service is authorized, under section 801, to refuse admission of any food presented for import into the United States, if it determines that the product is adulterated. The act specifies that a food shipment is adulterated if, among other things, it contains either (1) any pesticide residue that is not subject to an EPA-approved tolerance (i.e., approved by EPA for use on or in that food) or (2) a pesticide residue in an amount greater than the tolerance level established by EPA for that food under sections 408 and 409 of the act.² Such products are to be destroyed, re-exported, or in appropriate cases, allowed admission if other action brings it into compliance with the act. Customs may authorize delivery of imported food shipments to the owner or consignee, pending a decision on admission, if the broker, agent, or shipper (herein referred to as the importer) executes a bond providing for payment of liquidated damages if the shipment is adulterated or otherwise fails to comply with FDA admissibility requirements. Customs will assess and collect damages if shipments are not re-exported, destroyed, or reconditioned to comply with the act.

Under this authority FDA can request Customs to detain imported food that FDA suspects, either from past experience or initial sampling results, contains illegal pesticide residues. The food cannot move into U.S. commerce until it has been either further tested by FDA or until the importer presents a certification that it has been analyzed by a laboratory and is free of illegal pesticide residues.

²FFDCA also defines an adulterated product as one that is defective, unsafe, filthy, or not produced under sanitary conditions.

Chapter I
Introduction

FDA's pesticide monitoring efforts are carried out through its chemical contaminants program—one of many programs FDA has responsibility for under the law. Under the contaminants program, FDA collects and analyzes food, animal feed, and other products for industrial chemicals, heavy metals, and pesticides to (1) assure that residue levels comply with established tolerances, (2) remove products found to contain illegal residues from interstate commerce, and (3) deny entry of adulterated products offered for import into the United States. FDA monitors imported foods for illegal pesticide residues by selectively sampling raw and processed food and feed products when they arrive at U.S. Customs ports of entry.

Imported food shipments are sampled for pesticide residues under FDA's general import food monitoring program and a special program for pesticides in Mexican produce. (Mexican imports account for a substantial percentage of all fresh fruits and vegetables consumed in the United States during the winter months.) FDA collects and analyzes two types of samples. Surveillance samples are collected by FDA inspectors without any suspicion that illegal pesticide residues are present. Compliance samples are collected when FDA finds illegal residues in a surveillance sample or when other information leads inspectors to suspect the presence of illegal residues. Compliance samples, taken as a result of violative surveillance samples, are normally taken from subsequent shipments entering the United States from the same importer or grower.

FDA consists of a headquarters staff, 10 regional offices, 22 district offices, and 20 laboratories (16 of which routinely analyze food samples for pesticides). Most staff associated with pesticide monitoring are located in the district offices and laboratories and include chemists and laboratory support staff who test food samples for residues, as well as investigators who collect food samples at the various U.S. Customs ports of entry. During fiscal year 1985, FDA's total budget was about \$397.5 million and 7,000 staff years. FDA allocated about \$13.7 million (3.4 percent) and 309 staff years (4.4 percent) of the budget to monitoring both domestic and imported foods, animal feeds, cosmetics, and other products for pesticides. About one-third of all samples collected and analyzed are for imported foods, animal feeds, processed foods, cosmetics, and other products.

This report addresses FDA's efforts to enforce prohibitions against illegal pesticide residues on foodstuffs imported into the United States. It does not address pesticide residues in imported meat, poultry, and eggs which are monitored by USDA.

Chapter 8
FDA Could Improve Sampling Coverage of
Imported Commodities

with the high level of sampling, shipments from 17 of the 30 countries regularly exporting tomatoes to the United States were not sampled.

While there might be some valid reasons for this lack of coverage of some food commodities being imported on a regular basis, the large number of different foods imported from various countries not being sampled indicates a need for FDA to re-evaluate its overall sampling plan for imported foods. There also appears to be some oversampling, e.g., tomatoes. It is important to note that these are commodities that are regularly being imported into the United States. As we have previously stated, a comprehensive monitoring summary would assist FDA in this task as well as provide a vehicle for independent congressional oversight.

Results of Imported Food Sampling

FDA's monitoring of imported foods indicates that between 1979 and 1985 about 6.1 percent of the samples collected and analyzed were found to contain illegal pesticide residues.

FDA data indicate that 2,066 of 33,687 imported food samples contained illegal residues. Imported food samples containing illegal residues ranged from a high of 8.2 percent in 1981 to a low of 4.7 percent in 1983. Table 2.1 shows the number of imported food samples collected and the violation rates for fiscal years 1979 through 1985.

Table 2.1: Violation Rates of Imported Food Samples Analyzed by FDA in Fiscal Years 1979 Through 1985

Fiscal year	Samples collected and analyzed	Samples containing illegal residues	Violation rate (percent)
1979	3,635	225	6.2
1980	4,515	305	6.8
1981	4,401	362	8.2
1982	4,050	299	7.4
1983	5,190	245	4.7
1984	5,948	290	4.9
1985	5,948	330	5.5
Total	33,687	2,066	6.1

Since fiscal year 1979, FDA has conducted a special surveillance program for pesticide residues in produce imported from Mexico. This program came about because Mexican produce represents a substantial percentage of fruits and vegetables consumed in the United States during

Chapter 3
FDA Could Improve Sampling Coverage of
Imported Commodities

the winter and because past FDA sampling showed a relatively high violation rate for pesticide residues in Mexican produce. The major concern was for residues of pesticides on crops for which usage in the United States is prohibited. The program included

- (1) a significant increase in the number of samples taken,
- (2) use of analytical methods that detect residues of pesticides approved by the Mexican government,
- (3) improved information exchange between the district offices (Los Angeles and Dallas) that participate in the program, and
- (4) more rapid determination of the regulatory significance of a pesticide residue finding and initiation of regulatory action as appropriate.

FDA data indicate that, during the period 1979 to 1985, 1,005 of 18,292 samples of commodities imported from Mexico (5.5 percent) were found to contain illegal pesticide residues. Samples of Mexican foods containing illegal residues ranged from a high of 8.1 percent in 1980 to a low of 4.2 percent in 1983.

Table 2.2 shows the number of Mexican import samples collected and the violation rates for fiscal years 1979 through 1985.

Table 2.2: Violation Rates for Mexican Produce Program in Fiscal Years 1979 Through 1985

Fiscal year	Samples collected and analyzed	Samples containing illegal residues	Violation rate (percent)
1979	1,455	88	6.0
1980	2,194	177	8.1
1981	2,142	114	5.3
1982	2,291	152	6.6
1983	3,511	151	4.3
1984	3,329	168	5.0
1985	3,370	155	4.6
Total	18,292	1,005	5.5

FDA data indicate that, during 1979 to 1985, 1,051 of 15,395 samples of commodities imported from countries other than Mexico (6.8 percent) were found to contain illegal pesticide residues. Samples of foods from

Chapter 2
FDA Could Improve Sampling Coverage of
Imported Commodities

these countries containing illegal residues ranged from a high of 11 percent in 1981 to a low of 4.6 percent in 1984. Table 2.3 shows the number of imports from countries other than Mexico and the violation rates for fiscal years 1979 through 1985.

**Table 2.3: Violation Rates for FDA's
General Import Program (All Countries
Except Mexico) in Fiscal Years 1979
Through 1985**

Fiscal year	Samples collected and analyzed	Samples containing illegal residues	Violation rate (percent)
1979	2,180	137	6.3
1980	2,321	128	5.5
1981	2,259	248	11.0
1982	1,759	147	8.4
1983	1,679	94	5.6
1984	2,619	122	4.6
1985	2,578	175	6.8
Total	18,396	1,081	6.8

These data indicate that the overall violation rate for Mexican imports has been lower than the rate for other importing countries (5.5 percent compared with 6.8 percent) during the period 1979 through 1985.

FDA officials told us the violation rates indicated in Tables 2.1 to 2.3 are higher than the percentage of violations FDA finds when sampling without suspicion that a violation exists (surveillance sampling). Conversely, samples taken after a violative surveillance sample from the same grower/shipper, or because other information leads FDA officials to suspect a problem (compliance samples), have higher violation rates. Tables 2.4 and 2.5 show the difference in violation rates for surveillance and compliance samples under FDA's Mexican Produce Program and the General Import Program.

Chapter 4
Damages Should Be Collected to Enforce
Compliance With FDA Requirements

loses the value of the shipment while the importer of the shipment that reaches the consumer suffers no loss.

**U.S. Customs Assists
 FDA in Enforcing
 Admissibility
 Requirements for
 Imported Food**

In monitoring the entry of imported foods and removing adulterated products from the marketplace, FDA works in cooperation with the U.S. Customs Service, Department of Treasury. As a principal border enforcement agency, Customs is responsible for (1) notifying FDA of all formal entries subject to its jurisdiction, (2) requiring importers to post a bond on imported food distributed to owners or consignees pending FDA approval for release into U.S. commerce, (3) ordering and supervising the export or destruction of foods FDA identifies as adulterated, and (4) imposing and collecting liquidated damages against importers who fail to export or destroy adulterated shipments.

As part of the entry process, commercial goods imported into the United States are to remain in Customs' custody until they are cleared of all duties and taxes and comply with all applicable laws and regulations. However, Customs does not retain possession of all food shipments pending FDA's final approval. Customs' regulations state that imported products valued at \$1,000 or more may be released to importers if a performance bond is posted. This is allowed to help minimize port congestion. Although owners may take possession of imported food upon execution of a bond, they are not to release the shipment for consumer use until FDA issues a release notice. If analysis of a sample or other evidence indicates that the shipment contains illegal residues, FDA notifies the importer and Customs that the shipment is refused admission into U.S. commerce and must be redelivered to Customs.

Customs assists FDA in enforcing pesticide tolerances and ensuring the removal of adulterated food from the market by enforcing the redelivery requirement of the bond. The bond serves as a guarantee that the shipment will be returned to Customs for either (1) re-export or destruction under Customs supervision or (2) with FDA's approval, reconditioning to bring the product into legal conformity, or render it other than a food product for human consumption. If delivery is not made within 30 days, the importer has violated the bond. A bond violation occurs when an importer distributes a shipment, or any portion of it, before FDA releases it and the importer fails to redeliver the shipment to Customs upon request. Failure to meet the conditions of the bond requires that Customs notify the importer in writing of his/her liability for liquidated damages. Liquidated damages are based on the transaction value of the shipment as it was appraised by Customs upon entry, plus duties, if any.

Appendix I

Sampling and Violation Rates for Selected Food Commodities Exported to the United States in Fiscal Years 1983 Through 1985

Commodity	Total Volume (Pounds)	Total Samples	Total Violations	Violation Rate	Exporting Countries	Exporting Countries in all 3 years	Countries Not Sampled in any of the 3 years
Bananas	17,620,058,245	180	0	.0000	50	19	10
Tomatoes	3,544,578,848	2,210	10	.0045	52	30	17
Pineapples	1,457,155,650	137	39	.2647	58	26	17
Cucumbers	1,178,566,781	1,019	78	.0765	50	27	18
Onions	749,617,017	147	0	.0000	48	18	5
Apples	728,581,174	414	3	.0072	40	18	4
Watermelons	684,297,859	178	4	.0225	21	6	5
Peppers	602,639,198	1,984	153	.0779	53	21	11
Plantains	601,223,488	10	0	.0000	29	14	10
Carrots	448,698,746	73	1	.0137	31	11	5
Squash	362,174,442	1,016	25	.0246	14	5	0
Peas	325,518,181	622	50	.0804	69	34	11
Mangoes	283,533,830	381	88	.2257	44	18	8
Peaches	259,038,703	128	2	.0159	42	16	9
Yams/Dasheen	251,892,819	24	0	.0000	34	16	11
Melons (Other)	245,515,583	88	8	.0930	39	21	9
Cabbages	211,948,334	291	42	.1443	37	15	11
Strawberries	189,333,733	208	11	.0534	48	25	11
Beans	186,160,891	808	51	.0633	64	36	6
Broccoli	177,261,820	95	1	.0105	12	4	2
Waterchestnuts	148,094,982	9	0	.0000	15	6	3
Pears	129,145,747	104	6	.0577	35	11	1
Okra	118,657,748	238	31	.1314	18	5	1
Eggplants	109,633,888	314	18	.0510	18	4	2
Artichokes	104,475,991	9	0	.0000	19	6	4
Garlic	100,079,593	15	0	.0000	30	15	11
Tangerines	77,579,583	179	23	.1285	9	3	2
Blueberries	84,893,338	80	3	.0500	18	11	8
Plums	62,646,973	53	0	.0000	38	19	16
Grapes	50,682,399	680	9	.0136	25	10	3
Blackberries	47,407,988	81	23	.3770	23	3	1
Raspberries	46,699,672	2	0	.0000	29	10	8
Chinese Gooseberries	40,897,879	0	0	.0000	12	2	2
Cassaba/Yuccas	39,130,208	4	0	.0000	11	4	2
Chestnuts	32,091,494	14	0	.0000	21	9	6
Papayas	24,341,700	28	0	.0000	37	13	7

Appendix I
Sampling and Violation Rates for Selected
Food Commodities Exported to the United
States in Fiscal Years 1988 Through 1990

Commodity	Total Volume (Pounds)	Total Samples	Total Violations	Violation Rate	Exporting Countries	Exporting Countries in all 3 years	Countries Not Sampled in any of the 3 years
Pumpkins	19,907,804	18	0	.0000	15	4	2
Cherries	18,780,917	28	0	.0000	32	15	10
Endives	15,048,922	42	0	.0000	28	9	4
Ginger roots	3,689,891	8	0	.0000	19	8	6

Source: This data was compiled by GAO staff from U.S. Bureau of Census data on import volume and FDA's Laboratory Management Data System information on commodities sampled.

Appendix II

Fifteen Highest Volume Foods Imported Into FDA's Dallas District (From Mexico) and Number of Samples Taken in Fiscal Year 1984

Commodity	Weight (in Kilograms)	Samples taken
1. Onions	68,261,316	23
2. Cucumbers	61,655,694	59
3. Cantaloupes	60,022,819	82
4. Watermelons	55,815,420	03
5. Cabbages	51,206,712	153
6. Bananas	28,147,208	45
7. Strawberries	25,248,673	17
8. Broccoli	25,074,662	18
9. Okra	21,084,672	49
10. Peppers	17,908,367	110
11. Pineapples	17,633,791	40
12. Limes	17,199,924	13
13. Tangerines	16,973,471	30
14. Tomatoes	15,062,081	27
15. Melons "other"	14,802,763	32
Total (top 15 commodities)	493,898,694	706
Total (all Mexican imports)	577,825,408	897

Source: Commodity volume is taken from USDA's Report of U.S. Imports of Fruits and Vegetables Under Plant Quarantine Regulations. The number of samples was taken from automated records and other files available at FDA's headquarters and district offices.

APPENDIX F

Letter from U.S. Customs in reply to Commission request for
information on country-of-origin labeling

DEPARTMENT OF THE TREASURY

U.S. CUSTOMS SERVICE

WASHINGTON, D.C.



SEP 28 1988

MAR 2-05 CO:R:C:V
731722 LR

Mr. David L. Ingersoll
Chief, Agriculture Division
U.S. International Trade Commission
Washington, D.C. 20436

Dear Mr. Ingersoll:

This is in response to your letter dated August 26, 1988, requesting a summary of the current country of origin marking requirements for imported asparagus, broccoli and cauliflower. The request is made in connection with your investigation into the competitive condition in the U.S. market for asparagus, broccoli and cauliflower.

Section 304 of the Tariff Act of 1930, as amended (19 U.S.C. 1304), provides that, unless excepted, every article of foreign origin or its container, imported into the U.S. shall be marked in a conspicuous place as legibly, indelibly and permanently as the nature of the article will permit in such manner as to indicate to an ultimate purchaser in the U.S. the English name of the country of origin of the article. Section 134.33, Customs Regulations (19 CFR 134.33), providing for the so-called "J-list" exceptions, excepts foreign natural products (such as asparagus, broccoli and cauliflower) from individual marking requirements. However, the containers of such J-list articles in which they reach the ultimate purchaser must be marked to indicate the country of origin of the articles contained therein. Section 134.1(d), Customs Regulations (19 CFR 134.1(d)), defines "ultimate purchaser" as generally the last person in the U.S. who will receive the article in the form in which it was imported.

Pursuant to section 134.25, Customs Regulations (19 CFR 134.25), if imported J-list articles and other articles which are incapable of being marked are repacked in the U.S. before sale to the ultimate purchaser, the new container must indicate the country of origin of the foreign product. It is the position of the Customs Service that if an imported article is processed in the U.S. prior to repacking, the repacked article is subject to the requirements of 19 CFR 134.25, unless the processing substantially transforms the foreign article into a new and

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different article with a new, name, character, or use. If the product is substantially transformed, the processing plant is considered to be the ultimate purchaser and the requirements of 19 CFR 134.25 are not applicable.

In HQ 729365, dated June 25, 1986 (copy enclosed), Customs ruled on the country of origin marking requirements of fresh broccoli imported from Mexico in bulk form which is cut, blanched, frozen and packaged in the U.S. Customs found that imported broccoli is not substantially transformed in the U.S. into a new and different article, that it remains after processing a product of the country where the fresh product was produced, and that broccoli processed in this manner must be marked with the name of the country in which the fresh broccoli is produced. Customs further determined that the ruling is applicable to other imported produce which is processed in a substantially similar manner.

With regard to your specific questions, we offer the following comments:

(a) If the vegetables are imported fresh and then reduced in size and frozen in the U.S., pursuant to HQ 729365 the repacked product would be required to be marked with the name of the country in which the fresh vegetables are produced.

(b & c) Customs has not ruled on the marking requirements of imported vegetables which are imported frozen in bulk containers and: mixed with frozen vegetables that are a product of the U.S., used in the manufacture of frozen vegetables in cheese or butter sauce, used in the manufacture of battered and breaded frozen vegetables, or used in the manufacture of frozen mixed vegetables with pasta in cheese or butter sauce. In each case, the marking requirements hinge on whether or not the imported product is substantially transformed as a result of the U.S. processing. There is no minimum percentage share below which the foreign content of the final product does not require labeling for country of origin of the foreign product.

We are of the opinion that if the vegetables are imported frozen in bulk containers and commingled with U.S. frozen vegetables of the same type (i.e., imported frozen broccoli is mixed with U.S. broccoli), the imported product is not substantially transformed and is subject to the requirements of 19 CFR 134.25. However, in the situation where the imported product is mixed with another type of U.S. vegetable (i.e. imported broccoli

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is mixed with U.S. cauliflower), and sold as mixed vegetables or where the vegetables are further processed as described above, the substantial transformation question cannot be resolved without a more detailed presentation of the specific facts.

There are two cases pending in our office concerning the country of origin marking requirements of imported vegetables. One involves the issue of whether the country of origin marking which appears in small letters on the back of the package is sufficiently conspicuous. The other involves the issue of whether a rubber binder which holds imported asparagus in place is considered a container within the meaning of 19 CFR 134.33 which is required to be marked with the country of origin of the asparagus.

Please let us know if we can be of further assistance to you in this matter.

Sincerely,

Thomas L. Robid

for Marvin M. Amernick
Chief, Value, Special Programs
and Admissibility Branch

Enclosure

APPENDIX G

Names and locations of primary asparagus, broccoli, and cauliflower
processors in the United States and Mexico

<u>Firms</u>	<u>Location of plant(s)</u>
<u>United States: 1/</u>	
Agripac, Inc.....	Oregon
Bannworth Frozen Foods, Inc.....	Texas
Console Foods Corp.....	California
Crosetti Frozen Foods, Inc 2/.....	California
D & K Frozen Foods, Inc.....	Washington
Frio Foods, Inc.....	Texas
International Frozen Foods, Inc.....	Texas
Norcal/Crosetti Foods, Inc.....	California
Norpac Foods, Inc.....	California
Patterson Frozen Foods, Inc.....	California
The Pillsbury Company (Green Giant).....	California
Richard A. Shaw, Inc.....	California
J.R. Simplot Company.....	California, Washington
Southern Frozen Foods.....	Texas, Georgia
Stillwell Foods, Inc. (Rio Grande Foods, Inc.).....	Texas, Oklahoma
United Foods, Inc.....	California
Watsonville Canning & Frozen Food Co. 2/.....	California
<u>Mexico: 1/</u>	
Agrosem, S.P.R. de R.S.....	Coahuila
Arteaga.....	Aguascalientes
Azteca 3/.....	Guanajuato
BirdsEye de Mexico, S.A. de C.V.....	Guanajuato
Campbell's de Mexico, S.A. de C.V.....	Guanajuato
C.E.N., S.A.....	Michoacan
Congeladora Del Rio.....	Guanajuato
Congeladora de Zamora.....	Michoacan
Congeladora Estrella 4/.....	Michoacan
Covemex S.A.....	Guanajuato
Empacadora Chapala.....	Michoacan
Empacadora Del Celio, S.A. de C.V.....	Michoacan
Empacadora El Duero.....	Michoacan
Empacadora Fox.....	Guanajuato
Expohort S.A. de C.V.....	Queretaro
Frutas y Refrigerata 4/.....	Guanajuato
Frutas y Vegetales.....	Michoacan
Gigante Verdi, S.A. de C.V.....	Guanajuato
Hortimex.....	Nuevo Leon
Industrias Horticolas de Montemorelos, S.A. de C.V.....	Nuevo Leon
Legumbres Congeladora, S.A.....	Aguascalientes
Mar Bran, S. de R.L. de C.V.....	Guanajuato
Procesadora de Productos Agricolas.....	Michoacan
Productos Frugo.....	Guanajuato

1/ Only firms processing frozen vegetables from fresh product during 1985-87.

2/ Not in business at close of 1987.

3/ Reported to be processing only strawberries.

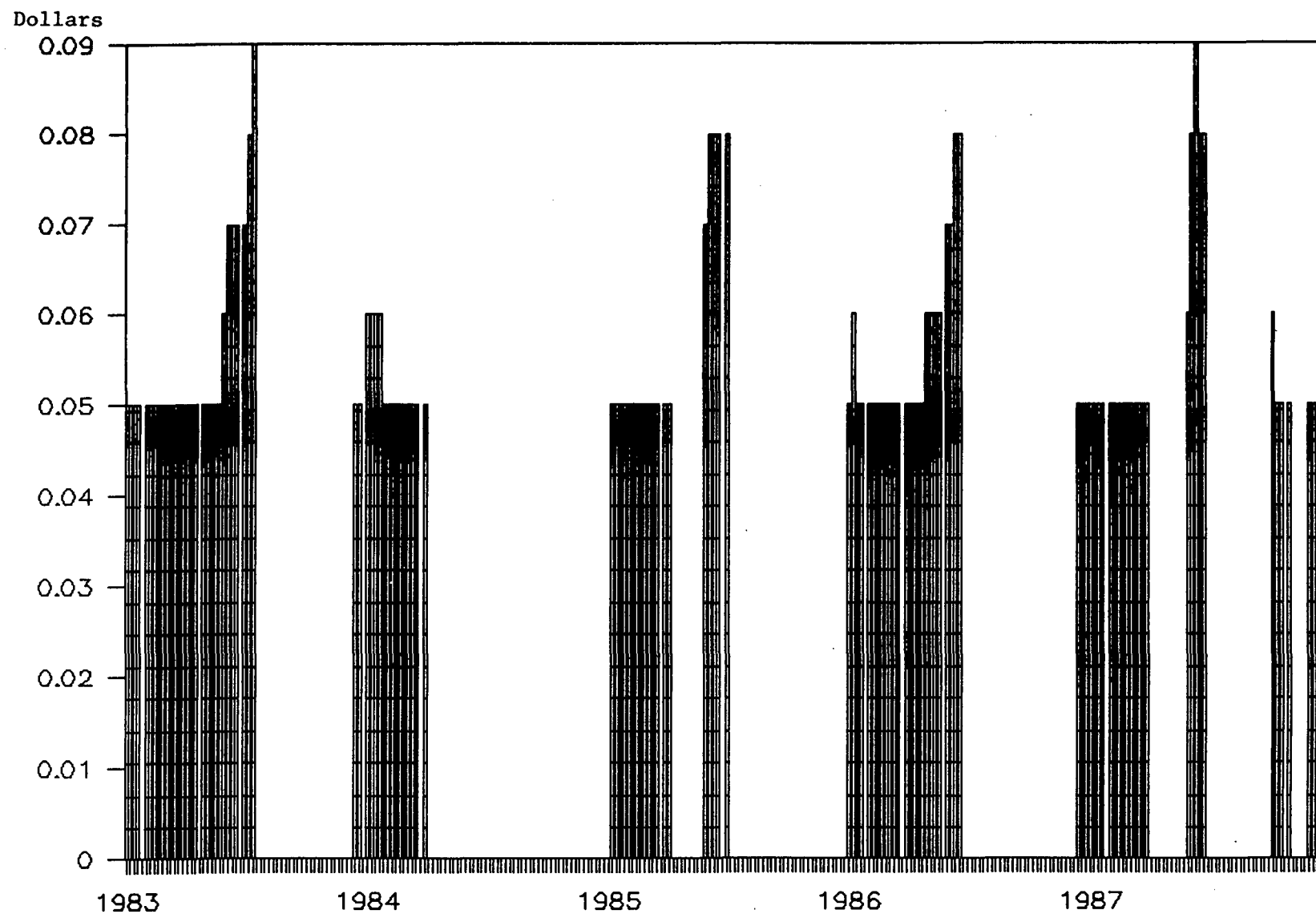
4/ Reported to be out of business during 1988.

Source: Compiled by Commission staff from questionnaire responses, field notes, and other sources during the course of the investigation.

APPENDIX H

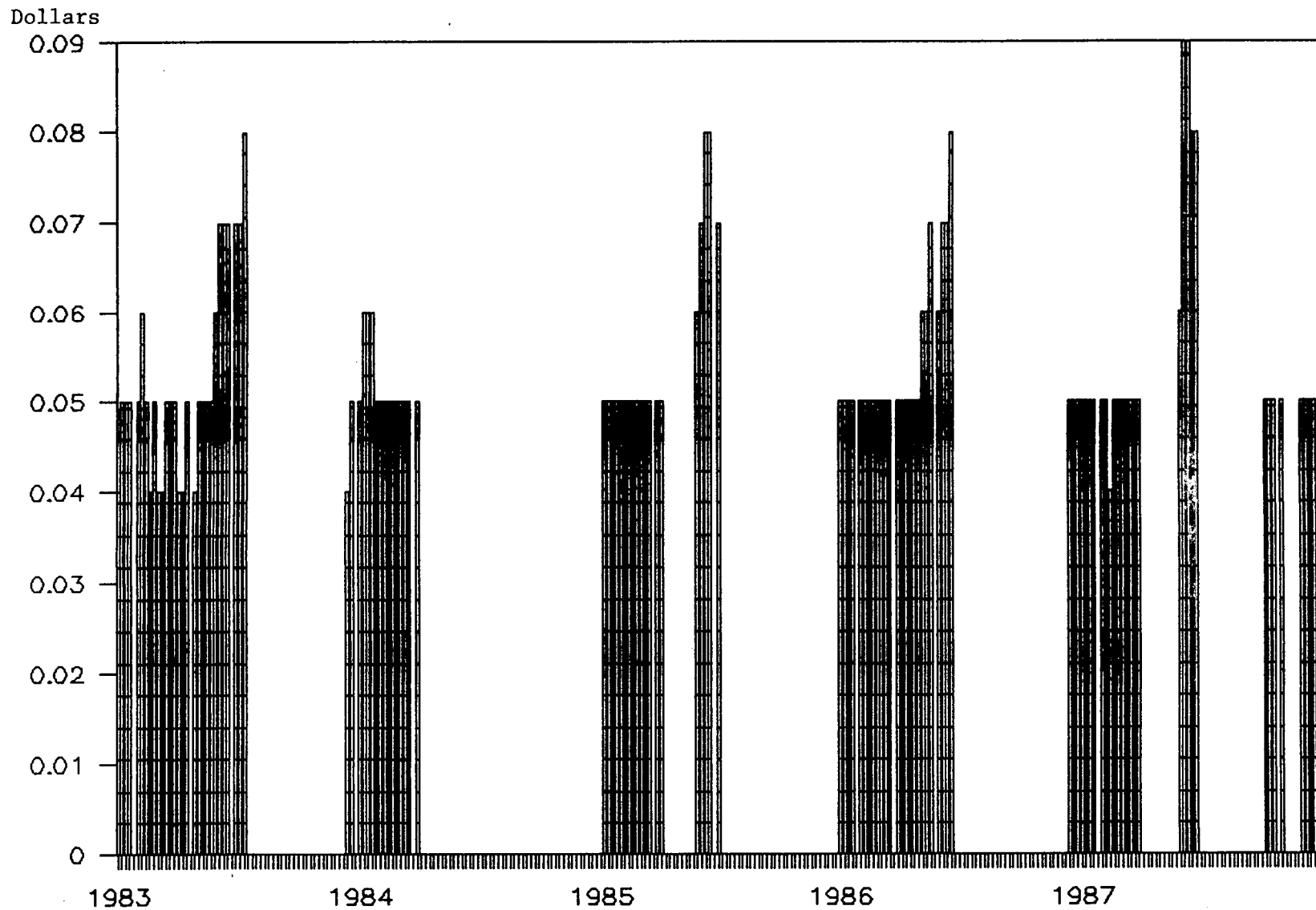
Supplemental data on U.S. truck rates

Figure H-1.
Imperial Valley, California, to Atlanta truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure H-2.
Imperial Valley, California, to Chicago truck rates, per pound, by week, 1983-87



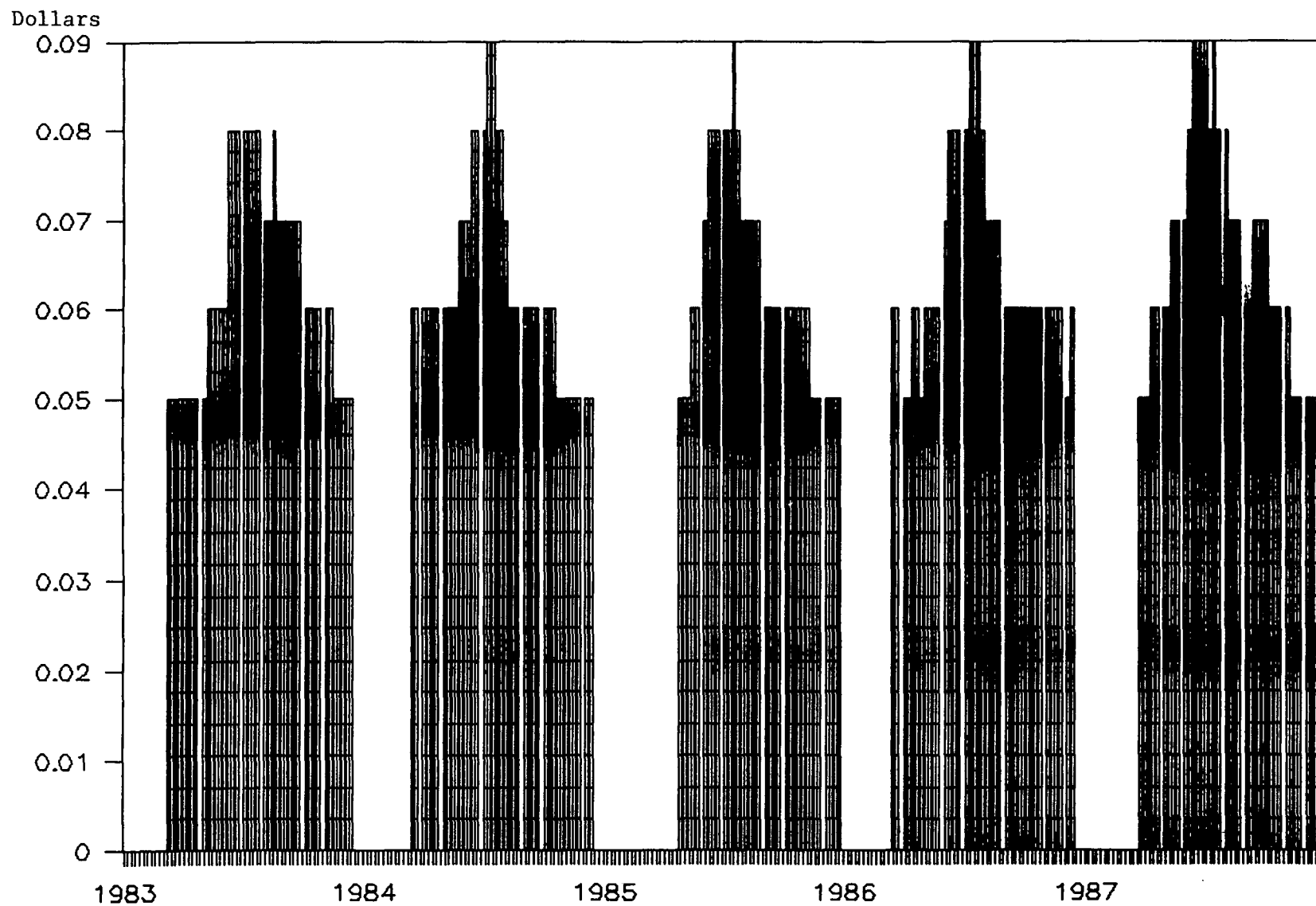
Source: Compiled from official statistics of the U.S. Department of Agriculture.

Imperial Valley, California, to New York truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure H-4.
Salinas/Watsonville, California, to Atlanta truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

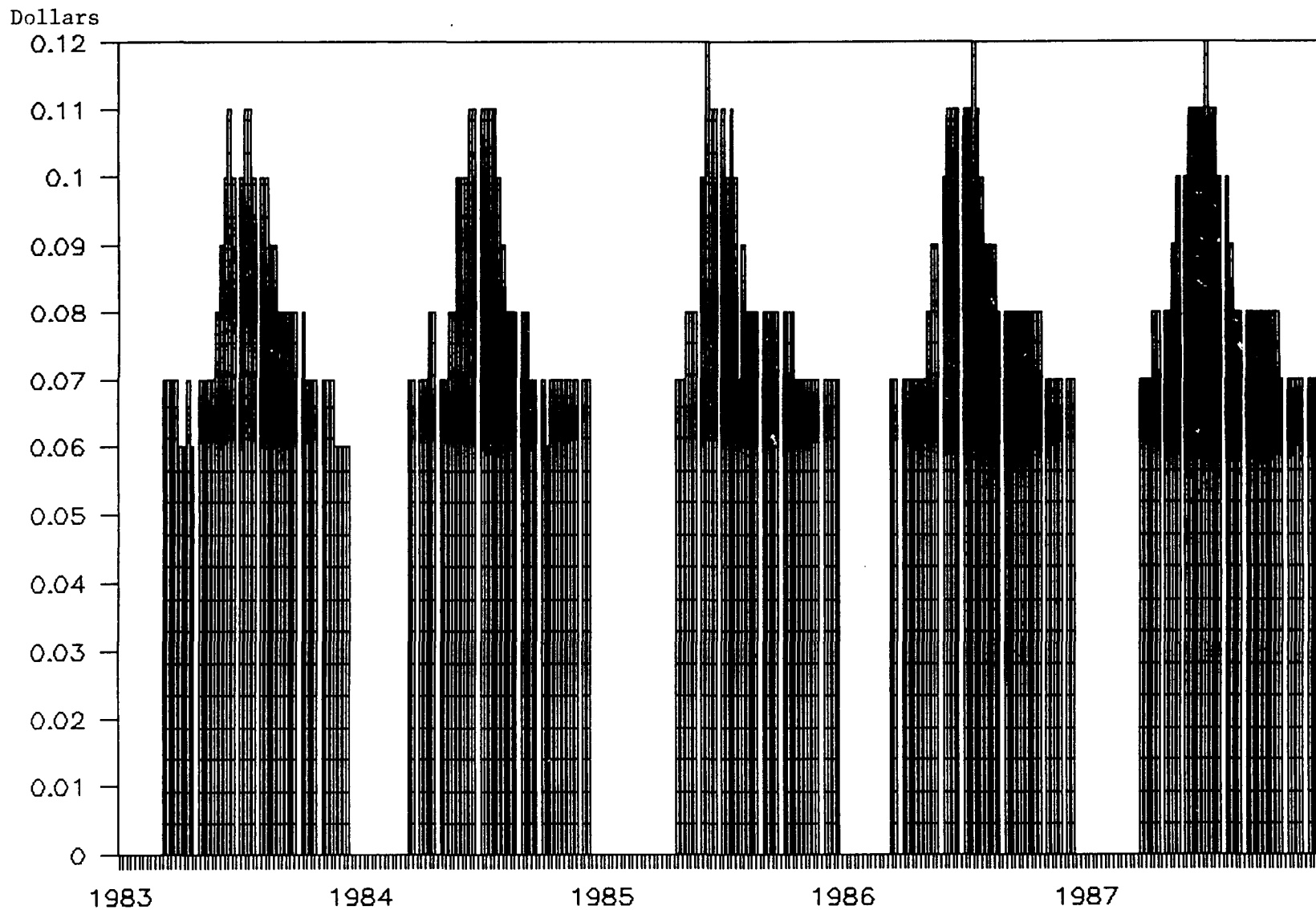
Salinas/Watsonville, California, to Chicago truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure H-6.

Salinas/Watsonville, California, to New York truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Nogales, Arizona, to Atlanta truck rates, per pound, by week, 1983-87



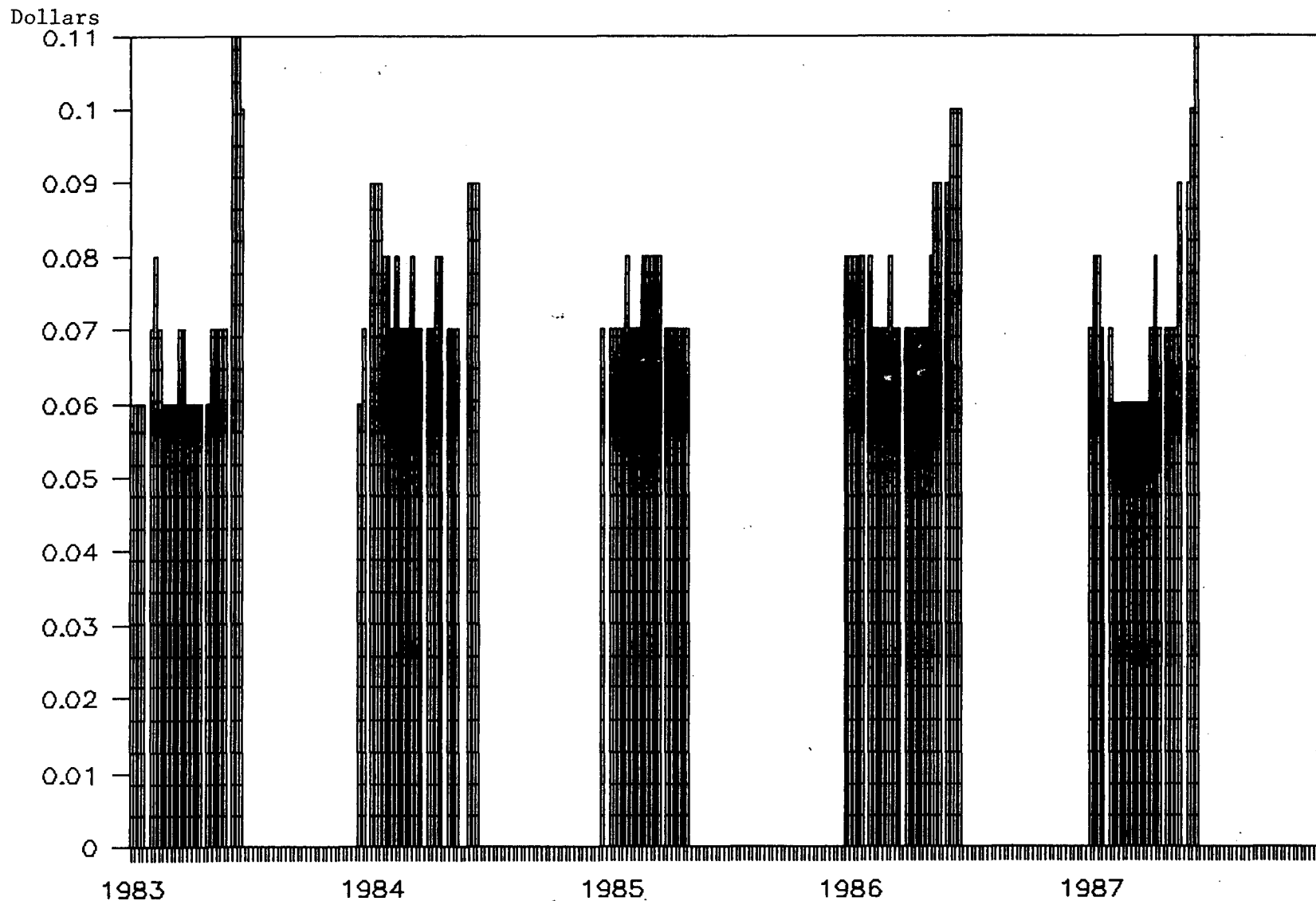
Source: Compiled from official statistics of the U.S. Department of Agriculture.

H-10

Source: Compiled from official statistics of the U.S. Department of Agriculture.

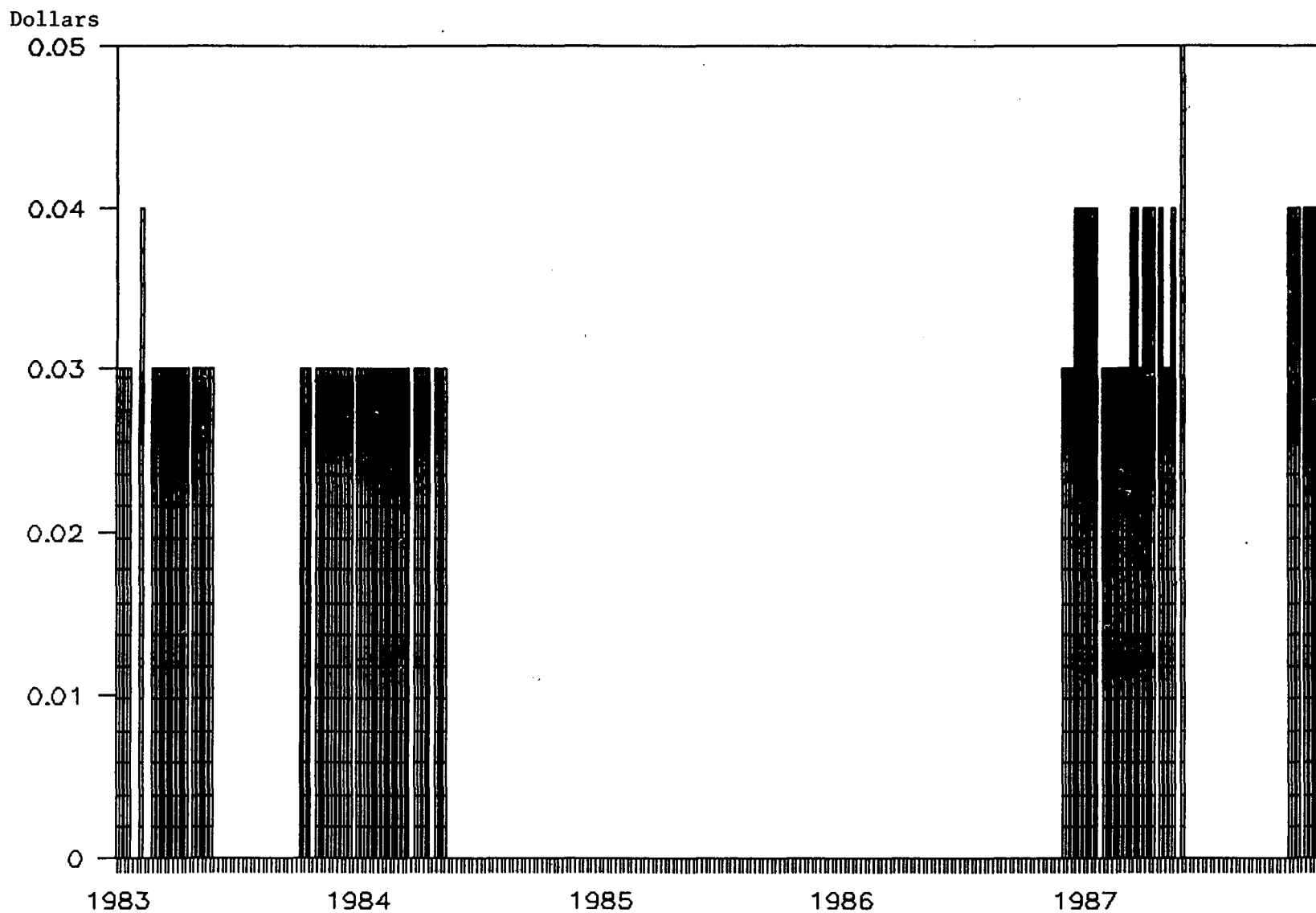
Figure H-9.

Nogales, Arizona, to New York truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

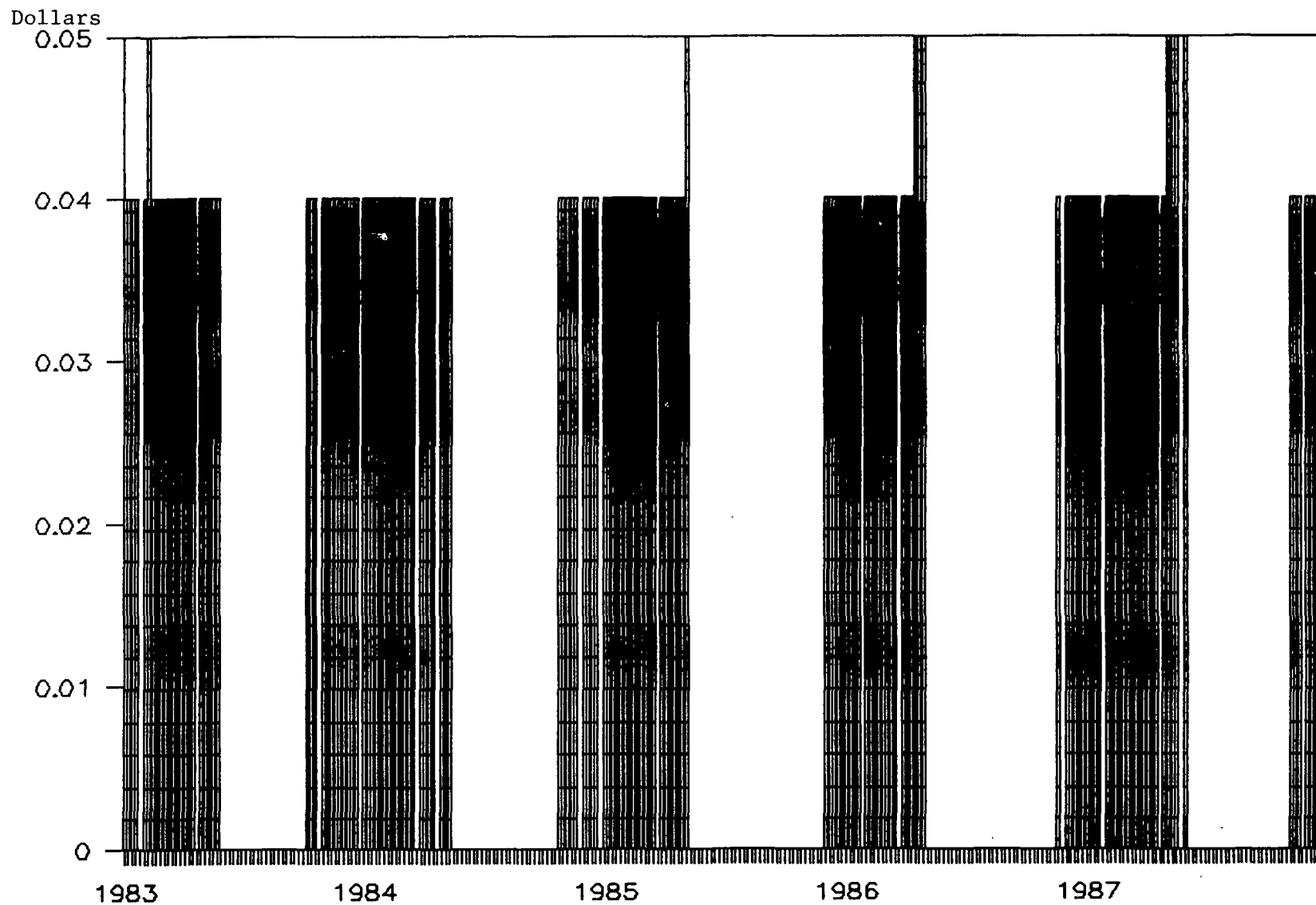
Figure H-10.
Lower Rio Grande Valley, Texas, to Atlanta truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Figure H-11.

Lower Rio Grande Valley, Texas, to Chicago truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

Lower Rio Grande Valley, Texas, to New York truck rates, per pound, by week, 1983-87



Source: Compiled from official statistics of the U.S. Department of Agriculture.

APPENDIX I

Additional Views of Acting Chairman Brunsdale

ADDITIONAL VIEWS OF ACTING CHAIRMAN BRUNSDALE

Although I approve of this report, I have several concerns regarding the summarization provided in chapter 6 as well as with the format and preparation of the report. These views are set forth below.

1. Language in Chapter 6, the summary chapter of the report, is somewhat at odds with the record of the investigation as developed in Chapters 1 through 5 of the report. For example, the first paragraph of the summary states that the dominant position of U.S. industries in the domestic market has eroded since the early 1980's. The record of changes in market share, levels of market share, production levels, and profitability does not, in my opinion, support such a sweeping statement.

The statement makes no distinction between the fresh and frozen product markets. Yet, an examination of changes in market shares, one indicator of competitiveness, reveals a clear distinction between the fresh and frozen categories. Market share changes for fresh products ranged from +1 to -6 percent, while changes in frozen product shares ranged from -14 to -28 percent (see Table 6-1). Levels of market share are another indicator of competitiveness. The U.S. producers' domestic market share for fresh broccoli and cauliflower remain above ninety five percent, while the market share in asparagus is seventy-nine percent. In my opinion, these data taken together do not indicate an erosion of U.S. producers' dominance in the fresh product market.

Production information presented in the report (see table 4-2, 4-3, and 4-4) indicates sharply rising U.S. production of asparagus, broccoli and cauliflower. This trend is apparent in both the fresh and frozen product categories. Harvested acreage for these products is increasing (see Tables 4-5, 4-6, and 4-7). The number of farms growing these vegetables has also increased (see page 4-2). The limited available data on unit values (see Tables 3-2, 3-3, and 3-4) show that these increases have occurred despite falling unit values. This suggests that the supply curve of the domestic industry has shifted outward, indicating strength in the domestic industry.

Finally, the summary suggests that U.S. vegetable growers suffered negative returns during the period of investigation. This view is apparently based on the responses of 39 growers (out of 150 sampled) reported in chapter 4 and summarized in the table on the top of page 6-5.

The fact that 74% of questionnaire recipients chose not to provide financial data suggests to me that we simply don't have enough information to characterize the vegetable growing industry as being chronically unprofitable. This concern is reinforced by industry-wide data cited above indicating substantial growth in production, harvested acreage, and the number of farms growing

the subject vegetables over the period of investigation. These developments do not provide absolute proof that the industry is profitable, but they do cast doubt on the wisdom of extrapolating an industry profitability trend from the questionnaire responses. A presentation of fragmentary questionnaire responses as a true picture of the industry exposes the Commission to the risk of creating information rather than reporting it. In my opinion, the record does not provide a sufficient basis for reaching a conclusion regarding the profitability of the U.S. vegetable growing industry.

Consideration of all the indicators of competitiveness suggests to me that, while competitiveness trends are somewhat divergent between the fresh and frozen markets and across vegetables, the overall picture is not one of erosion.

2. While I think that the staff has done an excellent job in collecting information for this report, I would have preferred that a more analytical approach be taken. I believe such an approach would have better served the purposes of our clients. I also believe that the current version of the report is burdened by an excessive concern with citing the positions of interested parties. As in the case of most 332 requests, our clients for this study are fully aware of parties' positions. What clients want from the Commission is an evaluation that sifts through the competing claims and, if possible, finds the truth. Extensive citations to views that staff has found to be largely unsupported by the record as a whole only confuses the presentation of our findings. Section 332 investigations, unlike Title VII investigations, have no adversarial aspect to them, and we should not invite adversarial behavior by prominently incorporating all competing views into our studies.

3. Finally, I am concerned with the role of commissioners as fact-finders in section 332 studies as in this instance. The staff conducts section 332 investigations in a systematic fashion pursuant to a Commission-approved outline that includes any necessary fieldwork. In my opinion the views developed by Commissioners during their field trips are appropriately included in a study only if they are (1) contained in a separate Appendix to the study or (2) compiled in cooperation with the staff and pursuant to the Commission-approved outline.