Fruit and Tree Nuts Situation and Outlook. Market and Trade Economics Division, Economic Research Service, U.S. Department of Agriculture, March 1999. FTS-285.

Contents

Situation Coordinator
Agnes Perez
Voice (202) 694-5255 Fax (202) 694-5820

Principal Contributors
Susan Pollack (202) 694-5251
Agnes Perez (202) 694-5255
Doyle Johnson (202) 694-5248

Editor
Carrie Ingoglia

Graphics, Table Design and Layout
Wynnice Pointer-Napper

Approved by the World Agricultural Outlook Board. Summary released March 25, 1999. The next summary of the *Fruit and Tree Nuts Situation and Outlook* is scheduled for release on September 8, 1999. Summaries and full text of Situation and Outlook reports may be accessed electronically via the ERS web site at www.econ.ag.gov.

The *Fruit and Tree Nuts Situation and Outlook* is published two times a year and supplemented by a yearbook. To order, call 1-800-999-6779 in the United States or Canada. Other areas please call (703) 605-6220. Or write ERS-NASS, 5285 Port Royal Road, Springfield, VA 22161.

Summary

The index of prices received by growers for fruit and nuts has been higher during the first 2 months of 1999 than for any previous January-February since 1993. Higher prices, mainly for citrus fruits, have been boosting the overall fruit index. Prices are expected to remain above a year ago through the first half of 1999, particularly for oranges, grapefruits, lemons, specialty citrus, and pears. Continued lower prices for apples in the 1998/99 marketing season and expectations of increased strawberry supplies from California will offset some of the upward pressure on fruit prices. Retail prices in January and February 1999 averaged above a year ago for many fresh fruit, including bananas.

As of March 1, 1999, the 1998/99 U.S. orange crop is forecast at 10.2 million short tons, down 27 percent from the record crop last year and smaller than any crop since 1991/92. Crops are expected to be smaller in all producing areas except Arizona, with declines greatest in California and Florida. This year's crop was not only smaller but later to mature. Both these factors helped put upward pressure on prices so far in 1998/99.

The size of California's 1998/99 orange crop fell drastically after 4 days of freezing weather this past December. The navel crop suffered the brunt of the freeze and only 712,500 tons are expected to be harvested in 1998/99, down 57 percent from a year ago. The Valencia crop, reduced 37 percent from the previous year, was expected to also yield 712,500 tons. California is a major supplier of fresh oranges to domestic and export markets. Due to reduced availability of fresh oranges this year, higher prices and lower exports and domestic consumption are expected.

Florida is expected to produce 19 percent fewer early- to mid-season oranges and 25 percent fewer Valencia oranges in 1998/99 than a year ago, mostly attributed to El Niño's effects on fruit set. Orange juice production is forecast at 1.3 billion single-strength equivalent (sse) gallons, down from the last 2 years, but the third highest on record.

U.S. grapefruit production is forecast at 2.6 million tons in 1998/99, down 1 percent from the previous year. Due to a slightly smaller crop this year, grower prices appear to be improving from last year's low returns.

The 1998/99 lemon crop is forecast to decline 14 percent from last year, to 806,000 tons. The December freeze destroyed the entire remaining lemon crop in the San Joaquin Valley, the area which supplies approximately 20 percent of California's lemon output. Most of California's lemon crop is planted south of the area affected by this year's frost. Lemon grower prices in California have averaged sharply higher than a year ago thus far. Prices should moderate, however, as the season progresses with sufficient supplies from southern California.

Specialty citrus crops, such as tangerines, tangelos, and Temples are expected to be smaller for the second year in a row. Tangerines, the largest crop among the specialty varieties, are expected down 15 percent from 1997/98, to 307,000 short tons.

The 1998 utilized production of noncitrus fruit decreased 12 percent from the 1997 record of 18.4 million tons. Heavy winter rains, flooding, and windy conditions, especially in Florida and California, and drought conditions in several other States throughout the summer delayed crop maturity and reduced crop size. The value of noncitrus fruit production in 1998 is estimated at $7.1 billion, down 13 percent from the previous year's record.

The Washington apple crop in 1998 was estimated up 20 percent from the previous year—the largest crop on record. While production declined in other important apple-producing States (New York, Michigan, California, and Pennsylvania), the 1998 U.S. apple crop increased 6 percent and was second only to the record U.S. crop in 1994. With the record crop in Washington, fresh-market supplies during the 1998/99 marketing season are likely to exceed the year before, and apple prices are likely to average lower.

Increased strawberry supplies are expected this year from California, where production averages about 83 percent of the U.S. total and supplies are year round. According to the California Strawberry Commission, planted acreage will be up slightly in 1999. Also, generally favorable weather thus far has led to normal crop development, good yields, and better-quality berries. Increased supplies are putting downward pressure on prices.

The December freeze and pest problems have reduced the size of the 1998/99 California avocado crop, and avocado prices are likely to average stronger. Over 85 percent of the U.S. avocado crop is produced in California. Mexico, the world's largest avocado producer, will continue to increase its presence in the U.S. avocado market.

Production decreased sharply in 1998 for all major tree nuts, except pistachios. Production for the six major tree nuts (almonds, hazelnuts, walnuts, pistachios, pecans, and macadamia) totaled 903,000 tons, in-shell equivalent, down 25 percent from the previous year's record. The value of production also fell sharply from the prior year's record, to $1.64 billion.

Higher Fruit Prices Expected in First-Half 1999

The index of prices received by growers for fruit and nuts has been higher in the first 2 months of 1999 than for any previous January-February since 1993 (table 1). Higher prices, mainly for citrus fruits, have been boosting the overall index. Lower citrus supplies in 1998/99 reflect the effects of both the El Niño weather conditions during 1998 and a 4-day California freeze in December 1998. While fruit prices, in general, have declined from January levels, the February grower index was slightly higher mostly due to continued stronger orange prices. Prices are expected to remain above a year ago through the first half of 1999, particularly for oranges, grapefruit, lemons, specialty citrus, and pears. Lower prices for apples in the 1998/99 marketing season (partly due to a larger crop last fall) and expectations of increased strawberry supplies from California will offset some of the upward pressure on fruit prices.

Table 1--Index of prices received by growers for fruit and nuts, 1993-99

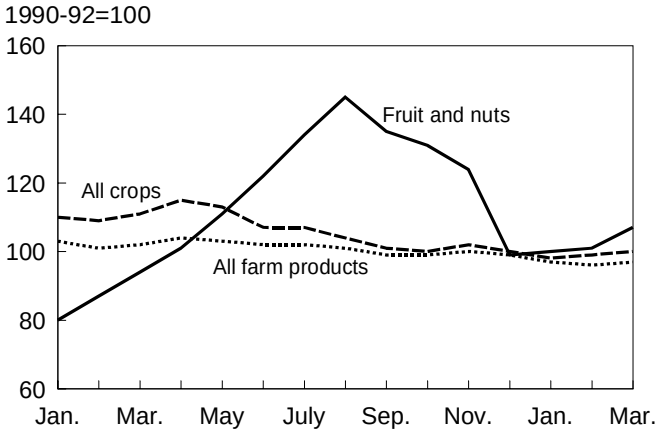
Month	1993	1994	1995	1996	1997	1998	1999
				1990-92=100			
Jan.	72	79	74	95	93	80	100
Feb.	72	79	74	95	90	87	101
Mar.	69	84	76	104	97	94	107
Apr.	73	86	81	100	88	101	
May	81	92	101	114	106	111	
June	97	97	105	134	127	122	
July	101	100	111	130	127	134	
Aug.	113	102	127	131	126	145	
Sep.	121	105	118	144	131	135	
Oct.	119	97	113	140	120	131	
Nov.	106	88	99	125	106	124	
Dec.	86	76	90	103	89	99	
Annual	93	90	97	118	108	114	

Source: National Agricultural Statistics Service,USDA.

Retail prices in January and February 1999 averaged above a year ago for many fresh fruit (table 2). Weather-reduced crops of navel oranges and lemons in California raised their prices sharply over the same period last year and helped boost overall retail prices for fresh fruit. Retail prices also averaged higher for bananas, Anjou pears, Thompson seedless grapes, and strawberries. The Consumer Price Index (CPI) for fresh fruit in January was 11 percent above a year ago and in February, the index was 7 percent higher. If retail prices continue higher than a year ago as expected, particularly for oranges and bananas, the fresh fruit CPI will stay above a year ago—at least until May or June when a number of freshly harvested noncitrus fruit become available. The California Valencia crop, which accounts for a majority of the domestic summer fresh orange supplies, is forecast to be significantly smaller due to the December freeze and is expected to keep orange prices strong. Many of the remaining fruit crops (mostly noncitrus) are still passing through the bloom and fruit setting periods, and it is still too early to forecast production.

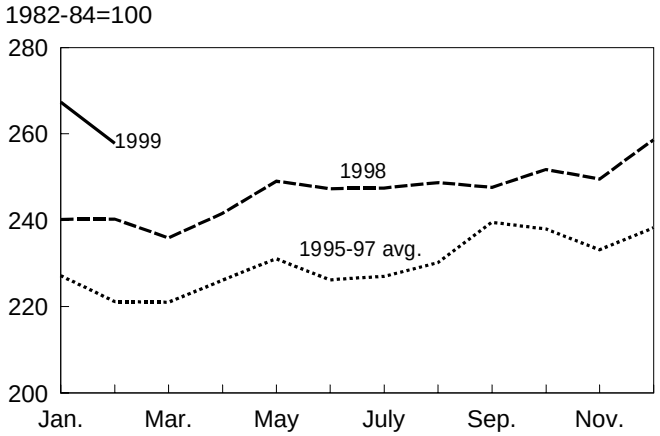
Banana prices are expected to increase seasonally through much of the first half of 1999 from January's 48.9 cents per pound, and prices will likely remain strong. While declining seasonally since July 1998 (except in November and December), banana prices averaged 5 percent higher than a

Figure 1
Indexes of Prices Received by Farmers, 1998-99



Source: National Agricultural Statistical Service, USDA.

Figure 2
U.S. Consumer Price Index for Fresh Fruit



Source: Bureau of Labor and Statistics, USDL.

year ago during June 1998 to February 1999. Imports account for virtually all fresh banana supplies in the United States. Trade reports indicate that during the second half of 1998, U.S. fresh banana supplies were down less than 1 percent from a year ago. Serious damage to banana plantations in Honduras and Guatemala, due to Hurricane Mitch in November 1998, resulted in sharply reduced imports from these two major suppliers. In the past, these two countries supplied about 30 percent of the U.S. fresh banana market. Banana prices rose in November and December, fell in January 1999, and rose again in February. Imports from other major suppliers, such as Ecuador, Costa Rica, and Colombia are likely to increase in 1999, attempting to fill in supply shortages from Honduras and Guatemala.

Table 2--U.S. monthly retail prices for selected fruits and juices, 1996-99

Month	Valencia oranges				Navel oranges				Orange juice, concentrate 1/				Grapefruit			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
	--Dollars per pound--				--Dollars per pound--				--Dollars per 16 fl. oz--				--Dollars per pound--			
Jan.	--	--	--	--	0.561	0.555	0.525	0.830	1.577	1.737	1.601	1.753	0.463	0.515	0.499	0.543
Feb.	--	--	--	--	.559	.554	.507	.889	1.625	1.768	1.568	1.780	.460	.489	.481	.545
Mar.	--	--	--		.565	.546	.505		1.609	1.747	1.587		.464	.496	.503	
Apr.	--	--	--		.620	.598	.571		1.657	1.727	1.634		.468	.512	.510	
May	--	--	--		.716	.706	.672		1.704	1.736	1.589		.493	.518	.491	
June	0.616	0.580	0.664		--	--	--		1.743	1.752	1.633		.592	.520	.587	
July	.604	.607	.683		--	--	--		1.774	1.770	1.655		.648	.592	.695	
Aug.	.717	.669	.679		--	--	--		1.765	1.755	1.668		.670	.646	.738	
Sep.	.779	.670	.650		--	--	--		1.733	1.695	1.599		.775	.681	.750	
Oct.	.799	.616	.643		--	--	--		1.761	1.711	1.655		.716	.628	.767	
Nov.	--	--	.621		.707	.642	--		1.747	1.666	1.654		.587	.543	.618	
Dec.	--	--	--		.593	.583	.608		1.735	1.670	1.679		.550	.532	.548	

	Lemons				Red Delicious apples				Bananas				Peaches			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
	--Dollars per pound--															
Jan.	1.011	1.115	1.026	1.402	0.877	0.907	0.992	0.860	0.463	0.497	0.473	0.489	--	--	--	--
Feb.	.902	1.084	.976	1.274	.877	.912	.960	.870	.501	.518	.489	.509	--	--	1.894	1.856
Mar.	.896	1.005	.959		.894	.914	.949		.539	.532	.475		--	--	--	
Apr.	.934	.990	.946		.915	.895	.974		.505	.512	.511		--	--	--	
May	1.013	1.059	1.027		.921	.912	.955		.512	.484	.510		--	--	--	
June	1.143	1.309	1.059		.954	.914	1.000		.498	.488	.507		1.142	1.122	1.425	
July	1.233	1.519	1.262		.976	.918	.990		.498	.487	.530		1.218	.951	1.179	
Aug.	1.331	1.623	1.405		.998	.935	.935		.478	.475	.489		1.101	.973	1.065	
Sep.	1.352	1.631	1.428		1.006	.933	.971		.458	.458	.476		1.244	1.143	1.221	
Oct.	1.274	1.477	1.462		.949	.881	.902		.465	.459	.470		--	--	--	
Nov.	1.140	1.162	1.453		.907	.864	.878		.477	.468	.487		--	--	--	
Dec.	1.144	1.057	1.372		.886	.897	.854		.481	.461	.510		--	--	--	

	Anjou pears				Strawberries 2/				Thompson seedless grapes				Wine 3/			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
	--Dollars per pound--				--Dollars per 12-oz. pint--				--Dollars per pound--				--Dollars per liter--			
Jan.	--	1.017	0.863	0.923	1.692	--	2.135	--	2.072	1.981	1.815	2.341	4.962	5.266	5.302	5.287
Feb.	--	1.001	.931	.925	1.505	1.514	2.080	2.102	1.557	1.508	1.722	1.663	4.578	4.933	4.790	5.103
Mar.	0.860	1.003	.878		1.236	1.317	1.751		1.350	1.675	1.579		5.031	5.337	5.306	
Apr.	.895	1.011	.918		1.082	1.179	1.613		1.824	1.876	1.516		4.661	4.933	4.764	
May	.878	1.026	.962		.957	1.073	1.386		1.893	2.136	--		5.096	5.320	5.322	
June	.886	--	.996		1.226	1.213	1.413		1.934	1.606	1.651		4.703	4.992	4.808	
July	--	--	--		1.247	1.383	1.346		1.532	1.372	1.256		5.118	5.406	5.319	
Aug.	--	--	--		1.164	1.375	1.454		1.167	1.240	1.448		4.775	5.022	4.801	
Sep.	--	--	--		1.420	1.488	1.469		1.269	1.275	1.393		5.188	5.414	5.370	
Oct.	--	--	--		1.409	--	1.779		1.690	1.646	1.564		4.870	5.132	4.823	
Nov.	--	--	--		--	1.654	--		2.252	2.035	1.941		5.226	5.275	5.274	
Dec.	1.059	0.854	0.983		--	--	--		--	2.188	--		4.902	5.001	4.978	

-- = Insufficient marketing to establish price.
1/ Data converted from 12 fluid ounce containers.
2/ Dry pint.
3/ Data series began August 1995.

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Lasting effects from El Niño and freezing temperatures in California this past December have reduced the expected citrus crop this year by 22 percent from 1997/98. If realized, this would be the smallest amount of citrus produced since 1992/93. Florida's crop is projected down 18 percent from a year earlier and California's crop down 39 percent. Production of all citrus crops (oranges, grapefruit, tangerines, lemons, Temples, and tangelos) is expected to be lower this year.

Orange Crop Expected Down Sharply in 1998/99

The 1998/99 orange crop is expected to drop 27 percent from last year's record crop. As of March 1, 1999, the forecast crop size, 10.2 million short tons, is the smallest since 1991/92 (table 3). Crops are expected to be smaller in all producing areas except Arizona, with declines greatest in California and Florida. California's orange crop is expected to decrease 49 percent from last year, to 1.4 million tons. Florida's production is expected to decrease 21 percent from a year ago, to 8.6 million tons. Texas' crop is down 5 percent, to 61,000 tons. Arizona's crop is projected to remain stable at 38,000 tons, the same as the past 2 years.

This year's crop was not only smaller but later to mature. Both these factors helped put upward pressure on prices so far in 1998/99 (table 4). California grower prices have increased 60 percent from November through February over the same time last year. Prices in California and Arizona rose sharply in January after freezing temperatures in late December sharply reduced the fresh-orange crop. Supplies in January were further reduced as growers waited to pick what was remaining on the trees after the freeze to allow the fruit time to recover. Florida's orange prices have risen considerably over last year for the same period. The price increase was due to this year's smaller crop and the very low prices growers received from last year's record crop.

California Production Drops By Almost Half, Fresh Orange Prices Higher in 1998/99

California is the major supplier of fresh oranges to the domestic and export markets. The size of this year's orange crop fell drastically after 4 days of freezing weather this past December. USDA's initial forecast in October 1998 estimated the crop to be less than last year's, and the December freeze reduced crop size even further. The freezing temperatures occurred when most of the crop was still on the tree, and led to great orange losses on trees in the San Joaquin Valley, California's major orange-production area. While California's navel oranges are usually marketed from November through mid-June, the reduced crop is expected to be finished by the end of March, according to industry sources. The navel crop suffered the brunt of the freeze and the crop was down 57 percent from a year ago, with only 712,500 tons expected to be harvested in 1998/99.

Table 3--Oranges: Utilized production, 1995/96-1997/98 and indicated 1998/99 1/

Crop and State	Utilized			Forecast 1998/99	Utilized			Forecast 1998/99
	1995/96	1996/97	1997/98	as of 3-99	1995/96	1996/97	1997/98	as of 3-99
	--1,000 boxes 2/--				--1,000 short tons--			
Oranges:								
Early/mid season and navel 3/:								
Arizona	700	400	350	450	27	15	13	17
California	38,000	40,000	44,000	19,000	1,426	1,500	1,650	713
Florida	121,200	134,200	140,000	114,000	5,454	6,039	6,300	5,130
Texas	830	1,300	1,350	1,300	35	55	57	55
Total	160,730	175,900	185,700	134,750	6,942	7,609	8,020	5,915
Valencia:								
Arizona	950	600	650	550	36	23	25	21
California	20,000	24,000	30,000	19,000	750	900	1,125	713
Florida	82,100	92,000	104,000	78,000	3,695	4,140	4,680	3,510
Texas	110	120	175	140	4	5	6	6
Total	103,160	116,720	134,825	97,690	4,485	5,068	5,836	4,250
Total	263,890	292,620	320,525	232,440	11,427	12,677	13,856	10,165

1/ The crop year begins with bloom of the first year shown and ends with completion of harvest the following year.
2/ Net pounds per box: Arizona and California--75 lbs., Florida--90 lbs., and Texas--85 lbs.
3/ Navel and miscellaneous varieties in California and Arizona, and early- and mid-season (including Navel) varieties in Florida and Texas. Small quantity of tangerines also included in Texas.

Source: National Agricultural Statistics Service, USDA.

Table 4--All oranges: State average equivalent on-tree prices received by growers, 1995-99

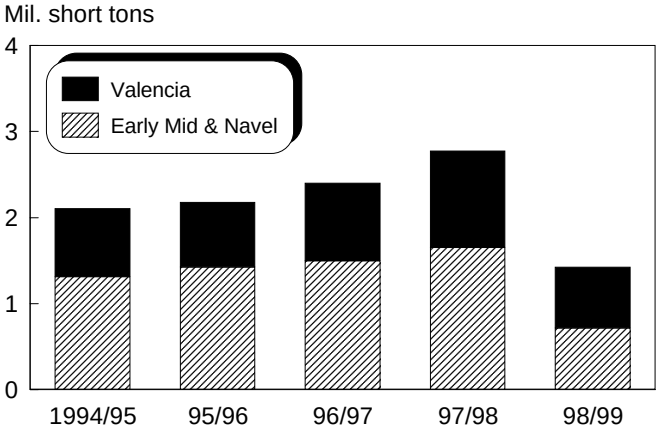
Month	Arizona					California				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	--Dollars/75-lb. box--									
Jan.	7.27	4.76	6.35	3.42	20.13	6.75	4.94	7.17	7.49	12.82
Feb.	1.23	2.89	3.33	.61	18.95	5.03	3.61	6.18	5.62	9.71
Mar.	3.07	3.68	2.39	2.69	15.36	4.35	5.30	6.40	6.38	9.20
Apr.	3.61	2.50	3.60	3.56		6.04	6.08	7.38	8.80	
May	3.70	1.09	3.29	2.41		7.56	7.65	8.35	7.79	
June	1.95	.51	.12	2.82		7.46	6.13	5.93	8.46	
July	1.80	.68	--	--		7.46	7.18	6.48	6.71	
Aug.	--	--	--	--		7.30	8.91	7.45	5.37	
Sep.	--	--	--	--		7.26	13.70	7.15	4.97	
Oct.	17.50	--	-2.26	--		--	11.33	6.52	5.55	
Nov.	9.22	9.49	3.85	17.14		10.33	8.88	7.60	11.31	
Dec.	5.32	6.74	4.80	10.56		6.06	7.33	6.86	9.98	

	Florida					Texas				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	--Dollars/90-lb. box--					--Dollars/85-lb. box--				
Jan.	3.28	3.72	3.17	2.62	4.98	2.57	4.16	2.12	1.18	7.17
Feb.	3.41	3.95	3.18	3.36	5.36	2.99	5.18	3.93	1.66	8.45
Mar.	4.35	5.18	4.00	4.73	5.80	4.90	6.85	4.74	3.86	5.24
Apr.	4.50	5.48	4.15	5.10		5.53	7.80	4.95	2.89	
May	4.59	5.78	4.11	5.41		5.07	7.47	4.66	3.00	
June	4.55	6.36	4.21	6.00		--	--	--	--	
July	--	--	--	--		--	--	--	--	
Aug.	--	--	--	--		--	--	--	--	
Sep.	--	--	--	--		--	--	--	--	
Oct.	--	--	2.42	5.18		11.21	8.41	7.18	6.50	
Nov.	3.49	3.38	1.73	5.43		6.85	4.19	3.05	6.47	
Dec.	3.49	3.12	2.28	4.44		5.75	2.00	1.88	6.23	

-- = Not available.

Source: National Agricultural Statistics Service, USDA.

Figure 3
Utilized Orange Production in California



Source: National Agricultural Statistical Service, USDA.

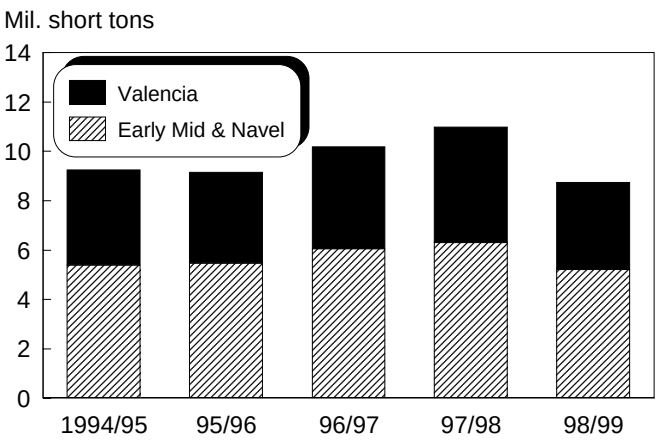
The Valencia crop, reduced 37 percent from the previous year, was also expected to yield 712,000 short tons. The Valencia oranges are reported to be smaller in size as well as quantity this year. Marketing the crop, which usually picks up when navel orange marketing is finished and continues through December, is expected to finish earlier than normal, according to industry sources. Due to the reduced availability of fresh oranges this year, prices, which shot up after the freeze, are likely to stay higher than last year, although down somewhat from the spike in January. Also, domestic consumption will likely be lower than the previous year's 16.4 pounds per person.

Exports are expected to be down this year. The smaller supply of fruit, along with reduced demand in international markets because of the smaller size and reduced quality of the fruit, likely will result in considerably lower exports. Exports from November 1998 through January 1999 fell 41 percent from a year earlier, with fewer shipments to Canada, Japan, and Hong Kong, the three biggest markets.

Florida Production Lower, Improving Prices Over Last Year

In 1998/99, Florida is expected to produce 19 percent fewer early-to mid-season oranges and 25 percent fewer Valencia oranges than a year ago. The decline in production is mostly attributed to El Niño's effects on the trees and fruit set. Last year, the trees experienced stressful conditions with extremes of wet periods and droughts. Heavy rains last February through April affected this year's bloom period.

Figure 4
Utilized Orange Production in Florida



Source: National Agricultural Statistical Service, USDA.

The hot, dry weather in May through July caused the trees to increase fruit shedding, further reducing the number of fruit produced, and caused this year's crop to mature more slowly than previous years.

The late maturing fruit caused Florida's marketing season to start a few weeks later than most years. As a result, utilization is behind compared to last year. Even with the late start, approximately 5 percent of the oranges picked have been sold for fresh use, similar to the past 2 years. Florida growers are unable to take full advantage of the weaker supply of fresh oranges coming out of California because of their own smaller supply and commitments already made for processing. As a result, it is difficult for growers to increase their share of the fresh market, even though they could receive higher prices for suitable quality fruit.

Orange juice production is forecast at 1.3 billion single-strength equivalent (sse) gallons in 1998/99, down from the last 2 years but the third highest on record (table 5). Coupled with very high beginning stocks and a record high yield forecast of 1.62 gallons per box (at 42-degrees Brix), orange juice supply is expected to reach 2.1 billion sse gallons. Continued strong consumer demand for not-from-concentrate (NFC) and chilled orange juices should help keep consumption growing.

About 48 percent of this year's crop is expected to be used to make frozen concentrated orange juice (FCOJ), down 25 percent from last year (table 6). With the increasing popularity of NFC and tighter fruit supplies, a larger share of this year's crop is going to NFC production. FCOJ stocks were high coming into the new marketing year, therefore supply will be sufficient as these stocks are drawn down. The industry has reported that retail sales and prices for NFC have been strong so far this year. Retail prices for 16-ounce cans of FCOJ are also running above last year for the first 2

Table 5--United States: Orange juice supply and utilization, 1986/87-1998/99

Season 1/	Beginning stocks	Production	Imports	Exports	Domestic consumption	Ending stocks 2/
			Million SSE gallons 3/			
1986/87	204	781	557	73	1,267	201
1987/88	201	907	416	90	1,223	212
1988/89	212	970	383	73	1,258	233
1989/90	233	652	492	90	1,062	225
1990/91	225	876	327	96	1,174	158
1991/92	158	930	286	108	1,097	170
1992/93	170	1,207	326	114	1,339	249
1993/94	249	1,133	403	106	1,319	360
1994/95	360	1,257	198	117	1,415	283
1995/96	283	1,271	261	130	1,387	298
1996/97	298	1,437	257	148	1,454	390
1997/98	390	1,554	305	148	1,651	449
1998/99 f	449	1,285	351	148	1,688	250

f=Forecast.

1/ Season begins in December of the first year shown.

2/ Data may not add due to rounding. Beginning with 1994/95 ending stocks, stock data includes chilled as well as canned and frozen concentrate juice.

3/ SSE = single-strength equivalent. To convert to metric tons at 65 degree brix, multiply by 1,405.88.

Source: Economic Research Service and Foreign Agricultural Service, USDA.

Table 6--Oranges used for frozen concentrate, Florida 1989/90-1998/99

Season	Orange and Temple production	Used for frozen concentrate		Yield per box
	--Million boxes 1/--		Percent	Gallons 2/
1989/90	111.6	70.1	62.8	1.23
1990/91	154.1	100.4	65.2	1.45
1991/92	142.2	90.6	63.7	1.55
1992/93	189.1	128.3	67.8	1.58
1993/94	176.7	111.7	63.2	1.57
1994/95	208.1	140.8	67.7	1.50
1995/96	205.5	129.3	62.9	1.52
1996/97	228.6	147.8	64.7	1.57
1997/98	246.3	156.4	63.5	1.58
1998/99 3/	194.0	93.4	48.1	1.62

1/ Picking boxes weigh approximately 90 pounds.

2/ Gallons per box at 42-degrees-brix equivalent.

3/ Forecast, March 1999.

Sources: National Agricultural Statistics Service, USDA, and the Florida Department of Citrus.

months of the new marketing year. With the smaller crop this year and strong demand for orange juice, grower prices have improved over last year at this time (table 7). For December through February, grower prices were 73 percent higher than the same period a year ago. Prices should remain above a year ago, as demand should stay firm for the Valencia crop.

Brazil, the world's largest orange juice producer, also had a smaller orange crop and reduced production in 1998 (table 8). Orange juice production is expected to be down 23

Table 7--Processing oranges: Average equivalent on-tree prices received by growers, Florida, 1994-99

Month	1994	1995	1996	1997	1998	1999
	--Dollars/90-lb. box--					
Jan.	3.61	3.29	3.70	3.19	2.63	4.85
Feb.	3.74	3.38	3.89	3.15	3.38	5.27
Mar.	4.00	4.36	5.18	3.99	4.75	5.69
Apr.	4.59	4.52	5.47	4.17	5.15	
May	4.75	4.60	5.77	4.11	5.45	
June	4.77	4.53	6.07	4.02	5.95	
July	--	--	--	--	--	
Aug.	--	--	--	--	--	
Sep.	--	--	--	--	--	
Oct.	2.83	--	--	.75	2.35	
Nov.	3.06	3.27	2.86	1.62	4.88	
Dec.	3.19	3.43	3.10	2.21	4.13	

-- = Not available.

Source: National Agricultural Statistics Service, USDA.

Table 8--Brazilian FCOJ production and utilization, 1991-98

Season 1/	Beginning stocks	Production	Domestic consumption	Exports	Ending stocks 2/
	--Million SSE gallons 3/--				
1991	177	1,334	25	1,390	96
1992	96	1,610	25	1,532	148
1993	148	1,572	25	1,546	148
1994	148	1,583	31	1,482	218
1995	218	1,525	25	1,476	242
1996	242	1,620	24	1,660	177
1997	177	1,954	22	1,778	331
1998	331	1,501	22	1,656	155

1/ Season begins in July.

2/ Data may not add due to rounding.

3/ SSE = single-strength equivalent. To convert to metric tons at 65 degree brix, divide by 1.40588

Source: Foreign Agricultural Service, USDA.

percent from 1997. Smaller production in Brazil and the United States has led to higher prices for U.S. growers and the near-term future price so far this year.

Orange juice exports are expected to remain firm this year. Exports from December through January have been running 30 percent above last year at this time. Major markets for U.S. orange juice include the European Union, Canada, Japan, and Korea.

Grapefruit Production Expected To Be Slightly Lower in 1998/99

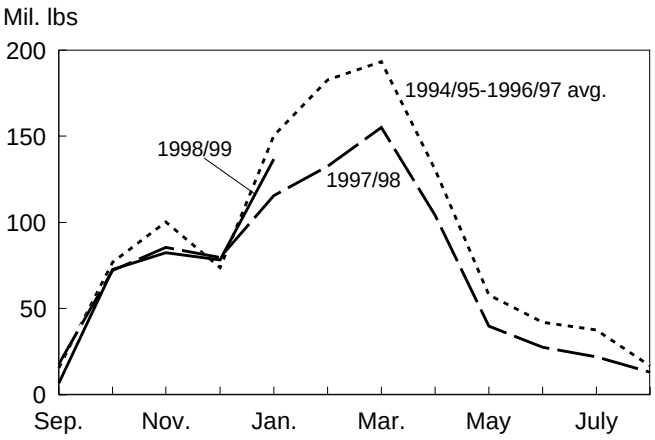
Grapefruit production, forecast at 2.6 million tons, is expected to be down 1 percent in 1998/99 from the previous year (table 9). Production in Florida, which accounts for 80 percent of the crop, is projected to decrease 1 percent. Grapefruit production in California and Arizona also is expected to decline from a year ago. Texas' crop, however, is projected to be up 13 percent.

Florida grapefruit matured later this year than usual, putting harvesting off a few weeks. The late start to this season has kept fresh shipments below the same time last year. However, movement appears strong. Despite starting several weeks late this year, about 47 percent of the fruit had been harvested by the third week in February, almost the same as last year, according to industry statistics. In Florida, about 53 percent of the grapefruit is sold to the fresh market. The remainder goes to processing.

Despite an only slightly smaller crop this year, grower prices appear to be improving over last year's low returns. From October through February, Florida grapefruit growers were receiving an average of 77 percent more for their fruit than a year earlier (table 10). For fresh-market grapefruit, much of the price gain was incurred during the early part of the season when fruit was less available. Now that the season is in full swing, fresh fruit grower prices have come down and are below last year. The improvement in prices is for fruit going to processing. So far this year, growers have been able to recover more of the costs of producing these fruit than they did last year. Retail prices this year have ranged from about 76 cents a pound in September and October to about 54 cents in December to February, running about 12 percent over a year ago.

So far in 1998/99 (September-January), U.S. fresh grapefruit exports were nearly 2 percent higher than the same period a year earlier. Exports have declined 16 percent to Canada, but have increased 5 percent to Japan and 1 percent to the European Union, the destination for about half the exports to date.

Figure 5
U.S. Fresh Grapefruit Exports



Source: Bureau of Census.

Table 9--Grapefruit: Utilized production, 1995/96-1997/98 and indicated 1998/99 1/

Crop and State	Utilized			Forecast for 1998/99	Utilized			Forecast for 1998/99
	1995/96	1996/97	1997/98	as of 3-99	1995/96	1996/97	1997/98	as of 3-99
	--1,000 boxes 2/--				--1,000 short tons--			
Florida, all	52,350	55,800	49,550	49,000	2,225	2,371	2,106	2,083
seedless	51,300	54,900	48,900	48,500	2,180	2,333	2,078	2,062
colored	28,100	31,400	30,600	29,500	1,194	1,334	1,301	1,254
other	1,050	900	650	500	45	38	28	21
Arizona	1,200	900	800	700	40	30	27	23
California	8,100	8,200	9,000	8,000	271	275	301	268
Texas	4,550	5,300	4,800	5,400	182	212	192	216
Total	66,200	70,200	64,150	63,100	2,718	2,888	2,626	2,590

1/ The crop year begins with bloom of the first year shown and ends with completion of harvest the following year.

2/ Net pounds per box: California and Arizona-67, Florida-85, and Texas-80.

Source: National Agricultural Statistics Service, USDA.

Table 10--Grapefruit: Monthly equivalent on-tree prices received by growers, 1995-99

	Florida														
	All					Fresh market					Processing				
Month	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	--Dollars/85-lb. box--														
Jan.	2.12	1.69	2.01	0.77	1.47	3.85	3.04	3.75	3.27	3.20	0.85	0.47	-0.02	-1.85	-0.48
Feb.	2.02	1.68	1.55	.49	1.41	4.10	3.39	3.29	3.46	2.97	1.12	.68	.15	-1.24	.43
Mar.	1.77	1.56	1.10	.22	1.50	3.67	3.41	3.88	3.13	3.67	1.08	.74	.13	-1.00	.54
Apr.	1.32	2.07	.93	.14		2.90	4.67	3.24	2.99		.53	.64	.02	-1.14	
May	1.05	2.29	.56	-.21		2.35	4.26	1.92	2.29		.03	.33	-.01	-1.18	
June	--	--	1.42	--		--	--	2.16	--		--	--	.40	--	
July	--	--	--	--		--	--	--	--		--	--	--	--	
Aug.	--	--	--	--		--	--	--	--		--	--	--	--	
Sep.	--	--	--	--		--	--	--	--		--	--	--	--	
Oct.	4.78	5.24	3.26	3.60		6.24	6.76	4.57	5.48		-.31	-.50	-2.39	-1.85	
Nov.	2.20	2.76	1.53	2.55		3.43	4.20	3.36	4.20		-.43	-.42	-1.88	-1.34	
Dec.	1.49	1.95	1.61	2.07		2.45	3.38	3.77	3.68		.28	-.14	-1.85	-.87	

	Fresh-Arizona					Fresh-California					Fresh-Texas				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	--Dollars/67-lb. box--					--Dollars/67-lb. box--					--Dollars/80-lb. box--				
Jan.	2.10	3.42	2.92	2.62	4.22	5.64	3.92	4.62	3.22	6.12	2.71	5.02	3.75	3.85	5.55
Feb.	3.52	3.82	3.72	3.82	4.92	3.72	3.72	3.82	4.02	6.02	2.68	3.82	2.95	4.85	5.25
Mar.	3.82	3.82	2.50	3.92	5.72	3.89	4.12	3.52	3.92	5.92	3.04	3.62	3.25	4.25	5.25
Apr.	2.62	3.82	3.92	4.32		4.16	4.92	4.82	4.72		2.45	3.32	3.35	4.75	
May	4.32	4.52	4.12	5.92		5.29	7.82	5.52	7.82		1.81	3.32	3.35	4.75	
June	4.92	7.02	3.82	7.82		7.82	6.02	7.22	9.02		--	--	--	--	
July	-4.00	-3.20	2.42	7.52		8.96	4.72	7.32	9.62		--	--	--	--	
Aug.	--	--	--	--		9.02	9.32	7.02	10.02		--	--	--	--	
Sep.	13.42	13.62	--	--		7.62	12.12	7.52	13.82		--	--	--	--	
Oct.	6.42	8.42	--	--		10.02	15.02	3.12	11.72		11.32	6.75	6.45	14.05	
Nov.	4.02	7.82	1.72	--		7.12	7.82	1.42	11.82		7.02	5.05	5.55	9.05	
Dec.	4.32	5.12	2.82	6.92		3.32	5.62	3.42	7.92		5.12	4.25	4.65	8.05	

-- = Not available.

Source: National Agricultural Statistics Service, USDA.

Smaller Lemon Crop Boosts Grower Prices

The lemon crop this year is forecast to total 806,000 short tons, 14 percent lower than last year (table 11). The initial USDA crop estimate made in October 1998 forecast a 3-percent decline from the previous year. The December freeze in California, however, destroyed the entire remaining lemon crop in the San Joaquin Valley, according to the industry, and reduced California's crop by another 14 percent. The San Joaquin crop accounts for approximately 20 percent of California's lemon production. Most of California's lemon crop is planted south of the area affected by the frost. According to industry sources, the remaining crop is expected to provide enough lemons to fulfill summer demand, the peak season for lemon consumption. Arizona's production increased 23 percent this year, after very low levels the past 2 years. New plantings, which are replacing trees lost to disease, have come into production, and are boosting the crop size. Arizona's production accounts for about 15 percent of the lemon crop this year, up 10 percent from the previous 2 years.

Lemon grower prices in California for 1998/99 (August-February thus far) have averaged about 59 percent higher than a year earlier (table 12). Prices started out strong early in the marketing year in response to the forecast smaller crop and have remained above since. Arizona's grower prices averaged over 1 percent higher than last season from August through February. Lemon prices should moderate as the season progresses because of the sufficient supply of southern California lemons.

Specialty Citrus Crops Down in 1998/99

Specialty citrus crops, such as tangerines, tangelos, and Temples, are expected to be smaller for the second year in a row in 1998/99 (table 13). Tangerines, the largest crop among the specialty varieties, are expected down 15 percent to 307,000 tons. Florida, which is expected to produce about

Table 11--Lemons: Utilized production, 1995/96-1997/98 and forecast for 1998/99 1/

State	Utilized			Forecast for 1998/99	Utilized			Forecast for 1998/99
	1995/96	1996/97	1997/98	as of 3-99	1995/96	1996/97	1997/98	as of 3-99
	--1,000 (75-lb.) boxes--				--1,000 short tons--			
Arizona	5,100	2,600	2,600	3,200	194	99	99	122
California	21,000	22,600	22,000	18,000	798	859	836	684
Total	26,100	25,200	24,600	21,200	992	958	935	806

1/ The crop year begins with bloom of the first year shown and ends with completion of harvest the following year.

Source: National Agricultural Statistics Service, USDA.

Table 12--All lemons: State-average equivalent on-tree prices received by growers, 1995-99

Month	Arizona					California				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	--Dollars/76-lb. box--									
Jan.	3.48	1.05	4.16	5.12	10.42	4.23	2.10	4.34	1.83	7.51
Feb.	1.59	.65	2.46	3.72	4.51	2.05	1.85	1.83	1.52	5.62
Mar.	2.59	.18	1.43	5.02	2.47	2.65	2.69	1.98	1.65	4.34
Apr.	--	.12	--	6.92		3.60	4.88	5.28	2.66	
May	--	--	--	--		9.24	7.09	15.34	6.78	
June	--	--	--	--		18.89	11.40	25.14	15.91	
July	--	--	--	--		20.23	13.52	29.44	22.87	
Aug.	25.42	--	--	--		19.13	15.24	24.05	24.67	
Sep.	23.59	15.80	37.20	20.86		15.65	14.16	18.53	19.48	
Oct.	12.07	12.91	19.52	21.01		10.03	9.81	10.55	16.61	
Nov.	5.09	7.99	7.92	15.96		5.97	8.18	4.40	19.62	
Dec.	3.12	5.78	5.82	7.50		3.56	6.74	2.74	7.40	

-- = Not available.

Source: National Agricultural Statistics Service, USDA.

72 percent of this year's tangerine crop, is forecast to have an 11-percent smaller crop than a year ago. As a result of last year's El Niño, this year's crop produced fewer fruit per tree and smaller-sized fruit than a year ago. Although the crop was late maturing, the movement of the smaller sized crop appears strong. Early-variety tangerine harvest was completed by the first week in January, earlier than the past 2 years. The late variety crop was about half utilized by the third week in February, similar to last year. California's crop is forecast down 33 percent from a year ago. About half of California's tangerine acreage was affected by the December freeze, and those tangerines still to be harvested were lost. Arizona is expected to have a 13-percent bigger crop this year than a year ago. Because of the smaller crop this year, tangerine grower prices through February 1999 are averaging 46 percent higher than a year earlier, ranging from $9.02 per box in October to as high as $17.19 in January.

Table 13--Other citrus: Utilized production, 1995/96-1997/98 and forecast for 1998/99 1/

Crop and State	Utilized			Forecast for 1998/99	Utilized			Forecast for 1998/99
	1995/96	1996/97	1997/98	as of 3-99	1995/96	1996/97	1997/98	as of 3-99
	--1,000 boxes 2/--				--1,000 short tons--			
Tangelos:								
Florida	2,450	3,950	2,850	2,600	110	178	128	117
Tangerines:								
Arizona	1,000	550	600	700	37	21	23	26
California	2,600	2,600	2,400	1,600	98	98	90	60
Florida	4,500	6,300	5,200	4,650	214	299	247	221
Total	8,100	9,450	8,200	6,950	349	418	360	307
Temples:								
Florida	2,150	2,400	2,250	2,000	97	108	101	90

1/ The crop year begins with bloom of the first year shown and ends with completion of harvest the following year.

2/ Net pound per box: tangerines--California and Arizona--75; Florida--95; tangelos--90; Temples--90.

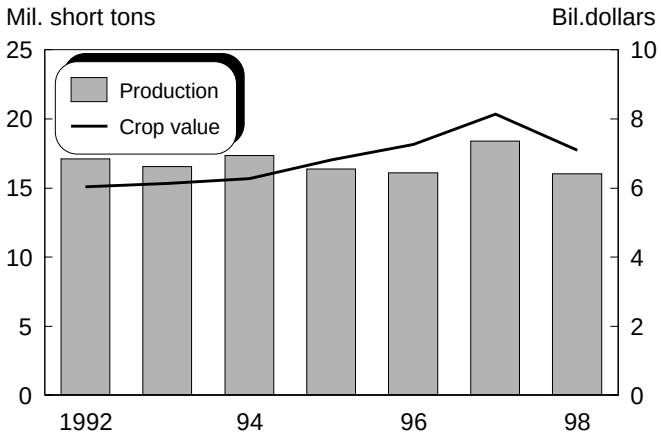
Source: National Agricultural Statistics Service, USDA.

Noncitrus Production in 1998 Declines from Last Year's Record

The 1998 utilized production of noncitrus fruit was estimated at about 16.2 million short tons, down 12 percent from the record output in 1997 (table 14). Heavy winter rains, flooding, and windy conditions, especially in Florida and California, and drought conditions felt in several other States throughout the summer delayed crop maturity and reduced crop size for many noncitrus fruits. Utilized production declined for apricots, avocados, berries, sweet cherries, cranberries, grapes, peaches, pears, and California figs, kiwifruit, nectarines, olives, plums, and prunes. Utilized production increased for apples, tart cherries, California dates, Hawaiian papayas and pineapples, prunes and plums, and strawberries.

The preliminary estimate of the value of noncitrus fruit production in 1998 was $7.1 billion, down 13 percent from the previous year's record. Declines in production more than

Figure 6
Utilized Production and Value of Noncitrus Fruits



Source: National Agricultural Statistical Service, USDA.

Table 14--Utilized production and value of noncitrus fruit, United States, 1996-98

Crop	Utilized production			Value of utilized production		
	1996	1997	1998	1996	1997	1998
	--1,000 short tons--			--1,000 dollars--		
Apples	5,165.0	5,127.2	5,298.6	1,641,462	1,575,403	1,226,380
Apricots	79.3	129.6	107.9	35,171	43,072	35,274
Avocados	190.7	178.3	3/ 143.0	272,784	277,754	3/
Bananas, Hawaii	6.5	6.9	10.0	5,200	5,206	7,000
Berries 1/	117.0	156.9	146.6	218,381	223,901	196,243
Cherries, sweet	151.7	223.5	206.6	223,022	278,511	225,626
Cherries, tart	130.1	141.7	153.1	41,747	44,911	3/
Cranberries	233.6	274.9	269.4	307,827	350,146	4/
Dates, California	23.0	21.0	22.2	25,070	23,100	25,086
Figs, California	45.5	57.5	40.2	12,894	15,209	9,687
Grapes	5,537.3	7,287.4	5,592.0	2,376,111	3,122,195	2,492,306
Guavas, Hawaii	8.2	8.0	3/ 8.1	2,249	1,940	3/
Kiwifruit, California	28.0	31.8	31.6	13,157	16,483	3/
Nectarines, California	247.0	264.0	230.0	116,977	98,895	108,502
Olives, California	166.0	104.0	90.0	102,364	66,801	40,346
Papayas, Hawaii	20.9	19.4	19.5	17,054	18,978	12,370
Peaches	1,021.9	1,254.2	1,175.5	389,894	444,137	442,939
Pears	820.3	1,041.9	923.9	308,367	287,822	276,688
Pineapples, Hawaii	347.0	324.0	332.0	95,914	91,721	92,776
Plums, California	228.0	246.0	187.0	95,831	76,825	98,858
Prunes, California	704.0	627.3	329.6	187,097	163,590	3/
Plums & prunes 2/	18.7	23.7	24.8	8,272	6,481	7,707
Strawberries	813.0	813.9	844.1	768,943	903,350	1,027,929
Total	16,102.7	18,363.1	5/ 16,177.9	7,265,788	8,136,431	7,095,525

1/ Berries include cultivated blueberrries, cultivated blackberries, boysenberries, loganberries, black and red raspberries, and all California raspberries.
2/ Idaho, Michigan, Oregon, and Washington. 3/ NASS data available on July 7, 1999 . The avocado production for 1998 is based on estimates from the California Avocado Commission, Florida Agricultural Statistics Service, and ERS. The guava production estimate is an average of 1996-97 production.
4/ Data available August 17, 1999. 5/ Total estimates based on estimates for avocado and guava production.

Source: National Agricultural Statistics Service, USDA.

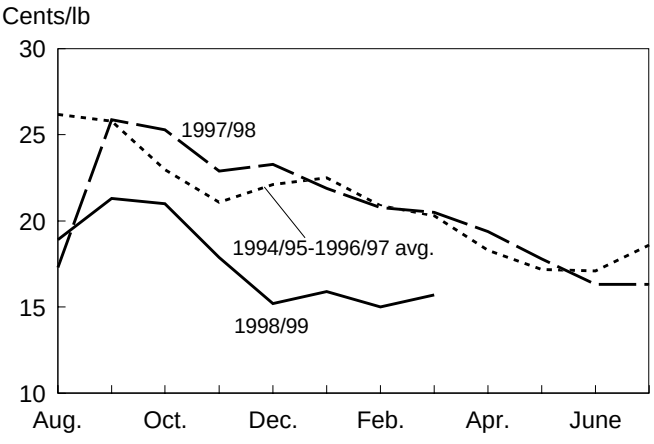
offset increases in price for major noncitrus fruit crops, particularly grapes, peaches, and pears, whose combined value made up 45 percent of the total value of noncitrus fruits in 1998. The decline in the season-average grower price for apples, the second most valuable noncitrus crop in the United States next to grapes, more than offset the increase in production, lowering the value of the 1998 U.S. apple crop by 22 percent from the previous year. For other crops such as apricots, berries, sweet cherries, and California figs and olives, season-average grower prices declined from the year before despite lower production.

Plenty of Fresh-Market Apples in 1998/99, Average Prices the Lowest in the Last 3 Years

USDA will report its estimate of 1998 fresh-market apple production in the United States on July 7, 1999. Based on USDA's January 1999 preliminary estimates, apples produced in Washington, the largest producing State, reached 6.0 billion pounds (fresh and processed) in 1998, 20 percent larger than the year earlier and a record (table 15). While production declined in other important producing States such as New York, Michigan, California, and Pennsylvania during the same year, the 1998 U.S. apple crop was estimated at 10.9 billion pounds, up 6 percent from the previous year and second only to the record crop in 1994.

Typically over 60 percent of U.S. fresh-market apple production comes from Washington. With the record large crop there, fresh-market supplies during the 1998/99 marketing season are likely to exceed the year before and apple prices are likely to average lower. Prices received by growers for fresh-market apples during the 1998/99 marketing season thus far (August-February) have averaged 20 percent lower than the same period a year earlier and 23 percent below the 1994/95-1996/97 average. Increased shipments, especially from Washington, and large supplies remaining in storage as of February 1, 1999, will continue to put downward pressure on apple prices through much of the 1998/99 marketing season.

Figure 7
Fresh-Market Apples: U.S. Grower Prices



Source: National Agricultural Statistics Service, USDA.

According to the U.S. Apple Association, total movement of fresh-market apples as of February 1999 was 9 percent greater than the same period in 1998 and the average of the previous 5 years. The association also reported total U.S. apple stocks on March 1, 1999, to be 12 percent above a year earlier. Apples intended for the fresh market were up 18 percent and processing apple stocks were up less than 1 percent. By region, apple stocks were higher only in the West (up 28 percent) and lower for the other regions: Northeast (down 27 percent), Southeast (down 26 percent), and the Midwest (down 12 percent).

More than 50 percent of the fresh-market apples in storage on March 1, 1999, were Red Delicious, and there were 21 percent more of this variety in storage than at the same time a year ago. Stocks of fresh-market Golden Delicious were up 35 percent, and Granny Smith up 18 percent. Meanwhile, stocks of fresh-market McIntosh apples, grown mostly in the Northeast, were down 52 percent. Increasing in popularity over the last several years, stocks of fresh-market Fuji apples were up 48 percent.

Increased exports will help clear out supplies and help support prices. The volume of U.S. fresh-market apple exports from August 1998 through January 1999 was up 15 percent from the same period the year before, mainly due to sharply higher exports to important markets such as Taiwan, the largest market (up 14 percent), Hong Kong (up 20 percent) and Mexico (up 147 percent). Exports to Canada, the second largest market, were down 12 percent and exports to Indonesia, another important market, fell 70 percent.

Strawberry Supplies Likely To Be Ample in 1999

In the winter of 1998, heavy rains reduced Florida's strawberry production 9 percent from the previous year, to 80,600 short tons (table 16). Because of the smaller winter crop, the 1998 season-average price received by Florida growers rose 21 percent from the previous year. Unlike the previous year, the weather this winter was much drier for Florida's strawberry growers. The crop developed much faster due to relatively warm temperatures, particularly in December when picking began. Because of the lack of cool nights this past December, the early winter crop produced smaller, soft fruit that were more prone to bruising. A 2-day cold snap in early January brought little damage to the winter crop as growers used water sprinklers to protect their fields. Although crop development slowed due to the freeze, fruit quality improved, producing sweeter fruit that could keep longer. Warmer weather toward mid- to late January promoted rapid crop growth, pushing the season about 2 weeks earlier than the previous year. Despite the warm temperatures, both berry size and shipping ability were better than earlier in the season.

Table 15--Apples, commercial crop 1/: Total production and season-average prices received by growers, 1996-98

State and area	Production 2/			Price per short ton		
	1996	1997	1998	1996	1997	1998
	--1,000 short tons--			--Dollars--		
EASTERN STATES:						
Connecticut	10.0	12.0	8.8	648	624	640
Delaware	7.5	3/	3/	370	3/	3/
Georgia	7.5	7.5	5.5	328	274	352
Maine	32.5	32.0	22.0	404	386	422
Maryland	14.5	23.0	17.3	312	400	368
Massachusetts	27.3	30.0	14.0	524	516	566
New Hampshire	19.5	20.3	10.3	448	420	434
New Jersey	30.0	27.5	27.5	302	264	250
New York	515.0	560.0	505.0	270	252	224
North Carolina	100.0	76.0	100.0	240	220	186
Pennsylvania	195.5	267.5	206.0	258	266	242
Rhode Island	1.7	1.8	1.1	502	534	548
South Carolina	15.0	30.0	22.5	276	244	386
Vermont	22.5	25.0	17.3	372	374	388
Virginia	137.5	135.0	140.0	232	212	182
West Virginia	52.5	57.5	52.5	222	206	158
Total	1,188.5	1,305.1	1,149.7			
CENTRAL STATES:						
Arkansas	3.2	3.6	2.3	356	578	454
Illinois	26.5	37.0	22.5	580	392	364
Indiana	24.0	25.0	26.0	536	436	488
Iowa	5.6	6.5	4.4	626	572	618
Kansas	1.0	3.8	0.8	516	370	416
Kentucky	5.3	3.3	5.5	632	522	568
Michigan	350.0	500.0	485.0	252	196	174
Minnesota	10.5	11.0	11.9	920	886	888
Missouri	16.0	26.5	17.0	466	378	356
Ohio	45.0	30.0	40.0	532	442	430
Tennessee	5.5	5.0	6.3	482	476	452
Wisconsin	23.0	24.8	38.1	648	588	546
Total	515.5	676.4	659.7			
WESTERN STATES:						
Arizona	50.0	22.5	21.5	248	214	364
California	475.0	481.0	400.0	332	338	332
Colorado	12.5	17.5	32.5	404	302	298
Idaho	95.0	55.0	90.0	272	278	186
New Mexico	2.5	3.5	4.0	624	678	420
Oregon	78.0	80.0	90.0	182	476	286
Utah	24.0	21.0	24.5	272	330	360
Washington	2,750.0	2,500.0	3,000.0	332	328	208
Total	3,487.0	3,180.5	3,662.5			
United States	5,191.0	5,161.9	5,471.8	318	308	232

1/ In orchards of 100-or-more bearing-age trees.

2/ Includes unharvested production and harvested not sold.

3/ Estimates discontinued in 1997.

Source: National Agricultural Statistics Service; converted to short tons by the Economic Research Service, USDA.

Table 16--Strawberries: Acreage, yield per acre, and production for major States, 1996-98

Crop and state	Acreage			Yield per acre			Production		
	1996	1997	1998	1996	1997	1998	1996	1997	1998
	-- Acres harvested --			-- Short tons --			-- 1,000 short tons --		
Early:									
Florida	6,000	6,100	6,200	13.0	14.5	13.0	78.0	88.5	80.6
Late:									
Arkansas	170	210	180	1.1	3.6	2.3	0.2	0.8	0.4
California	25,200	22,600	24,600	27.0	29.5	29.0	680.4	666.7	701.8
Louisiana	750	450	400	3.8	5.5	7.5	2.8	2.5	3.0
Michigan	1,500	1,500	1,400	2.0	3.3	3.4	3.0	4.9	4.8
New Jersey	450	450	450	1.8	2.2	2.2	.8	1.0	1.0
New York	1,900	1,600	1,600	2.0	2.1	1.9	3.7	3.4	3.1
North Carolina	1,800	1,500	1,600	4.5	6.0	6.3	8.1	9.0	10.0
Ohio	1,000	950	1,000	1.8	1.8	2.6	1.8	1.7	2.6
Oregon	5,200	5,000	4,400	4.6	5.0	5.8	23.9	25.0	25.3
Pennsylvania	1,300	1,400	1,200	2.2	2.3	2.1	2.8	3.2	2.5
Washington	1,300	1,400	1,500	4.1	3.3	4.0	5.3	4.6	6.0
Wisconsin	1,100	1,100	1,100	2.0	2.6	2.8	2.2	2.8	3.1
Total 1/	47,670	44,260	45,230	17.1	18.4	18.7	813.0	813.9	844.1

1/ Totals may not add due to rounding.

Source: National Agricultural Statistics Service and Economic Research Service, USDA.

While both Florida's 1999 planted and harvested winter acreage remain the same as the previous year's 6,200 acres, shipments from Florida were running much higher than a year earlier in December, January, and March. Although shipments were down more than 50 percent during the first week of January due to the 2-day freeze, they were able to recover during the remainder of the month—overall supplies for the month were up 36 percent from a year ago. Shipments came in strong in early February but started to dwindle and fall below a year ago for the rest of the month. As of the third week of March, shipments were running about 14 percent above last year. Free on board (F.o. b.) prices per flat of 12, 1-pint baskets of medium to large strawberries in Central Florida averaged $15-$17 in December 1998, $12-$14 in January 1999, and $7-$8 in early February. In the same 3 months the previous season (1997/98), f.o.b. prices averaged $21-$27, $11-$14, and $12-$14, respectively.

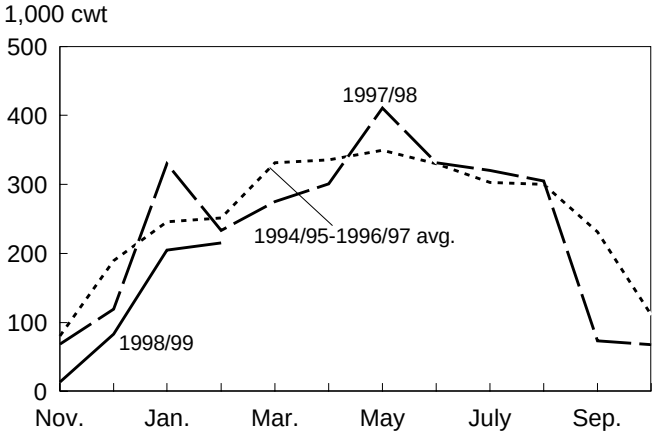
Heavy volume is also expected from California in 1999 where production averages about 83 percent of the U.S. total and supplies are year-round. According to the California Strawberry Commission, planted acreage will be up slightly in 1999. In addition, generally favorable weather thus far has led to normal crop development, good yields, and good-quality berries. In 1998, heavy winter rains not only led to lower yields through much of the first half of the year but also resulted in generally poor quality berries, a large proportion of which were diverted to processors. Assisting in a recovery from lower, poor-quality yields, increased supplies through much of second-half 1998 placed U.S. production at a record 844,050 short tons in 1998, up 3 percent from the previous year. Production utilized for the fresh-market declined 3 percent, to 581,900 short tons, while production for processing rose 23 percent, to 262,150 short tons.

For this year, strawberry shipments from California in January were nearly half the volume of the same period a year ago, but in February, shipments were already more than double. F.o.b. prices per flat of 12, 1-pint baskets of strawberries were running about $14-$28 in January, compared to $12-$16 in January 1998. Prices in February were about $18.5, compared to about $14-$22 the same time last year. Heavy volume likely during California's peak season (April-June) will put some downward pressure on prices. However, expectations of good quality berries from the 1999 California crop will help boost domestic and export demand, offsetting some of the downward pressure on prices. U.S. fresh strawberry consumption likely will rise above last year's 4.12 pounds per person.

Early Estimates Point to a Smaller U.S. Avocado Crop in 1998/99

NASS releases the official U.S. avocado crop estimate for the 1998/99 season on July 7, 1999. However, based on estimates from the Florida Agricultural Statistics Service and the California Avocado Commission (CAC), the U.S. avocado crop may reach only 143,000 short tons, down 13 percent from the previous season. The Florida Agricultural Statistics Service estimates certified shipments from the Florida 1998/99 crop to be 22,500 tons, down 4 percent from the 1997/98 season. Over the previous three seasons, certified shipments have averaged 98 percent of the actual Florida crop as reported by NASS. Hence, estimates of shipment volume are a good indicator of present crop size . Commercial avocado varieties in Florida typically mature from June through March, but most shipments occur from August to December. Through January 1999, approximately 97 percent of the estimated certified shipments had been shipped.

Figure 8
Shipments of Avocados from California



1 hundredweight (cwt) = 100 pounds.
Source: Agricultural Marketing Service, USDA.

The December freeze and pest problems have reduced the size of the California avocado crop for 1998/99. Over 85 percent of the U.S. avocado crop is produced in California, where harvest usually begins in November and continues into the following November (table 17). Based on 1998/99 estimates from the California Avocado Commission, California's production is expected to decline by more than 20 percent from the previous season. Avocado losses from the freeze were estimated at $15.5 million by the California Department of Food and Agriculture.

Because overall domestic supplies in 1998/99 are anticipated to fall short of last season, avocado prices are likely to average stronger. During 1997/98, both fresh and processing supplies declined from the previous year and season-average grower prices rose 8 percent and 41 percent, respectively. So far, 1998/99 shipments from California from November to February have been running much lower than last year, although most of California's shipments usually occur between March and August. February f.o.b. prices (shipping point basis) per 2 layer carton of Hass avocados in Fresno, California, ranged from $42 to $49 for size 48's and $35 to $45 for size 60's. During February 1998, prices ranged from $28 to $33 and $25 to $28, respectively.

The United States has been a net importer of avocados since 1989/90. Import share of domestic supplies has risen from nearly 2 percent of the total during the mid-1970's to over 11 percent during the 1990's. A smaller U.S. crop and higher domestic prices point to higher imports in 1998/99. USDA's Foreign Agricultural Service (FAS) forecast U.S. avocado imports in 1998/99 to increase 26 percent from a year earlier. The largest supplier to the United States is Chile, where production in 1998/99 is forecast up 5 percent from 1997/98, mostly due to favorable growing weather and additional new orchards coming into production. Mexico, the world's largest avocado producer, has increased its importance in the U.S. avocado import market. After the partial lifting of the phytosanitary ban in effect since 1914, Mexican avocado exporters began shipping to the United States in November 1997, but only during November to February each year. Mexico's share of total U.S. avocado imports has risen from about 9 percent in calendar year 1997 to about 13 percent in 1998. Although the Mexican avocado crop in 1998/99 (August-July) is forecast to be 8 percent smaller than the previous season, high-quality supplies are helping Mexico's export market, and export quantity is expected to increase significantly from 1997/98. With the smaller U.S. crop this year, imports from Mexico likely will continue to increase in 1998/99. From November 1998 through January 1999, U.S. imports from Mexico reached

Table 17--U.S. avocado production, by State, 1985/86-1998/99

Crop year 1/	Florida	California	Hawaii	Total
		--1,000 short tons--		
1985/86	28.5	160.0	0.61	189.1
1986/87	24.7	278.0	.65	303.4
1987/88	29.0	180.0	.45	209.5
1988/89	27.0	165.0	.60	192.6
1989/90	33.5	105.0	.55	139.1
1990/91	19.6	136.0	.45	156.1
1991/92	28.3	156.0	.42	184.7
1992/93	7.2	284.0	.35	291.6
1993/94	4.4	139.0	.25	143.7
1994/95	20.0	155.0	.25	175.3
1995/96	19.0	171.0	.25	190.3
1996/97	23.5	167.0	.20	190.7
1997/98	24.0	154.0	.25	178.3
1998/99 2/	23.0	120.0	.23	143.2

1/ Crop years begin: California, November; Florida, June; and Hawaii, January of first year shown.

2/ Estimates from the California Avocado Commission, the Florida Agricultural Statistics Service, and ERS estimates for Hawaii.

Source: National Agricultural Statistics Service, USDA and Hawaii Agricultural Statistics Service.

7,288 short tons (6,611 metric tons), up 54 percent from the same period a year earlier.

Fewer avocados from California and generally higher prices contributed to the 15-percent decline in U.S. avocado exports in 1997/98 (November-October). The European Union (led by the Netherlands), Canada, and Japan remain the top three markets for U.S. avocados. Much stronger exports to Europe, specifically to the Netherlands, Spain, and to the United Kingdom, more than made up for lower exports to almost all other markets. Increased competition from Mexico and another smaller U.S. crop this year likely will dampen exports in 1998/99. FAS forecasts U.S. exports to decline 5 percent from a year ago.

Winter Fresh Grape Supplies Are Rising

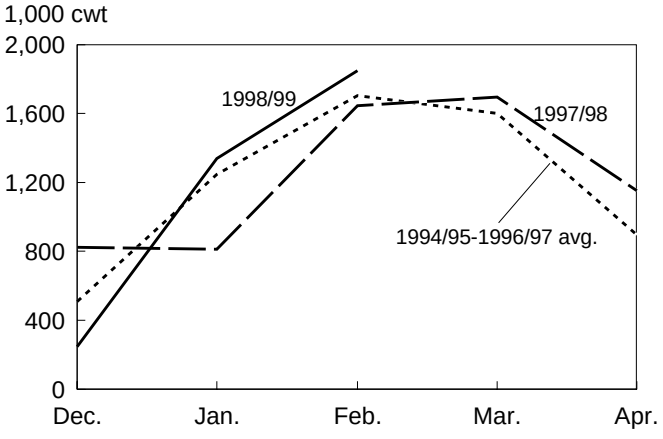
During the Northern Hemisphere winter season, imports dominate the market for fresh grapes in the United States. Virtually all U.S. fresh grape imports during the winter come from Chile. The Chilean export season runs from December through April, with peak shipments usually occurring in March. Grapes are Chile's biggest export crop and most come to the United States. During 1998, grapes accounted for 64 percent of the value of all U.S. fresh and frozen fruit imported from Chile.

Chilean production of table grapes is expected to decline in 1998/99 mostly due to an increasing number of vineyards that have reached the stage of diminishing yields. Smaller economic returns in the past have stalled new plantings. Low replanting rates, mostly of new varieties, and reduced yields from aging vineyards point to a continued decline in production in the next few years.

More than half of Chile's table grape production goes to the export market. Although Chilean production is forecast down in 1998/99, relatively good weather in most production areas improved the quality of the crop this year, supporting only a marginal decline in exports.

So far in 1998/99 (December-January), total U.S. fresh grape imports were up 12 percent from the same period a year earlier. Also, shipment data from USDA's Agricultural Marketing Service shows imports of Chilean grapes were higher than a year ago in January (up 64 percent) and February (up 12 percent).

Figure 9
Shipments of Fresh Table Grapes from Chile



1 hundredweight (cwt) = 100 pounds.
Source: Agricultural Marketing Service, USDA.

Freeze Helped California Stone Fruits Achieve Above-Average Chill Hours

Early indications point to a strong crop of California stone fruits in 1999, particularly for early-variety nectarines and plums. Although the season of frosts and hail is still not past, abundant supplies of good quality fruit are likely. Stone fruit orchards in California have received below-average rainfall so far, but heavy precipitation during the past year have helped maintain water supplies from reservoirs. The orchards actually benefited from the December freeze that caused serious damage to the State's citrus crop. A much colder winter this year provided above-average chill hours for the tree fruits to achieve full dormancy. According to the California Tree Fruit Agreement, these trees have not received the normal chill hours required for full dormancy since 1994. Trees that go through a full dormant stage usually tend to produce strong fruit, meaning fruit that is less susceptible to pest and diseases, less prone to bruising, and has a longer shelf-life. This winter, with 1,331 chill hours, compared to the average 1,100 chill hours, the quality of the fruits potentially could be much improved over previous years, helping to boost the outlook for stone fruit prices and exports in 1999.

As of the third week of March, most varieties of nectarines and plums were past full bloom—the stage when petals start to fall. The very early varieties of nectarines, May Glow in particular, were in full bloom as of the third week of February, followed by Red Beaut plums at the end of the month. In both cases, blooms appeared strong. Cold weather and frost, particularly during the first 2 weeks of February, have slowed the bloom stage, but warmer weather since has helped the buds to swell. While a couple of rainy days occurred during the bloom stage, winds assisted in drying up the blooms as well as the orchard grounds. Hence, fungicide application was not disrupted. The tip of the fruit has started to emerge from the blooms in some of the early-variety (May Glow and Early Glow) nectarines and indications are that there will be enough for a full crop. Both the nectarine and plum crops are developing about 8-10 days behind 1997 and 1996 (stone fruit crops were generally late throughout the season in 1998). However, plenty of chill hours and healthy trees will help narrow the gap between bloom and harvest.

Acreage Reaches New Record, But Production and Value Fall

Bearing acreage of five major tree nut crops (almonds, hazelnuts, walnuts, pistachios, and macadamia) reached a record 761,630 acres in 1998, 2 percent higher than the previous record of 748,600 acres in 1997. (Estimates are not available for bearing acreage of pecans. However, the 1997 U.S. Census of Agriculture shows 10.1 million pecan trees or 519,000 acres of which 8.6 million trees are of bearing age). In spite of the record tree nut acreage, yields were substantially lower because of adverse weather conditions and alternate bearing cycles (table 18).

Production in 1998 for all six major tree nuts, except pistachios, totaled 903,000 tons, in-shell equivalent, down 25 percent from the previous year's record. The value of production for the six tree nut crops also fell sharply to $1.64 billion, 22 percent lower than the 1997 record. Because the value of the 1998 walnut crop is not currently available, the total tree nut value estimate includes a projected value using the 1997 walnut price.

Almond Acreage Continues Up

Bearing acres of California almonds last year continued to rise and hit a record 454,000 acres. This compares with 442,000 acres in 1997 and 428,000 acres in 1996. Yield per bearing acre in 1998 decreased sharply to 1,150 pounds, which reduced production to 520 million pounds, shelled basis. The 1998 crop was 31 percent lower than the record 1997 output but 2 percent larger than the crop harvested in 1996. Beginning stocks on August 1, 1998, were above average at 172 million pounds, partially offsetting the smaller new crop supply for the 1998/99 season.

Due to the smaller supply, grower prices rose to $1.80 per pound compared with $1.56 during the 1997/98 season and $2.08 in 1996/97. Even though grower prices were up significantly, the smaller production reduced total almond cash receipts for growers to $898 million, down 23 percent from 1997 and 12 percent less than in 1996. Refer to table 19 for almond handler f.o.b. prices during 1998 and prices for other tree nuts.

Table 18--Tree nuts: Acreage, yield per acre, production, and price, 1996/97-1998/99

Commodity and year	Bearing acreage	Yield per acre	Production	Grower price
	Acres	Pounds	1,000 lbs.	$/pound
Almonds 1/				
1996/97	428,000	1,190	510,000	2.08
1997/98	442,000	1,720	759,000	1.56
1998/99	454,000	1,150	520,000	1.80
Macadamia nuts				
1996/97	19,200	2,940	56,500	.78
1997/98	19,200	3,020	58,000	.75
1998/99	19,200	2,760	53,000	.67
Pistachios				
1996/97	64,300	1,630	105,000	1.16
1997/98	65,400	2,750	180,000	1.13
1998/99	65,900	2,850	188,000	.99
Hazelnuts				
1996/97	28,600	1,320	38,000	.43
1997/98	29,000	3,240	94,000	.45
1998/99	29,530	1,040	31,000	.49
Walnuts				
1996/97	192,000	2,160	416,000	.79
1997/98	193,000	2,780	538,000	.72
1998/99	193,000	2,360	454,000	2/
Pecans				
1996/97	--	--	209,500	.64
1997/98	--	--	335,000	.77
1998/99	--	--	155,050	1.23

-- = not available.

1/ Shelled basis. 2/ Available July 7, 1999.

Source: National Agricultural Statistics Service; converted by the Economic Research Service, USDA.

Table 19--Free-on-board tree nut prices, 1997-98

Month	Almonds		Pecans		Hazelnuts	
	Nonpareil supreme		Fancy halves		Large	
	1997	1998	1997	1998	1997	1998
	--Dollars per pound--					
Jan.	3.00-3.05	2.05-2.15	2.40	2.70	1.90	2.19
Feb.	3.00-3.10	2.05-2.15	2.40	3.00-3.20	1.97	2.19
Mar.	3.00-3.10	2.05-2.15	2.90-3.00	2.90-3.15	2.39	2.19
Apr.	3.00-3.10	2.05-2.15	2.95	2.90-3.15	2.39	2.40
May	3.05-3.15	2.10-2.15	3.00-3.15	2.90-3.10	2.39	2.40
June	3.00-3.05	2.10-2.15	3.00-3.15	2.90-3.10	2.39	2.40
July	3.00-3.10	2.30-2.40	2.95-3.00	2.75-3.20	2.88	2.40
Aug.	2.00-2.10	2.35-2.40	3.45-3.50	2.75-3.20	2.88	2.40
Sep.	2.05	2.30-2.35	3.45-3.50	3.30-3.40	2.85	2.40
Oct.	1.95-2.00	2.30-2.40	3.45-3.50	3.50-3.60	2.00-2.05	2.40
Nov.	2.02-2.15	2.20-2.40	3.75-3.90	3.50-3.60	2.48	2.40
Dec.	2.05-2.15	2.20-2.40	2.85	3.85-4.00	2.48	2.40

	Macadamia nuts		Walnuts		Pistachios	
	Style 2		Light halves and pieces		U.S. No. 1 21/25 Ct.	
	1997	1998	1997	1998	1997	1998
	--Dollars per pound--					
Jan.	5.10-5.15	5.00-5.25	2.85-3.10	2.15-2.20	2.35-2.40	2.00-2.05
Feb.	5.10-5.15	4.90-5.00	2.95-3.00	2.10-2.15	2.35-2.45	2.00-2.05
Mar.	5.10-5.15	4.90-5.00	3.00-3.10	2.05-2.15	2.35-2.30	2.00-2.05
Apr.	5.00	4.50-4.60	3.00-3.10	1.85-2.15	2.30-2.35	2.00-2.05
May	5.00	4.50-4.60	3.00-3.10	1.90-2.00	2.20-2.25	2.00-2.05
June	5.00-5.05	4.50-4.60	2.90	1.90-2.00	2.20-2.25	2.00-2.05
July	5.00-5.05	4.50-4.60	2.90-3.00	1.90-2.00	2.10-2.15	2.00-2.05
Aug.	5.00-5.05	4.50-4.60	2.70-2.90	1.90-2.00	2.00-2.05	1.85
Sep.	5.00-5.05	4.50-4.60	2.60-2.70	1.80-1.90	1.95-2.05	1.85
Oct.	5.00-5.05	4.50-4.60	2.35-2.40	1.70-1.75	1.95-2.05	1.80-1.85
Nov.	5.00	4.50-4.60	2.35-2.40	1.85-2.00	1.95-2.05	1.80-1.85
Dec.	5.00-5.25	4.50-4.60	2.15-2.30	1.85-2.00	1.95-2.05	1.80-1.85

Source: Food Institute Report, January, 1999.

The 1999 almond harvest in California is likely to be significantly higher due to more favorable weather this spring during the bloom period, which will enhance pollination, and due to the alternate-bearing nature of the almond tree and higher bearing acreage. The first forecast for the 1999 California almond crop will be issued in USDA's May 12 Crop Production report.

The February 1999 almond industry report, by the Almond Board of California, showed domestic shipments from August 1, 1998, to February 28, 1999, totaled nearly 101 million pounds, down 5 percent from the same period a year earlier, while export shipments totaled 260 million pounds to date, down 15 percent. The computed inventory as of March 1,1999, stood at 300 million pounds, of which 139 million pounds are commitments (sold, but not delivered) and 161 million pounds are uncommitted inventory. If almond demand continues steady in domestic and international markets, ending stocks could be about 100 million pounds, much lower than the previous season and less than one-half of ending stock levels in the late 1980's.

So far this season, export shipments have been significantly lower to all regions of the world. However, exports are expected to pick up as supplies from the rest of the world diminish. U.S. almonds should continue to be very price competitive in major markets due to reduced availability and higher prices in competing countries. Preliminary production and distribution estimates indicate that supplies in foreign countries fell sharply, as did the U.S. supply. Production was lower for Greece, Italy, Morocco, and especially Spain, but higher for Turkey (table 30). The world supply, demand, price situation likely will change greatly when new crop supplies enter U.S., European, and other major markets beginning in August this year.

Pistachio Acreage and Production Set Records, Price and Value Slip Lower

California pistachio-bearing acreage in 1998 increased to a new high of 65,900 acres, while yields reached a record 2,850 pounds per acre. The result was a record crop of 188 million pounds, in-shell basis. With the grower price decreasing 14 cents to $0.99 per pound, the crop value fell 8 percent, to $186 million. In 1999, the pistachio harvest is likely to be substantially lower since the trees will be in an off year of the production cycle. The pistachio tree is alternate bearing in its physiological nature, producing heavy yields one year and then resting or building reserves and producing a light crop the following year. However, there have been two occasions when a record crop was followed by even a larger crop. In 1992, a record crop of 147 million pounds was set,

but 152 million pounds followed in 1993. Another record was set in 1997 at 180 million pounds, but this was followed by a crop of 188 million pounds in 1998. Biologists can not fully explain these anomalies, but it appears that the pistachio is virtually always alternate bearing in countries outside the United States. In the United States, where cultural practices are superior, growers are using scientific measures to mitigate production down-cycles.

According to the California Pistachio Commission (CPC), in-shell domestic and export shipments are higher this season than the record levels established the previous season. Of the total open in-shell shipments to date, domestic shipments account for 63 percent of the total, and export shipments to date account for 37 percent of the total. Shipments of loose kernels and shelling stock to domestic markets are up, but sluggish to export markets.

The CPC reports an in-shell inventory of 72 million pounds on hand as of February 28, 1999, modestly above a year earlier, but 37 million pounds of the inventory are reportedly committed at this time. The projected carryover stocks of 35 million pounds would help to moderate a smaller expected crop in 1999. In addition, CPC reports an ending inventory of closed shell pistachios of 24 million pounds and shelling stock of 5 million pounds.

In 1998, pistachio production was reportedly well above average in Syria and Iran, the world's largest producer, but lower in Turkey and Italy. According to an industry report, Iranian production was reported by Iran's Ministry of Agriculture at 440 million pounds in 1998, nearly three times the small production in 1997 which was hit by a spring freeze. The 1998 Iranian crop was the fourth highest on record. Turkey's production was reportedly off substantially in 1998, to 55 million pounds, while Syria's crop more than doubled that of a year earlier, to 79 million pounds. Production in Greece remained steady at 11 million pounds. Total world production then approximated 732 million pounds in 1998, compared with 471 million pounds in 1997. Total world production was nearly the same as the 781 million pounds produced in 1995, but below the world record of 832 million pounds set in 1993. There is no further official information available at this time on the final outcomes of harvested production in these countries.

Pecan Production Sharply Lower and Prices Higher

The preliminary estimate for pecan production in 1998 is 155 million pounds, in-shell basis, substantially lower than the 335 million pounds harvested in 1997, and well below the 1996 crop of 210 million pounds. Production of improved varieties (improved pecans) decreased 38 percent to 125 million pounds, while production of seedling and native pecans dropped 77 percent to about 30 million pounds. Production was lower in all 14 commercial pecan producing States, except North Carolina and Louisiana.

Grower prices also increased for improved pecans to a preliminary estimate of $1.34 per pound in 1998/99, in-shell basis, compared with $0.93 in 1997/98 and $0.69 in 1996/97. The preliminary grower price for the native and seedling pecans is estimated at $0.77 per pound for the 1998/99 season, in-shell basis, compared with $0.53 the prior season and $0.46 in 1996/97. These prices resulted in a total crop value in 1998 of $191 million, compared with $259 million in 1997 and $134 million in 1996. These preliminary production, price, and value estimates will be updated and published in the USDA's Noncitrus Fruits and Nuts, 1998 Summary report to be issued on July 7, 1999.

Beginning stocks for all pecans on July 1, 1998, were nearly 99 million pounds, shelled-equivalent basis. With a new-crop supply of about 62 million shelled pounds and 35-40 million pounds of imported pecans, the pecan supply will total nearly 200 million pounds, down approximately 17 percent from the previous season. Imports of all pecans (shelled and in-shell) totaled 25 million pounds, shelled equivalent, from July 1 to December 31, 1998. This compares to total equivalent imports of 15.2 million pounds for the same period last season. Cold storage stocks of pecans in all warehouses on January 31, 1999, were 23 million pounds shelled, moderately lower than the previous year, and in-shell pecan stocks were much lower, at 123 million pounds. The net result is that the shelled equivalent of all pecans in storage in January 1999 was 84 million pounds, 19 percent lower than on January 31, 1998. This result indicates that domestic and export markets may be slowly absorbing the smaller new-crop supply at much higher prices, and some of the supply deficit has been offset by higher imports. Also, it may indicate increased competition with walnuts in domestic markets due to more favorable prices for walnuts.

Walnut Acreage Steady, Production Declines

Bearing acreage of California English walnuts remained unchanged in 1998 at 193,000 acres. Yield per bearing acre fell substantially from the previous year to 1.18 tons per acre, but slightly higher than the 1996 yield. Harvested production was 227,000 tons, in-shell basis, compared with the record crop of 269,000 tons in 1997 and 208,000 tons in 1996.

In-shell shipments from August 1, 1998, to February 28, 1999, totaled 107 million pounds, down 4 percent from the same period a year ago. Domestic shipments of in-shell walnuts are up about 7 percent while export in-shell shipments are down 6 percent. Shelled shipments during this period totaled 101 million pounds, compared with about 97 million the previous year. Both domestic and export shelled demand have been a little higher this marketing season. The net result

of all shipments shows 176,000 tons, in-shell equivalent, have been shipped to all markets, compared with 173,000 tons last season. Domestic demand has been 105,000 tons, 5 percent higher, while export demand has been 71,000 tons, nearly unchanged. The improvement in domestic demand stems mostly from manufacturers' resistance to much higher priced pecans. Manufacturers are substituting, where possible, more favorably priced walnuts. The sluggish export demand is due to record world supplies. Demand should improve as the season progresses and the supply decreases. The available supply from other countries, like China, India, and Turkey, is a relatively short-lived situation in the fall-winter period that can create a temporary glut in some regional markets. Generally, most countries do not have the same storage and shipping capabilities as the United States, nor is the walnut quality as high as the U.S. product.

The 1998 walnut production in China was a record 255,000 metric tons, in-shell basis. China exceeded the United States in walnut production for the first time in 1997. Other walnut-producing countries such as Turkey, India, France, and Chile also harvested higher production last year. Only Italy and the United States produced smaller crops in 1998 (table 31).

Hazelnut Acreage Still Increasing, Production and Value Fall

U.S. hazelnut production in 1998 fell to 15,500 tons, in-shell basis, in spite of record bearing acreage of 29,530 acres. Weather-related causes and the alternate bearing cycle of this tree nut caused the low yield of 0.52 tons per acre. Grower prices increased substantially to $983 per ton for the 1998/99 marketing season, compared with $899 in 1997/98 and $860 in 1996/97.

Due to the much smaller available supply, domestic in-shell shipments to date (July 1, 1998-January 31, 1999) have been lower. Export in-shell shipments also have been substantially lower this season. Similarly, shipments of kernels have been much smaller to both domestic and export markets than a year earlier, but also below the 1996/97 season when a comparable small crop supply situation occurred.

Turkey, the world's largest producer of hazelnuts, harvested a bumper crop of 625,000 metric tons, in-shell basis. The Italian crop also jumped to 130,000 tons. Only Spain and the United States harvested smaller crops (table 32).

Macadamia Nut Acreage Steady, Production and Price Lower

Hawaiian macadamia nut production in 1998 fell to 53 million pounds, in-shell wet basis, due to a lower yield of 2,760 pounds per acre. Drought-like conditions for most of 1998 in the major growing areas of Kauai and South Kona were mainly responsible for this season's lower output. Bearing acreage held steady at 19,200 acres. Total acreage in crop production remained at 20,200 acres or 1.52 million trees of which 95 percent were 6 years or older. Some macadamia nut tree planting was ongoing during the year while some growers abandoned acreage and others replaced macadamia nut trees with coffee trees.

Production in 1998 was lower than 1997 or 1996, but higher than 1994 and 1995. The estimated grower price fell to $0.67 per pound, compared with $0.75 in 1997 and $0.78 in 1996. Growers and processors are pointing to increased world production, weakness in the Asian economy, and more aggressive marketing of foreign nuts in the United States as reasons for the lower returns. As the U.S. crop declined in 1998, Australian production increased and surpassed the United States for the first time. Production in the rest of the world also increased (table 33).

Integration, Coordination, and Concentration in the Fresh Fruit and Vegetable Industry

Carolyn Dimitri[1]

Abstract: There is a widely held perception that contracts in the fresh fruit and vegetable industry are changing, and that both vertical and horizontal integration and coordination are playing larger roles. This paper examines available data and anecdotal evidence, and finds that severe data shortages make it difficult to confirm or refute general perceptions.

Keywords: Vertical integration, vertical coordination, horizontal integration, horizontal coordination, contracts, concentration, fresh fruits and vegetables.

Introduction

Agricultural economists, policymakers, and members of the horticultural industry are concerned about structural change —specifically, changing contractual relationships among firms that grow, move, and sell fresh fruits and vegetables —and the effect on profits, food quality, and consumer well-being. While these kinds of concerns about market structure have long been present in the broiler, livestock, and processed foods industry, they are just now emerging in the fresh fruit and vegetable industry. The recent focus on market structure in horticulture appears to be driven by several striking trends. First, anecdotal evidence suggests that marketing contracts, production contracts, strategic alliances, and mergers are becoming more common. Second, firms are changing, and these changes are "big"—farms are bigger, wholesalers are bigger, and retailers are bigger. At the same time, consumer demand for a wide variety of high quality fruits and vegetables is growing. As a result, retailers are devoting an increasing amount of their limited shelf and floor space to the fresh produce department.

Reaction to these phenomena has focused on how structural change affects market concentration at each level of the marketing chain, and on business practices between suppliers and retailers. Policymakers are trying to understand the connection between changing market structure and the observed new kinds of contracts, representing new relationships among growers, wholesalers, brokers, and retailers. By contract, we mean a formal or informal agreement between two parties that is costly to break, where the cost can be either a monetary penalty or lost future business.

[1]The author is an agricultural economist with the Economic Research Service of the U.S. Department of Agriculture. The author thanks Linda Calvin, Gary Lucier, Phil Kaufman, and Barry Krissoff for helpful comments and suggestions.

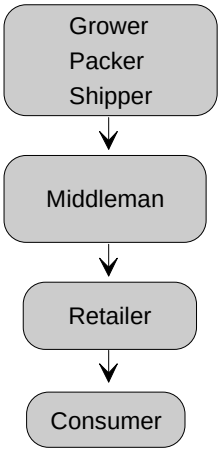
Contractual relationships are important, because they ultimately determine how growers, middlemen, and retailers share production risk and price variability, and influence both the distribution of and level of quality available in the market. Finally, these contracts also affect consumer prices. In other words, contractual form influences consumer well-being (through retail prices and quality available) and industry well-being (through profits, market share, and market access), making understanding horticultural market structure a pressing policy issue.

Contracts, Coordination, and Integration

The movement towards larger firms has evolved in two basic ways—through direct ownership, by which firms grow larger, or through agreements, by which firms are effectively larger. The first case is known as integration, which refers to mergers or acquisitions, where one firm purchases the assets of another firm. In the second case, known as coordination, firms gain access to larger markets, a wider product line, or higher quality produce through formal or informal agreements. Firms will agree to integrate or coordinate when they expect that doing so will ultimately result in higher profits. What is not as clear, however, is how changing contracts at one level of the marketing chain affect consumers and firms at other levels of the marketing chain. Figure A-1 shows a stylized version of the path fresh fruits and vegetables follow from farm to consumer. The journey begins at the shipping point, where fresh produce is grown, packed, and shipped. Next, fresh produce passes through middlemen, either wholesalers or brokers, then to retailers, and finally to consumers.

Horizontal integration refers to mergers within one level of the marketing chain, such as retailers merging with other retailers or shippers merging with other shippers. Similarly, horizontal coordination takes place within one level of the

Figure A-1
Fresh Fruits and Vegetables: From Grower to Consumer



farm-to-market chain, for example, wholesalers making agreements with other wholesalers or shippers making agreements with other shippers. Vertical integration refers to mergers between two levels of the marketing chain, for instance, between wholesalers and retailers or shippers and packers. In the same vein, vertical coordination refers to agreements between two levels, for example, between shippers and growers.

Understanding coordination and integration requires a grasp of both the law and economics. Whether a proposed merger can take place or whether a particular contract is valid is ultimately a legal decision. The law, however, leans on economic factors when deciding whether a particular merger or contract should be allowed, and relies on the ideals that businesses should have the opportunity to compete fairly and that consumers should have access to a wide variety of products at low prices. These principles have been manifested in three acts, referred to as the "Magna Carta of Free Enterprise": the Sherman Act, Clayton Act, and Federal Trade Commission Act (Posner, 1998). The Federal Trade Commission (FTC) and Department of Justice enforce these three acts, plus the Robinson Patman Act, which regulates firms' pricing schemes (Shenefied and Stelzer, 1996).

When deciding whether to allow a particular horizontal merger, such as a proposed supermarket merger, either the Federal Trade Commission or the Department of Justice examines the market to determine if the merger is likely to reduce competition. If there is evidence of a possible reduction in competition, the FTC uses its 1992 guidelines to assess the economic impact of the proposed merger.[2] This assessment is based on market conditions, including concentration, before and after the merger. If concentration is expected to rise significantly, the newly merged firm may have the ability to restrict supply into the market or to raise consumer prices.

The first part of the market analysis, according to FTC guidelines, defines which market the merger affects, and considers all substitute goods and services. Next, FTC economists establish the relevant geographic market that would be affected by the merger. If the industry is not concentrated, the FTC will allow the proposed merger to take place. If the analysis reveals that the industry is moderately or highly concentrated, analysts estimate how easily new firms can enter the industry, and how likely new entry will be. Depending on the results of the analysis, the FTC may either permit the merger, or require the firms to agree to change some terms of the merger agreement.

Vertical integration, which might be a merger between a wholesaler and a retailer, also comes under the jurisdiction of the FTC. The Sherman Act prohibits vertical mergers and price agreements that restrain trade. Yet, in practice, it is quite difficult to assess the impact of most vertical agreements, with the exception of two situations. Mergers that increase barriers to entry may not be allowed, since increased barriers to entry may lead to higher consumer prices. Also, the FTC prohibits mergers that facilitate collusion, since collusion might force a competitor to leave the industry, which potentially increases consumer prices. Other contractual agreements, such as price and non-price restraints, such as setting minimum prices, exclusive territories, and customer restrictions, potentially harm consumers by preventing prices from being competitively set. Most forms of price restraints violate the letter of the Sherman Antitrust Act, but in practice, enforcement takes place on a case-by-case basis, using "rule of reason" as the guideline (Shenefied and Stelzer, 1996).

These kinds of contractual relationships–horizontal and vertical integration, and coordination–potentially make some firms and consumers worse off. On the other hand, these contracts may provide benefits to consumers and firms. Horizontal integration may make it possible for firms to take advantage of economies of scale, and undertake an investment that would be prohibitively costly for a smaller firm. For example, large Washington D.C. area supermarkets such as Safeway and Giant have invested in expensive on-site banana ripening facilities, which make it possible for consumers to have access to uniformly ripe bananas year-round (Washington Post, February 5, 1999).

Vertical integration offers similar benefits by reducing the likelihood of one party taking advantage of another. For example, suppose a grower produces a commodity for a particular shipper, one that meets specific quality standards or requirements (such as an organic apple). After harvest, there may be an incentive for a shipper to decide not to purchase the good or to pay an extremely low price. Unless the grower has another buyer nearby, ready to buy the specific

[2]The guidelines are online at http://www.ftc.gov/bc/docs/horizmer.htm.

product, the grower may realize a loss. As a result, the grower may choose to produce a less-specialized, more easily marketable commodity. If the grower and shipper were vertically integrated, it would be less likely that the shipper could take advantage of the grower, and so the specific product would be grown. As a result, consumers will be better off. In general, consumers will benefit from vertical integration whenever production requires or generates a specific asset (Hart, 1995; Willamson, 1985).

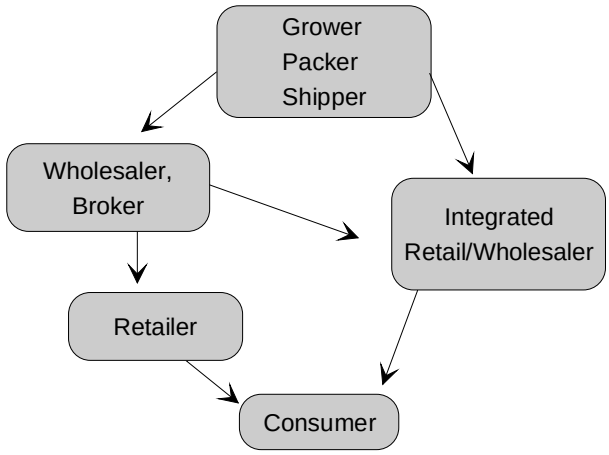
In general, most agricultural commodities grown under contract are produced by coordinated (rather than integrated) firms. For example, most fresh market lettuce and carrots, and virtually all processed vegetables, are grown under contracts specifying a coordinated production process. The contract typically specifies which seeds to use, the varieties to grow, which fertilizer and other chemical inputs to use, and may even specify that the contracting firm provide these inputs to the grower. In addition, the contracting firm usually monitors crop growth by periodically inspecting the fields. The firm may also harvest, pack, and market the crop. After harvest, the contracting firm frequently performs laboratory tests, for quality, on the crop. Shippers enter these kinds of contracts to control quality, as well as to lock in a supply of high quality produce. Another motivation for coordination is to make certain commodities such as tomatoes and lettuce available year-round. In this case, shippers may contract with growers in different domestic and international regions. For example, West Coast lettuce production shifts from Salinas, CA to Huron, CA to Yuma, AZ, while East Coast tomato production shifts from various counties in Florida to South Carolina to Maryland or Virginia. Florida firms may also coordinate with Mexican producers (Wilson, Thompson, and Cook, 1997).

From Grower to Consumer—The Changing Marketing Chain

Figure A-2 provides a stylized version of the fresh fruit and vegetable marketing chain. The first stage—production and preparing produce for shipment–comprises the grower, packer, and shipper. There are many possible combinations of growing, packing, and shipping. In some cases, one firm grows, packs, and ships, for example, while in other cases one firm grows and another packs and ships. At this point, produce can either be sold to retailers by a broker or delivered to the terminal market, where it is sold to retailers by wholesalers. A retailer's choice about whether produce should be purchased from a broker or a wholesaler depends on a number of factors: quality of produce available, prices, varieties available, reputation of seller, and any long-term relationship between the seller and buyer.

There are some instances when a specific variety, quality, or quantity is desired. In these cases, retailers may buy directly from the shipping point to make sure their needs are met. The practice of direct buying began in the early 1920's,

Figure A-2
Fresh Fruit and Vegetable Marketing Chain



when national supermarket chains first appeared (Manchester, 1964). The practice continued to grow as local and regional chains began purchasing directly from the shipping point. By 1936, 12 percent of the produce delivered to terminal markets had been purchased before delivery. In 1936, however, all fresh fruits and vegetables were delivered to terminal markets, even the shipments that were purchased directly from the shipping point.

To facilitate transactions and reduce costs, large retailers began creating central buying systems, which included hiring produce buyers and building produce warehouses. And by 1958, all three national chains, plus five regional chains, had a system for central buying, and were buying at least some of their produce directly from the shipping point. Larger firms bought more produce directly from the shipping point, and subsequently bypassed the middleman part of the chain. In 1958, all chains with sales exceeding $100 million purchased at least some produce directly, national chains purchased 70 percent of their produce directly, and regional chains bought 52 percent directly. The emergence of supermarket-owned warehouses changed the marketing chain, as these large retailers now had the facilities to act as their own wholesalers (Manchester, 1964).

Retailers were now able to purchase produce through independent brokers, from wholesalers in the terminal market, or by using their own salaried buyer to purchase shipments to be delivered to their warehouses. Integrating reduced transaction costs of purchasing fresh fruits and vegetables because retailers could purchase large quantities directly from one or two suppliers rather than buying from many small suppliers. Other benefits included the possibility of developing long-term relationships with growers, the potential to increase profits by circumventing traditional wholesalers and brokers, and the ability to acquire produce with specific characteristics. Growers and suppliers, in particular

those with large crops, were able sell to one or two large buyers, rather than relying on many smaller buyers in the terminal market. These growers and suppliers also benefited from establishing long-term relationships with buyers–disputes over quality were more easily solved when dealing with a firm that was a consistent trading partner.

Anecdotal evidence suggests that the tendency to purchase fresh produce directly from the shipping point has increased as the number of large retailers has grown. Confirming this notion is difficult, because there is little data describing the flow of produce from farm to consumer. There are only three comprehensive studies that give a picture of fresh fruit and vegetable marketing channels. The first was an ERS study done by Manchester in 1958 (and published in 1964), and the others, by McLaughlin, which examined the industry in 1993 and 1996. In addition, there are two other studies from 1973 and 1982, cited by McLaughlin in his 1994 work. Despite the different sources and the data shortage, these studies give us some insight into industry-wide trends. For example, the proportion of produce purchased directly from shippers increased until 1993, when over half of the fresh produce was purchased directly (table A-1); this share decreased to 41 percent just 3 years later. The share sold through brokers declined from 1982 on, while the share sold through the terminal market fell to 20 percent in 1993, but increased to 34 percent in 1996.

The share of produce purchased directly from the shipping point by the largest firms exceeds the share purchased by the smaller firms (table A-2). In 1993, the largest supermarkets (those with annual sales exceeding $1.5 billion) purchased 93 percent of their produce directly from the shipping point. Smaller supermarkets (those with sales less than $300 million) purchased 65 percent from the shipping point. In 1996, the largest supermarkets purchased 84.5 percent directly from the shipping point. Mid-sized supermarkets (those with annual sales between $300 million and $1.5 billion) purchased 63.4 percent, and smaller supermarkets, 34.8 percent. These statistics indicate that direct purchasing decreased for all supermarkets from 1993 to 1996, but the decline is greater for the smaller supermarkets. The reason for the decline is not readily apparent, and it is also unclear whether the decreasing trend will continue. The data describing changes in the flow of produce over time suggest that there is a strong relationship between the size of the retailer and the way in which fresh fruits and vegetables are purchased.

Table A-1--Proportion of produce purchased from shippers, brokers, and through the terminal market

Year	Shipper	Brokers	Terminal market
		Percent	
1973	39.0	28.5	32.5
1982	40.9	33.9	27.0
1993	53.0	27.0	20.0
1996	41.1	24.6	34.3

Note: The original source for the 1973 and 1982 data is Marcom Research, as reported in McLaughlin and Perasio, 1994. The shares for 1982 sum to more than 100 percent.

Source: *Fresh Fruit and Vegetable Procurement Dynamics: The Role of the Supermarket Buyer*, McLaughlin and Perasio, 1994; *Marketing and Performance Benchmarks for the Fresh Produce Industry*; McLaughlin, Park, and Perasio, 1997.

The Farm Level: Growers

There has been a general movement toward fewer, larger farms in the vegetable and fruit industries. Figure A-3 shows average size of vegetable farms and orchards. According to the Agricultural Census, average vegetable farm size increased at each 5-year interval between 1982 and 1997. Only farms greater than 250 acres increased in number throughout the period (figs. A-4 and A-5). The number of farms between 50 and 250 acres increased until 1992, but were fewer in 1997. All but the smallest farms, those with less than 1 acre, declined in number between 1982 and 1997, and the smallest farms increased in number after 1987. The data lend support to the perception that the industry is moving toward producing most vegetables on large

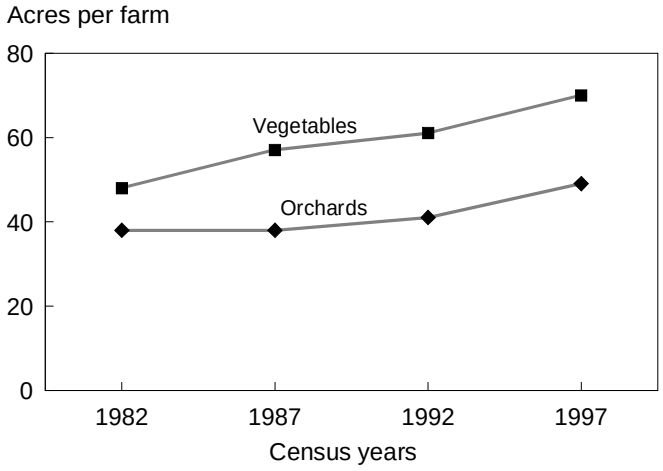
Table A-2--Proportion of produce purchased directly from shipping point by Supermarket size

Size by annual sales	1993	1996
	Percent	
More than $1.5 billion	93	84.5
$300 million - $1.5 billion	na	63.4
Less than 300 million	65	34.8

na = Not available.

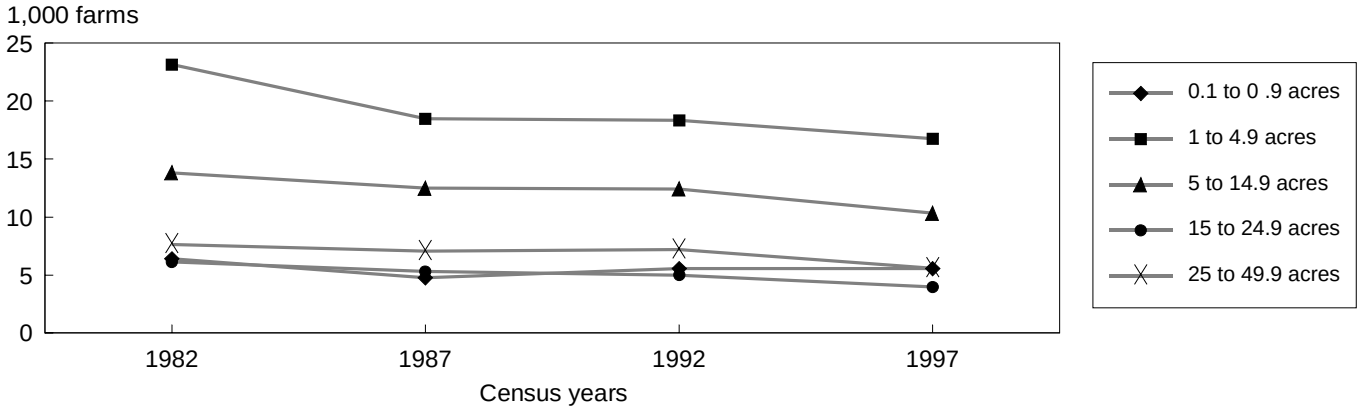
Source: *Fresh Fruit and Vegetable Procurement Dynamics: The Role of the Supermarket Buyer*, McLaughlin and Perasio, 1994; *Marketing and Performance Benchmarks for the Fresh Produce Industry*; McLaughlin, Park, and Perasio, 1997.

Figure A-3
Average Orchard and Vegetable Farm Size



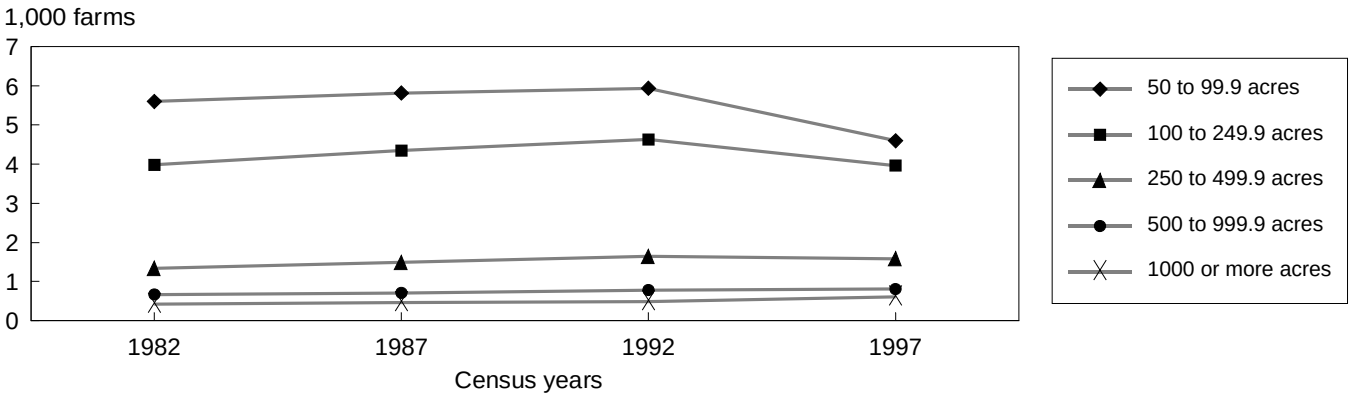
Source: Census of Agriculture.

Figure A-4
Vegetable Farms Less Than 50 Acres



Source: Census of Agriculture.

Figure A-5
Vegetable Farms Larger Than 50 Acres

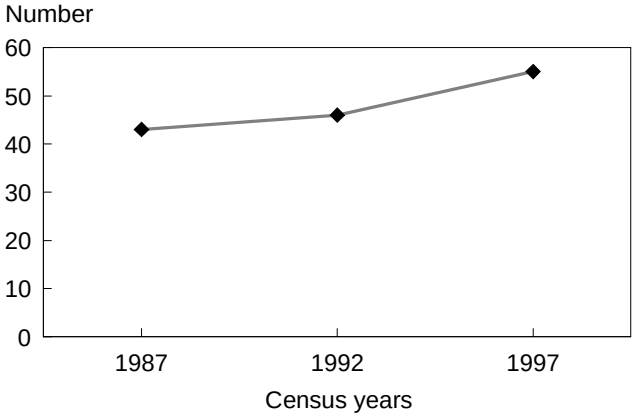


Source: Census of Agriculture.

farms, while efforts to meet demand for so-called niche products have led to an increase in the number of small farms. The Census also reports farm concentration, or the number of farms that sold 10 percent of the market value of vegetables, sweet corn, and melons. The number of firms selling 10 percent of the market value increased over the three 5-year intervals, suggesting that despite fewer farms overall and growth of large farms, the market has actually become less concentrated (fig. A-6).

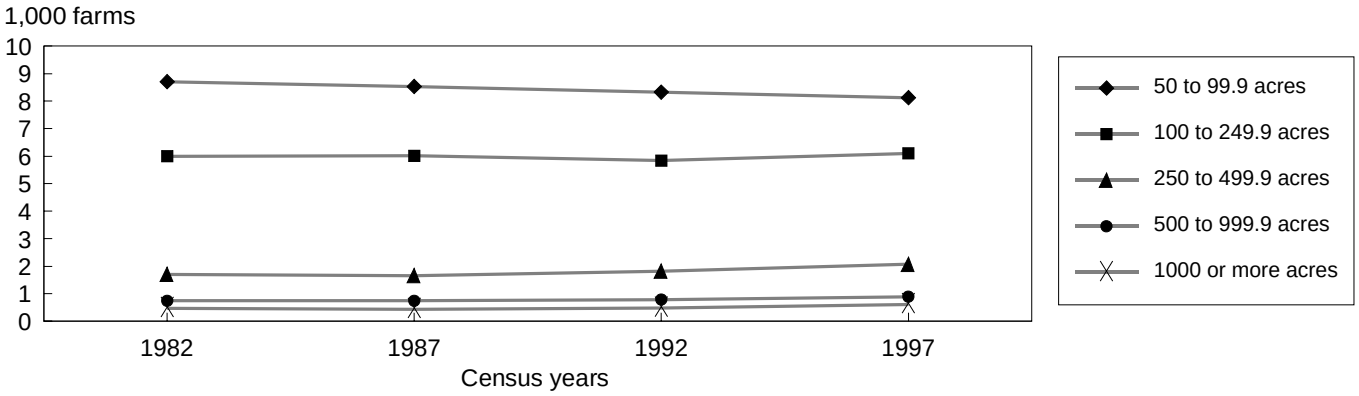
Average orchard size first slightly decreased, and then increased between 1987 and 1997 (fig. A-3). The number of orchards greater than 50 acres has remained relatively constant or increased between 1982 and 1997 (fig. A-7). Similarly, the number of orchards less than 50 acres remained fairly constant (fig. A-8). Market concentration of fruits, nuts, and berries did not significantly change between 1982 and 1997, and show the number of farms selling 10 percent of market value first decreased, then increased (fig. A-9).

Figure A-6
Farms Selling 10 Percent of the Market Value of Vegetables, Sweet Corn, and Melons



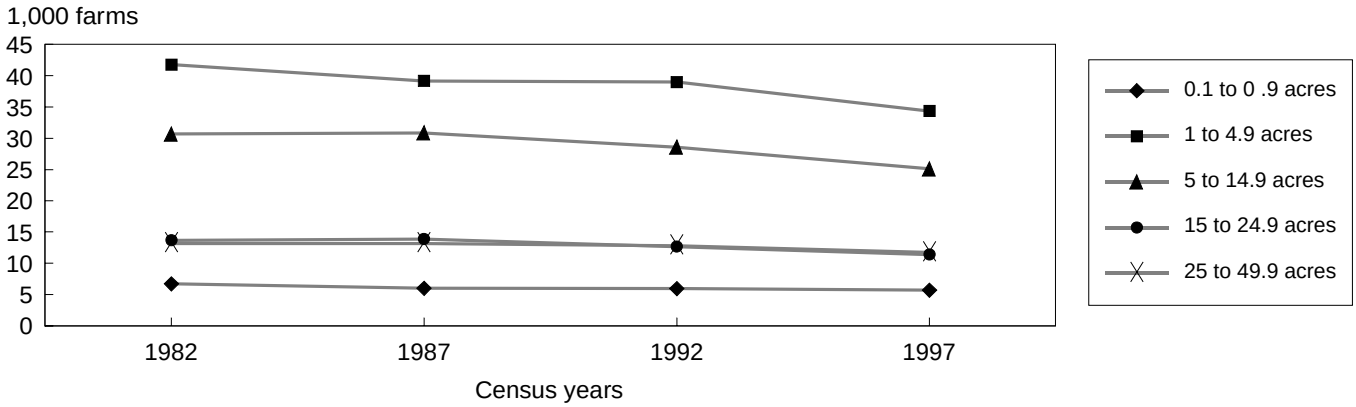
Source: Census of Agriculture.

Figure A-7
Farms With Orchards Larger Than 50 Acres



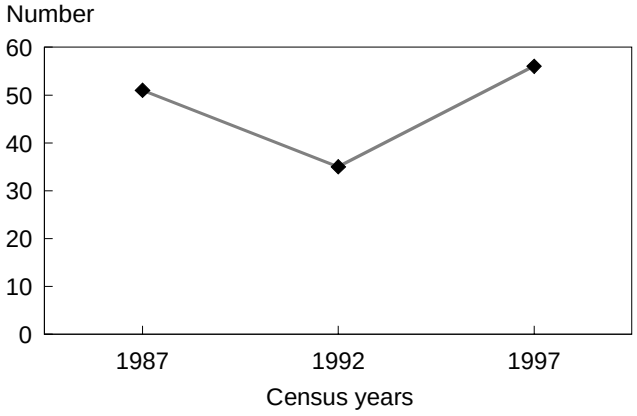
Source: Census of Agriculture.

Figure A-8
Farms With Orchards Smaller Than 50 Acres



Source: Census of Agriculture.

Figure A-9
Farms Selling 10 Percent of the Market Value of Fruits, Nuts, and Berries



Source: Census of Agriculture.

The First Intermediary: Shippers

Neither the U.S. Commerce Department's Economic Census of the Wholesale Trade nor the Agricultural Census focuses specifically on fresh fruit and vegetable shippers, and as a result, there is no national-level source of information detailing either the current or historical number of shippers and packers operating in the produce industry. Contracts in parts of the vegetable industry, specifically tomatoes, lettuce, and melons, have been closely examined. For example, Wilson, Thompson, and Cook surveyed 81 grower-shipper firms in California, Arizona, Mexico, and Florida, and uncovered information about how these firms obtain supplies. Calvin and Barrios surveyed Mexican growers. Currently, Hueth and Ligon are surveying California shippers to add to our understanding of contracts between California shippers and growers. Most of the current detailed information about transactions is for fresh vegetables, and to the best of our knowledge, there is little infor-

mation describing the fruit industry. This data shortage forces us to rely on anecdotal evidence to gain some insight into changes taking place in the fruit industry.

It appears that a great deal of structural change has already taken place in the fresh vegetable industry. Most of the contracting arrangements were new vertical relationships between shippers and growers, where the vertical relationships were instituted both through direct ownership and contracting. One significant factor driving contractual change was an effort to obtain year-round supplies of produce. With year-round grower-shippers supplying the market, shippers have an increased incentive to invest in seed development and merchandising (Wilson, et al 1997). In contrast, relationships among fruit shippers and packers appear to be in the process of changing. New contracts appear to result from a desire to increase fruit quality, to expand the varieties of fruits offered by shippers, and to increase market share. In the last 2 years, this theme has appeared in many articles in *The Packer*, which reports numerous examples of new formal marketing agreements, horizontal and vertical coordination, and strategic alliances among fruit shippers, growers, and wholesalers.

Anecdotal evidence also suggests that shippers are increasingly engaging in alternative marketing methods. These methods include shipping fruit under private labels, generic advertising, and providing in-store demonstrations of their products (*The Packer*, 11/98). "Give-backs" which include granting volume discounts and paying advertising or slotting fees, are used increasingly as methods to capture space in retail outlets. There are other variations of this kind of pricing system. To be able to sell to retailers, shippers may need to pay a fee in order to be included on the list of suppliers. These practices began in the fruit industry about 5 years ago, and while some shippers complain about them, others feel they are not "getting out of hand" (*The Packer*, 11/98).

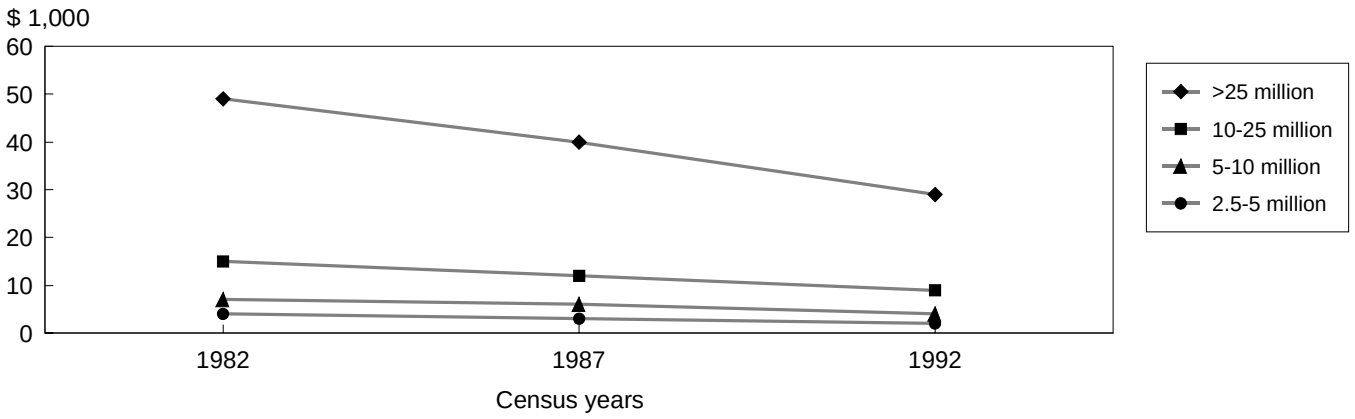
Middlemen: Wholesale Firms

The initial and most thorough study of the fresh fruit and vegetable wholesale industry was completed in 1958 by Alden Manchester. Wholesale produce markets had 5,541 firms, and most were small: 63 percent handled less than 1,000 carloads each year. Manchester's survey revealed that larger markets had larger wholesalers than did small markets. Concentration, however, was higher in smaller markets, and it was not unusual for the four largest firms to handle 95 percent of the trade. In contrast, the four largest wholesale firms in major cities handled 14 to 15 percent of the business.

Data from the Economic Census of the Wholesale Trade indicate that between 1982 and 1992 the average real sales of fresh fruit and vegetable wholesale firms declined (fig. A-10). This trend supports the industry-held perception that wholesalers are being used less frequently than they used to be. Further, the concentration ratio for the four largest merchant wholesale firms, as calculated by the Census, slightly decreased during this period. Agents, brokers, and commissioned merchants are another type of middlemen. They arrange sales, but never take ownership of the produce. Between 1982 and 1992, the average real sales per firm decreased. At the same time, the concentration ratios for the largest four firms slightly increased over the period. Trends in the census data clearly point to declining role of both wholesaling firms and agents, brokers, and commissioned merchants. These trends support the findings of McLaughlin, whose survey indicated that in 1982, 1993, and 1996, retailers were using traditional middlemen less frequently. After the results of the 1997 Census of Wholesale Trade are reported, we'll be able to see whether these trends have continued.

What the data do not show, however, is the emergence of another trend cited by anecdotal evidence—the growing usage of marketing agreements and strategic alliances

Figure A-10
Average Real Sales per Wholesale Firm



Source: Census of Wholesale Trade.

between wholesale firms and shippers, which can be viewed as a form of vertical coordination. *The Packer* reports numerous informal and formal agreements among wholesalers, and between wholesalers and grower/shippers, in efforts to increase market share.

Final Stop before Consumers: Retailers

Mergers and buyouts of grocery stores have been widespread over the past few years. In 1997 and 1998, the Federal Trade Commission investigated many proposed supermarket acquisition agreements, and required divestitures of stores in almost every case. Several large supermarkets–Kroger, Safeway, and Albertsons–merged with smaller chains in 1998, thereby becoming the three largest supermarket chains. The "merger mania," led to an increase in national grocery store concentration over the past 5 years. For example, in 1993, the top 4 chains served about 17 percent of the market share. In contrast, by 1998, the 4 largest chains (Kroger, Albertson's, Safeway, and Ahold) will control 28.8 percent of the market (ERS).

The shift towards increasingly large supermarkets has been taking place since at least 1982, and is reflected in ERS data reporting the number of grocery store establishments by category, and grocery store sales by category. Figure A-11 describes average real sizes for supermarkets (defined as grocery stores with sales exceeding $2.5 million annually, in 1985 dollars), superettes (grocery store with sales below $2.5 million annually, in 1985 dollars), and convenience stores (a small store selling a limited variety of food and nonfood items) for the census years from 1982 to 1997. Average real sales for supermarkets has increased over time, while average real sales have not dramatically changed for the other two categories.

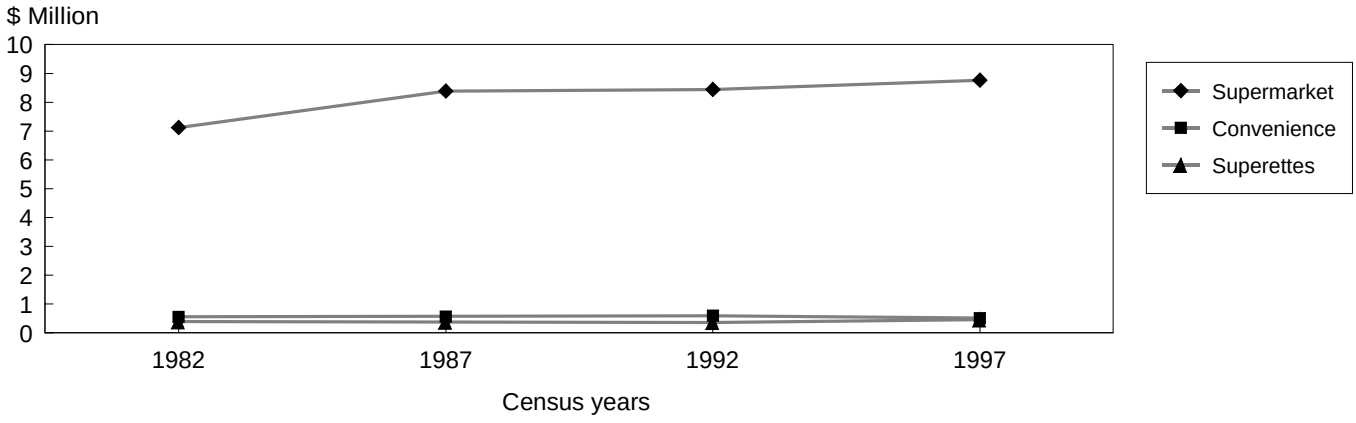
Conclusion

Anecdotal evidence suggests that significant changes in market structure are occurring in the fresh fruit and vegetable industry. On the one hand, it is said that the flow of produce from farm to consumer follows a different path than it once did. Rather than making heavy use of the wholesale terminal market, retailers, large ones in particular, are purchasing a large portion of fruits and vegetables directly from shippers. Farms and supermarkets are thought to be growing in size, while it appears that the wholesaler sector is decreasing in size. It is also claimed that alternative forms of pricing, such as rebates, slotting fees, and other kinds of allowance, are becoming more common. Some industry sources suggest that retail mergers are driving these changes.

Yet, data scarcity makes it difficult to either lend support to or refute many of these notions. For example, the retail practice of buying produce directly from the shipping point is not new, and has been growing since the 1920's. Further, the available data suggest this trend may be reversing. Census data and ERS data indicate that average farm (both fruit and vegetable) size has been increasing, average wholesale firm size decreasing, and average supermarket size increasing. On the other hand, there are no data available to discuss changes in either the activity or number of shippers. We are also unable to verify whether vertical and horizontal contracts are increasing or decreasing, and where along the farm-to-market chain they are being used. In addition, given the current state of the data, it is nearly impossible to measure the frequency of alternative pricing schemes, such as slotting fees and rebates.

Instead, we are left with a number of puzzles. These include: are the relationships among wholesalers, brokers, growers, and shippers significantly changing? If so, are the changes in

Figure A-11
Average Real Sales per Store



Source: Economic Research Service, USDA.

response to recent supermarket mergers? Or are they being driven by consumer demand for wider variety and high quality produce? Or are there additional factors driving structural change? Have the recent mergers made it possible for retailers to have a bargaining advantage over sellers? And are the alternative business practices an outcome of the competitive pricing strategy, or are they evidence that supermarkets can exert market power over intermediaries and growers? What kind of market structure will characterize the future produce industry? Finally, when considering growers, intermediaries, retailers, and consumers, who will gain and who will lose in the coming years?

References

Calvin, Linda and Veronica Barrios, "Marketing Winter Vegetables from Mexico," *Vegetable and Specialties Situation and Outlook*, USDA, Economic Research Service, VGS-274, April, 1998.

Hart, Oliver, *Firms, Contracts, and Financial Structure*, Oxford University Press, 1995.

Manchester, Alden Coe, "The structure of wholesale produce markets," U.S. Dept. of Agriculture, Economic Research Service, Marketing Economics Division, 1964.

McLaughlin, Edward W., Kristen Park, and Debra J. Perosio, *Marketing and Performance Benchmarks for the Fresh Produce Industry*, Produce Marketing Association, 1997.

McLaughlin, Edward W., and Debra J. Perosio, *Fresh Fruit and Vegetable Procurement Dynamics: The Role of the Supermarket Buyer*, Food Industry Management Program, Cornell University, 1994.

The Packer, various issues.

Posner, Richard A., *Economic analysis of law*, 5th edition, New York: Aspen Law & Business, 1998.

Produce Marketing Association, *Fresh Track 1997, The Fresh Produce Wholesaling System: Trends, Challenges, and Opportunities*, 1997.

Sedgwick, Stephanie, "Yes! We Have Nice Bananas," *Washington Post*, February 3, 1999.

Shenefeld, John H. and Irwin M. Stelzer, *The Antitrust Laws, A Primer, Second Edition*, American Enterprise Institute, Washington, DC, 1996.

U.S. Bureau of the Census, *Census of Agriculture*, 1982, 1987, and 1992, Washington, DC.

U.S. Bureau of the Census, *Census of Retail Trade*, 1982, 1987, and 1992, Washington, DC.

U.S. Bureau of the Census, *Census of Wholesale Trade*, 1982, 1987, and 1992, Washington, DC.

U.S. Department of Agriculture, National Agricultural Statistics Service, *Census of Agriculture*, 1997.

Williamson, Oliver, *The Economic Institutions of Capitalism*, The Free Press, New York, 1985.

Wilson, Paul, Gary Thompson, and Roberta Cook, "Mother Nature, Business Strategy, and Fresh Produce," *Choices*, First Quarter: 18-21, 24, 25, 1997.

List of Tables

Table 20--Peaches: Total production and season-average prices received by growers, 1996-98

State	Production			Price per short ton		
	1996	1997	1998	1996	1997	1998
	--1,000 short tons--			--Dollars--		
Alabama	0.3	12.5	8.0	1,012	604	912
Arkansas	0.6	7.2	6.3	310	580	656
California						
Clingstone	546.5	574.0	522.1	220	260	220
Freestone	337.0	369.5	353.7	434	244	318
Colorado	8.5	3.5	10.0	992	1,322	976
Connecticut	1.1	1.2	1.2	1,100	1,400	1,400
Delaware	1.1	1/	1/	850	1/	1/
Georgia	5.0	80.0	35.0	676	486	690
Idaho	4.3	3.8	4.5	940	1,148	872
Illinois	1.0	6.3	7.5	1,280	812	866
Indiana	1.0	1.3	1.9	946	1,090	636
Kansas	0.2	0.1	0.3	900	840	940
Kentucky	0.3	0.3	0.9	1,246	600	750
Louisiana	0.1	0.6	0.7	1,560	906	1,420
Maryland	4.7	4.9	5.3	800	860	600
Massachusetts	0.8	1.0	0.9	1,100	1,400	1,600
Michigan	19.0	27.5	21.5	540	526	528
Missouri	1.7	4.8	4.5	920	700	792
New Jersey	39.0	32.5	35.0	874	898	898
New York	6.0	6.0	5.0	696	922	832
North Carolina	1.0	5.0	12.5	804	700	760
Ohio	3.6	3.0	3.4	924	800	832
Oklahoma	2/	1.0	10.0	2/	448	824
Oregon	3.5	2.9	4.0	814	1,058	630
Pennsylvania	35.0	35.0	32.5	660	674	634
South Carolina	4.0	80.0	70.0	1,182	416	520
Tennessee	0.2	1.8	1.6	1,350	760	900
Texas	3.0	10.0	12.0	1,480	700	1,040
Utah	3.8	4.1	3.9	640	540	540
Virginia	7.0	4.5	7.0	680	560	600
Washington	5.5	23.0	25.5	928	840	688
West Virginia	8.0	5.5	6.5	738	586	528
United States	1,052.3	1,312.3	1,212.9	382	354	376

1/ Estimate discontinued in 1997.

2/ No significant commercial production due to freeze damage.

Source: National Agricultural Statistics Service; converted to short tons by the Economic Research Service, USDA.

Table 21--Blueberry area and production, by State, 1996-98

State	Area harvested			Utilized production		
	1996	1997	1998	1996	1997	1998
	Acres			Short tons		
Cultivated:						
Alabama	300	470	310	195	330	202
Arkansas	600	550	500	500	825	450
Florida	1,300	1,200	1,200	1,150	1,000	1,000
Georgia	3,500	4,000	4,400	2,750	6,500	3,750
Indiana	800	800	790	1,400	1,750	1,550
Michigan	16,500	16,500	16,400	21,000	36,000	27,500
New Jersey	7,500	7,400	7,500	17,000	17,000	18,000
New York	650	700	700	600	750	800
North Carolina	3,200	3,250	3,000	5,500	4,300	7,100
Oregon	2,100	2,500	2,500	8,500	10,500	11,500
Washington	1,300	1,300	1,500	4,095	4,355	5,250
Total	37,750	38,670	38,800	62,690	83,310	77,102
Wild:						
Maine	--	--	--	29,599	36,908	1/ 31,491
United States	37,750	38,670	38,800	92,289	120,218	108,593

-- = Not available.

1/ Preliminary

Source: National Agricultural Statistics Service, USDA, and New England Agricultural Statistics Service, USDA.

Table 22--Stocks of frozen fruits and berries: January 31, 1996-99

Frozen fruit	1996	1997	1998	1999 1/
		-- 1,000 short tons --		
Frozen fruits:				
Apples	51.9	40.1	35.7	36.6
Apricots	2.7	3.4	5.7	5.0
Cherries, tart 2/	58.8	57.4	65.4	56.8
Cherries, sweet	6.4	5.4	7.2	7.5
Grapes	2.8	2.8	1.3	2.6
Peaches	22.1	21.2	30.2	30.6
Frozen berries:				
Blackberries	7.4	9.0	11.6	9.7
Blueberries	30.3	27.9	41.7	30.0
Boysenberries	1.1	1.5	2.4	1.8
Raspberries 3/	19.3	17.3	21.7	17.6
Strawberries	108.2	92.4	91.1	89.9
Other	217.7	212.4	248.2	263.4
Total	528.8	490.8	562.2	551.6

1/ Preliminary.

2/ Includes juice cherries.

3/ Includes black raspberries.

Source: National Agricultural Statistics Service, USDA.

Table 23--Selected citrus, packinghouse-door returns, by month, 1996-99

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
						--Dollars per box 1/--						
ORANGES:												
Arizona												
1996	6.74	4.87	5.72	4.57	3.17	2.58	2.76	--	--	--	11.47	8.72
1997	8.33	5.31	4.43	5.68	5.37	2.20	--	--	--	-0.28	5.83	6.78
1998	5.40	2.60	4.74	5.63	4.49	4.90	--	--	--	--	19.12	12.54
1999	22.11	17.40										
Florida												
1996	5.77	6.01	7.28	7.58	7.88	8.46	--	--	--	--	5.28	5.02
1997	5.07	5.09	5.95	6.09	6.06	6.16	--	--	--	4.22	3.49	4.04
1998	4.38	5.13	6.58	6.96	7.26	7.85	--	--	--	7.02	7.21	6.20
1999	6.73	7.64										
California												
1996	6.92	5.59	7.29	8.08	9.72	8.21	9.26	10.99	15.78	13.39	10.86	9.31
1997	9.15	8.17	8.39	9.38	10.40	8.01	8.56	9.53	9.23	8.58	9.58	8.84
1998	9.47	7.60	8.38	10.81	9.82	10.54	8.79	7.45	7.05	7.63	13.35	11.96
1999	14.80	11.18										
Texas												
1996	5.30	6.32	8.00	8.95	8.61	--	--	--	--	9.70	5.47	3.26
1997	3.39	5.22	6.04	6.24	5.94	--	--	--	--	8.47	4.34	3.16
1998	2.46	2.95	5.16	4.18	4.30	--	--	--	--	7.80	7.76	8.86
1999	8.46	6.51										
GRAPEFRUIT:												
Arizona												
1996	5.08	5.30	3.33	3.46	3.26	4.85	-1.19	--	15.56	9.48	8.50	7.06
1997	4.48	5.36	4.25	3.36	2.50	2.22	3.32	--	--	--	3.66	3.28
1998	4.10	5.16	4.07	4.48	4.76	5.11	4.30	--	--	--	--	8.86
1999	4.56	7.05										
Florida												
1996	3.78	3.80	3.70	4.21	4.41	--	--	--	--	7.24	4.82	4.06
1997	4.13	3.70	3.32	3.15	2.81	3.57	--	--	--	5.27	3.66	3.77
1998	2.98	2.79	2.55	2.48	2.16	--	--	--	--	5.66	4.63	4.18
1999	3.66	3.82										
California												
1996	4.74	4.63	4.25	4.34	7.26	6.44	5.00	6.22	9.93	14.05	4.36	5.61
1997	4.51	3.89	3.20	4.04	3.90	6.65	8.73	5.98	6.16	2.54	2.52	3.86
1998	3.81	3.75	3.54	3.69	5.19	6.58	8.05	7.95	13.03	10.50	12.11	5.26
1999	5.09	5.57										
Texas												
1996	4.73	3.63	3.30	3.12	3.04	--	--	--	--	6.99	5.06	4.66
1997	3.99	3.29	3.29	3.30	2.89	--	--	--	--	7.06	5.81	4.83
1998	4.19	4.69	3.93	4.26	4.01	--	--	--	--	14.37	8.67	7.96
1999	5.64	4.92										
LEMONS:												
Arizona												
1996	5.14	4.29	3.82	3.76	--	--	--	--	19.44	16.55	11.63	9.42
1997	7.80	6.10	5.07	--	--	--	--	--	40.84	17.49	7.60	5.88
1998	5.19	4.39	4.39	3.75	--	--	--	--	24.50	24.65	19.60	11.14
1999	14.06	6.11										
California												
1996	5.74	5.49	6.33	8.52	10.73	15.04	17.16	18.88	17.80	13.45	11.82	10.38
1997	7.98	5.47	5.62	8.92	18.98	28.78	33.08	27.69	22.17	14.19	8.04	6.38
1998	5.47	5.16	5.29	6.30	10.42	19.55	26.51	28.31	23.12	20.25	18.09	11.04
1999	11.15	7.98										
TANGERINES:												
Arizona												
1996	13.69	9.20	8.16	8.05	4.44	--	--	--	--	--	16.93	17.18
1997	16.72	11.89	12.20	-1.08	-1.10	--	--	--	--	--	16.70	15.03
1998	12.72	11.67	11.01	9.60	4.95	--	--	--	--	--	20.40	14.77
1999	26.56	19.67										
Florida												
1996	17.05	17.01	17.95	22.09	--	--	--	--	--	11.42	10.43	9.71
1997	11.15	12.57	14.52	17.43	15.36	--	--	--	13.47	10.00	10.38	10.22
1998	13.98	11.28	12.05	21.47	--	--	--	--	--	12.33	13.11	14.23
1999	18.59	17.70										
California												
1996	7.44	6.38	6.22	6.69	8.09	--	--	--	--	24.95	17.11	13.38
1997	15.70	12.99	11.42	14.61	13.80	--	--	--	--	20.51	14.66	10.65
1998	10.58	9.61	10.64	11.77	-0.04	-0.31	--	--	--	--	16.91	15.25
1999	18.13	8.88										

-- = Insufficient marketing to establish price.

1/ Net contents per box: oranges: Arizona and California--75 lbs., Florida--90 lbs., and Texas--85 lbs.; grapefruits: Arizona and California 67 lbs., Florida--85 lbs., and Texas--80 lbs.; tangerines: Arizona and California--75 lbs., and Florida--95 lbs.; and lemons: 76 lbs.

Source: National Agricultural Statistics Service, USDA.

Table 24--Fruit and edible tree nuts: Season-average prices per unit received by growers, 1997-98

Commodity	1997			1998 1/		
	Fresh	Processed	All	Fresh	Processed	All
			--Dollars/short ton--			
NONCITRUS: 2/						
Apples, commercial	442	130	308	6/	6/	232
Apricots, three states	1,170	285	444	578	260	327
Avocados 3/	1,560	782	1,560	7/	7/	7/
Avocados, California 3/	1,720	782	1,710	6/	6/	6/
Bananas, Hawaii	760	--	760	700		700
Berries	--	--	1,427	--	--	1,338
Cherries, sweet	1,680	784	1,250	1,480	655	1,090
Cherries, tart	1,126	310	318	6/	6/	6/
Cranberries	--	--	1,274	--	--	8/
Dates, California	1,100	--	1,100	1,130		1,130
Figs, California	--	--	265	--	--	241
Grapes	607	402	428	630	418	446
Grapes, California	601	407	434	618	421	448
Guavas, Hawaii	--	244	244	--	6/	6/
Kiwifruit, California	--	--	518	--	--	6/
Nectarines, California	--	--	375	--	--	472
Olives, California	500	643	642	500	448	448
Papayas, Hawaii	1,058	60	978	700	60	634
Peaches	488	246	354	590	212	376
Pears	329	9/ 213	276	384	9/ 191	299
Pineapples, Hawaii	618	127	283	575	131	279
Plums, California	--	--	312	--	--	529
Prunes, California	--	798	798	--	6/	6/
Prunes and plums, other states	448	134	273	476	162	311
Strawberries	1,312	542	1,110	1,480	636	1,218
CITRUS: 4/			--Dollars/box--			
Oranges	9.96	5.23	6.16	9.73	5.19	6.13
Tangerines	16.78	3.87	12.42	15.97	2.96	11.75
Grapefruit	6.00	2.21	3.98	6.18	1.13	3.55
Lemons	20.38	3.02	12.00	18.29	2.18	9.88
Limes	14.50	1.81	11.93	12.50	2.59	10.02
Tangelos	6.50	4.13	4.75	6.30	2.96	4.03
Temples	8.70	4.18	5.23	6.50	4.35	4.89
TREE NUTS:			--Dollars/pound--			
Almonds, California 5/	--	--	1.56	--	--	1.80
Hazelnuts, Oregon, Washington	--	--	0.45	--	--	0.49
Macadamia nuts, Hawaii	--	--	0.75	--	--	0.67
Pistachios, California	--	--	1.13	--	--	0.99
Pecans, all	--	--	0.77	--	--	1.23
Improved	--	--	0.93	--	--	1.34
Native and seedling	--	--	0.53	--	--	0.77
Walnuts, California	--	--	0.72	--	--	6/

-- = Not available.

1/ Preliminary. 2/ Fresh fruit prices are equivalent returns at packinghouse-door for Washington and Oregon, equivalent first delivery-point returns for California, and prices as sold for other states. Processing fruit prices for all states are equivalent returns at processing plant door. 3/ Column headed 1997 refers to 1997/98 crop. 4/ Equivalent on-tree returns; column headed 1997 refers to 1996/97 crop. 5/ Shelled basis. 6/ Data available July 7, 1999. 7/ Data for 1998/99 will be available May 12, 1999 and July 7, 1999. 8/ Data available August 17, 1999. 9/ Processed mostly canned, but includes small quantities of dried and other uses.

Source: National Agricultural Statistics Service; converted to dollars per short ton by the Economic Research Service, USDA.

Table 25--Fruit for processing: Season-average prices received by growers, by use and principal State, 1996-98

Fruit, use, & States	1996	1997	1998
	--Dollars/short ton--		
Apricots:			
Canning			
California	320	320	330
Freezing			
California	310	300	315
Drying			
California 2/	325	262	258
Cherries, tart:			
Processing, all			
New York	270	320	3/
Michigan	316	308	3/
Wisconsin	340	330	3/
Cherries, sweet:			
Processing, all			
Oregon	832	886	827
Michigan	691	724	544
Washington	755	723	565
Canning			
Washington	1,130	1,120	845
Oregon	706	858	1,000
Michigan	960	1,000	580
Brining			
Washington	524	625	565
Michigan	610	650	530
Oregon	896	892	800
Grapes--California			
All processing	389	407	421
Grapes--California (cont'd):			
Dried 2/	255	219	239
Wine	540	603	580
Peaches, clingstone:			
Canning			
California	220	264	230
Peaches, freestone:			
Canning			
California	204	246	214
Freezing			
California	186	190	201
Drying			
California 2/	78	68	67
Pears, Bartlett:			
Canning			
Washington	262	214	166
California	233	247	236
Drying			
California 2/	184	151	217
Prunes and plums:			
Canning			
Michigan	300	267	225
Prunes:			
Drying 2/			
California	262	261	3/

1/ California fruits are priced at first delivery point, except prunes, pears for drying, and grapes. Prices of those California fruits and other States' fruit are equivalent processing-plant-door returns.

2/ Fresh basis.

3/ Data available July 7, 1999.

Source: National Agricultural Statistics Service, USDA.

Table 26--Fruit and edible tree nuts: Utilized production, 1997-98

Commodity	1997			1998 1/		
	Fresh	Processed	All	Fresh	Processed	All
			--Short tons--			
NONCITRUS:						
Apples, commercial	2,907,250	2,219,900	5,127,150	6/	6/	5,298,600
Apricots, 3 states	26,830	102,800	129,630	22,780	85,100	107,880
Avocados 2/	176,750	1,500	178,250	6/	6/	6/
Avocados, California 2/	152,500	1,500	154,000	6/	6/	6/
Bananas, Hawaii	6,850	--	6,850	10,000	--	10,000
Berries	36,955	111,470	7/ 156,905	41,549	96,793	7/ 146,617
Cherries, sweet	115,440	108,050	223,490	109,160	97,450	206,610
Cherries, tart	1,300	140,350	141,650	1,150	151,900	153,050
Cranberries	11,250	253,600	274,850	8/	8/	269,350
Dates, California	21,000	--	21,000	22,200	--	22,200
Figs, California	2,000	55,500	57,500	1,800	38,400	40,200
Grapes	937,115	6,350,250	7,287,365	722,795	4,869,210	5,592,005
Grapes, California	915,000	5,733,000	6,648,000	703,000	4,362,000	5,065,000
Guavas, Hawaii	--	7,950	7,950	--	6/	6/
Kiwifruit, California	31,300	500	31,800	31,100	500	31,600
Nectarines, California	258,500	5,500	264,000	213,600	16,400	230,000
Olives, California	500	103,500	104,000	500	89,500	90,000
Papayas, Hawaii	17,850	1,550	19,400	17,500	2,000	19,500
Peaches	563,400	690,800	1,254,200	513,150	662,300	1,175,450
Pears	572,310	9/ 469,620	1,041,930	519,895	9/ 404,000	923,895
Pineapples, Hawaii	103,000	221,000	324,000	111,000	221,000	332,000
Plums, California	10/	10/	246,000	10/	10/	187,000
Prunes, California (dried basis)	--	211,000	211,000	--	103,000	103,000
Prunes and plums, other states	10,500	13,200	23,700	11,750	13,050	24,800
Strawberries	600,900	213,000	813,900	581,900	262,150	844,050
			--1,000 short tons--			
CITRUS: 3/						
Oranges	2,489	10,188	12,677	2,856	11,001	13,857
Tangerines	277	141	418	243	117	360
Grapefruit	1,350	1,538	2,888	1,255	1,371	2,626
Lemons	496	462	958	447	488	935
Limes	11	3	14	14	5	19
Tangelos	47	131	178	41	87	128
Temples	25	83	108	25	76	101
			--Million pounds--			
TREE NUTS:						
Almonds, California 4/	--	--	759	--	--	520
Hazelnuts, Oregon, Washington	--	--	94	--	--	31
Macadamia nuts, Hawaii	--	--	58	--	--	53
Pistachios, California	--	--	180	--	--	188
Pecans, all 5/	--	--	335	--	--	155
Improved	--	--	203	--	--	125
Native and seedling	--	--	132	--	--	30
Walnuts, California	--	--	538	--	--	454

-- = Not available.

1/ Preliminary. 2/ Column headed 1997 refers to 1997/98 crop. 3/ Column headed 1997 refers to 1996/97 crop. 4/ Shelled basis. 5/ All pecans estimates discontinued for MO and TN in1996. 6/ Data available July 7, 1999. Avocado data available May 12 and July 7, 1999. 7/ Fresh and processed do not add to total because there is no breakdown of utilization available for boysenberries and all raspberries in California. 8/ Data available August 17, 1999. 9/ Processed mostly canned, but includes small quantities of dried and other uses. 10/ Missing data are not published to avoid disclosure of individual operations.

Source: National Agricultural Statistics Service; converted to short tons by the Economic Research Service, USDA.

Table 27--Fruit and edible tree nuts: Value of utilized production, 1997-98

Commodity	1997			1998 1/		
	Fresh	Processed	All	Fresh	Processed	All
			--1,000 dollars--			
NONCITRUS:						
Apples, commercial	1,287,866	287,537	1,575,403	6/	6/	1,226,380
Apricots, 3 states	14,963	28,109	43,072	13,170	22,104	35,274
Avocados 2/	276,581	1,173	277,754	6/	6/	6/
Avocados, California 2/	262,300	1,173	263,473	6/	6/	6/
Bananas, Hawaii	5,206	--	5,206	7,000	--	7,000
Berries	82,576	119,458	7/ 223,901	80,984	85,403	7/ 196,243
Cherries, sweet	193,805	84,706	278,511	161,769	63,857	225,626
Cherries, tart	1,465	43,446	44,911	6/	6/	6/
Cranberries	--	--	350,146	--	--	8/
Dates, California	23,100	--	23,100	25,086	--	25,086
Figs, California	--	--	15,209	--	--	9,687
Grapes	568,533	2,553,662	3,122,195	455,410	2,036,896	2,492,306
Grapes, California	549,605	2,333,155	2,882,760	455,410	2,036,896	2,492,306
Guavas, Hawaii	--	2,249	2,249	--	1,940	1,940
Kiwifruit, California	--	--	16,483	--	--	6/
Nectarines, California	--	--	98,895	--	--	108,502
Olives, California	250	66,551	66,801	250	40,096	40,346
Papayas, Hawaii	18,885	93	18,978	12,250	120	12,370
Peaches	274,458	169,679	444,137	302,312	140,627	442,939
Pears	188,022	9/ 99,800	287,822	199,396	7/ 77,292	276,688
Pineapples, Hawaii	63,654	28,067	91,721	63,825	28,951	92,776
Plums, California	--	--	76,825	--	--	98,858
Prunes, California	--	168,378	168,378	--	6/	6/
Prunes and plums, other states	4,709	1,772	6,481	5,594	2,113	7,707
Strawberries	787,974	115,376	903,350	861,013	166,916	1,027,929
CITRUS: 3/						
Oranges	645,975	1,188,114	1,834,089	727,471	1,272,604	2,000,075
Tangerines	107,738	11,447	119,185	89,109	7,280	96,389
Grapefruit	203,019	79,756	282,775	197,434	36,398	233,832
Lemons	265,681	36,729	302,410	215,041	28,015	243,056
Limes	3,698	118	3,816	4,125	285	4,410
Tangelos	6,708	12,051	18,759	5,752	5,734	11,486
Temples	4,829	7,712	12,541	3,679	7,325	11,004
TREE NUTS:						
Almonds, California 4/	--	--	1,160,640	--	--	898,200
Hazelnuts, Oregon, Washington	--	--	42,267	--	--	15,238
Macadamia nuts, Hawaii	--	--	43,500	--	--	35,510
Pistachios, California	--	--	203,400	--	--	186,120
Pecans, all 5/	--	--	259,220	--	--	190,744
Improved	--	--	189,226	--	--	167,559
Native and seedling	--	--	69,994	--	--	23,185
Walnuts, California	--	--	384,670	--	--	6/

-- = Not available.

1/ Preliminary. 2/ Column headed 1997 refers to 1997/98 crop. 3/ Column headed 1997 refers to 1996/97 crop. 4/ Shelled basis.

5/ All pecans estimates discontinued for MO and TN in 1996. 6/ Data available July 7, 1999. Avocado data available May 12 and July 7, 1999.

7/ Fresh and processed do not add to total because there is no breakdown of utilization available for boysenberries and all raspberries in California.

8/ Data available August17, 1999. 9/ Processed mostly canned, but includes small quantities of dried and other uses.

Source: National Agricultural Statistics Service, USDA.

Table 28--Production and utilization of specified noncitrus fruits, United States, 1996-98

Commodity and year	Production		Utilization 1/									
	Total	Utilized 2/	Processed (fresh equivalent)									
			Fresh	Canned	Frozen	Brined	Crushed for			Dried	Other	Total
							Wine	Juice	Oil		3/	2/
	--1,000 short tons--											
Apricots:												
1996 4/	79.3	79.3	13.5	20.0	9.0	--	--	21.5	--	15.0	--	65.8
1997 4/	139.2	129.6	26.8	46.7	15.1	--	--	27.7	--	12.0	--	102.8
1998 4/	118.3	107.9	22.8	40.7	10.4	--	--	24.0	--	9.0	--	85.1
Cherries, sweet:												
1996	154.1	151.7	80.7	9.2	--	49.0	--	--	--	--	5/ 12.9	71.0
1997	225.8	223.5	115.4	11.8	--	77.7	--	--	--	--	5/ 18.6	108.1
1998	209.7	206.6	109.2	14.7	--	69.3	--	--	--	--	5/ 13.5	97.5
Cherries, tart:												
1996	135.9	130.1	1.3	33.7	85.1	--	--	--	--	--	10.0	128.8
1997	146.5	141.7	1.3	43.2	86.8	--	--	--	--	--	10.0	140.4
1998	174.4	153.1	1.2	37.7	100.1	--	--	--	--	--	14.2	151.9
Figs:												
1996	45.5	45.5	2.0	--	--	--	--	--	--	43.5	--	43.5
1997	57.5	57.5	2.0	--	--	--	--	--	--	55.5	--	55.5
1998	40.2	40.2	1.8	--	--	--	--	--	--	38.4	--	38.4
Grapes:												
1996	5,553.6	5,537.3	767.0	36.0	--	--	3,042.9	362.5	--	1,329.0	--	4,770.3
1997	7,290.9	7,287.4	937.1	44.0	--	--	4,034.4	465.4	--	1,806.5	--	6,350.3
1998	5,595.6	5,592.0	722.8	36.0	--	--	3,198.1	353.6	--	1,281.6	--	4,869.2
Kiwifruit:												
1996	31.5	28.0	26.1	--	--	--	--	--	--	--	--	1.9
1997	35.0	31.8	31.3	--	--	--	--	--	--	--	--	0.5
1998	34.6	31.6	31.1	--	--	--	--	--	--	--	--	0.5
Nectarines:												
1996	247.0	247.0	239.8	--	--	--	--	--	--	--	--	7.2
1997	264.0	264.0	258.5	--	--	--	--	--	--	--	--	5.5
1998	230.0	230.0	213.6	--	--	--	--	--	--	--	--	16.4
Olives:												
1996	166.0	166.0	0.5	6/ 123.0	--	--	--	--	7.0	--	7/ 35.5	165.5
1997	104.0	104.0	0.5	6/ 82.2	--	--	--	--	3.6	--	7/ 17.7	103.5
1998	90.0	90.0	0.5	6/ 64.2	--	--	--	--	4.1		7/ 21.2	89.5
Papayas:												
1996	--	20.9	18.9	--	--	--	--	--	--	--	--	2.0
1997	--	19.4	17.9	--	--	--	--	--	--	--	--	1.6
1998	--	19.5	17.5	--	--	--	--	--	--	--	--	2.0
Peaches:												
1996	1,052.3	1,021.9	384.9	497.2	91.6	--	--	--	--	16.4	31.9	637.0
1997	1,312.3	1,254.2	563.4	553.9	100.5	--	--	--	--	17.1	19.4	690.8
1998	1,212.9	1,175.5	513.2	492.6	92.9	--	--	--	--	12.5	64.3	662.3
Pears:												
1996	820.6	820.3	459.6	8/ 304.0	--	--	--	--	--	4.9	--	360.7
1997	1,042.5	1,041.9	572.3	8/ 410.0	--	--	--	--	--	5.4	--	469.6
1998	926.2	923.9	519.9	8/ 342.0	--	--	--	--	--	3.5	--	404.0
Pineapples:												
1996	--	347.0	115.0	--	--	--	--	--	--	--	--	232.0
1997	--	324.0	103.0	--	--	--	--	--	--	--	--	221.0
1998	--	332.0	111.0	--	--	--	--	--	--	--	--	221.0
Plums, CA:												
1996	228.0	228.0	--	--	--	--	--	--	--	--	--	--
1997	246.0	246.0	--	--	--	--	--	--	--	--	--	--
1998	187.0	187.0	--	--	--	--	--	--	--	--	--	--
Prunes, CA:												
1996	223.0	223.0	--	--	--	--	--	--	--	223.0	--	223.0
1997	220.0	211.0	--	--	--	--	--	--	--	211.0	--	211.0
1998	108.0	103.0	--	--	--	--	--	--	--	103.0		103.0
Other prunes & plums 9/:												
1996	19.5	18.7	10.7	5.7	0.5	--	--	--	--	1.9	--	8.1
1997	25.5	23.7	10.5	8.7	1.7	--	--	--	--	2.8	--	13.2
1998	25.6	24.8	11.8	7.3	1.7	--	--	--	--	4.2	--	13.1
Strawberries:												
1996	813.0	813.0	606.3	--	--	--	--	--	--	--	--	206.7
1997	814.4	813.9	600.9	--	--	--	--	--	--	--	--	213.0
1998	844.3	844.1	581.9	--	--	--	--	--	--	--	--	262.2

-- = Not available.

1/ For all items except bananas and California apricots, dates, plums, and prunes, some quantities canned, frozen, or otherwise processed are included in other utilization categories to avoid disclosure of individual operations. 2/ Some totals do not add due to rounding. 3/ Tart cherries, juice, wine, and brined; sweet cherries, frozen, juice, etc.; and olives, chopped, minced, brined, and other cured. 4/ Missing data are not published to avoid disclosure of individual operations, but are included in total. 5/ Frozen, juices, and etc. 6/ Canning size fruit only, mostly whole and pitted but also includes some chopped and sliced. 7/ Limited (canned, sliced, chopped, wedged, and undersize). 8/ Mostly canned, includes small quantities dried; other, excluding California dried pears, uses not published by State to avoid disclosure of individual operations. 9/ Dried basis. 10/ Michigan, Idaho, Oregon, and Washington.

Source: National Agricultural Statistics Service, USDA.

Table 29--Value of fruit and tree nut crops, by State, 1996-98 1/

State	Crop value			Share of U.S.		
	1996	1997	1998	1996	1997	1998
	--1,000 dollars--			--Percent--		
Alabama	6,958	16,274	11,898	0.1	0.1	0.1
Arizona	109,624	88,607	86,601	1.0	0.7	0.8
Arkansas	9,097	14,690	8,509	0.1	0.1	0.1
California	6,462,125	7,596,569	6,608,391	56.5	59.3	58.2
Colorado	13,677	10,533	19,708	0.1	0.1	0.2
Connecticut	8,396	9,620	8,010	0.1	0.1	0.1
Delaware	3,663	2/	2/	3/	3/	3/
Florida	1,763,843	1,718,303	1,738,270	15.4	13.4	15.3
Georgia	69,022	131,835	81,736	0.6	1.0	0.7
Hawaii	164,701	161,610	149,861	1.4	1.3	1.3
Idaho	35,198	22,823	21,425	0.3	0.2	0.2
Illinois	15,415	17,163	12,233	0.1	0.1	0.1
Indiana	15,692	14,767	16,119	0.1	0.1	0.1
Iowa	3,125	2,148	2,439	3/	3/	3/
Kansas	795	4,084	485	3/	3/	3/
Kentucky	3,284	1,662	3,119	3/	3/	3/
Louisiana	10,972	10,053	13,544	0.1	0.1	0.1
Maine	12,746	11,992	8,870	0.1	0.1	0.1
Maryland	7,743	12,785	9,331	0.1	0.1	0.1
Massachusetts	136,880	155,540	127,458	1.2	1.2	1.1
Michigan	201,979	242,239	207,176	1.8	1.9	1.8
Minnesota	8,644	7,757	8,304	0.1	0.1	0.1
Mississippi	1,755	3,010	2,066	3/	3/	3/
Missouri	9,917	13,810	9,896	0.1	0.1	0.1
Montana	893	830	2,040	3/	3/	3/
New Hampshire	8,500	8,400	4,340	0.1	0.1	3/
New Jersey	105,402	105,043	97,541	0.9	0.8	0.9
New Mexico	17,840	44,673	42,180	0.2	0.3	0.4
New York	208,826	200,362	171,229	1.8	1.6	1.5
North Carolina	47,935	44,849	56,319	0.4	0.4	0.5
Ohio	32,360	20,704	24,648	0.3	0.2	0.2
Oklahoma	1,275	20,283	13,131	3/	0.2	0.1
Oregon	266,646	324,301	276,294	2.3	2.5	2.4
Pennsylvania	102,394	119,099	93,608	0.9	0.9	0.8
Rhode Island	804	907	548	3/	3/	3/
South Carolina	9,977	34,807	36,376	0.1	0.3	0.3
Tennessee	2,634	3,163	3,384	3/	3/	3/
Texas	61,415	93,611	91,118	0.5	0.7	0.8
Utah	14,243	12,128	14,312	0.1	0.1	0.1
Vermont	8,195	9,163	6,205	0.1	0.1	0.1
Virginia	34,580	29,981	28,032	0.3	0.2	0.2
Washington	1,283,429	1,279,215	1,029,959	11.2	10.0	9.1
West Virginia	16,826	14,380	10,770	0.1	0.1	0.1
Wisconsin	145,711	170,522	188,756	1.3	1.3	1.7
United States	11,445,136	12,804,295	11,346,239	100.0	100.0	100.0

1/ Crop value does not include avocados, tart cherries, cranberries, guavas, dried prunes from California, kiwifruit, and walnuts for 1998.

2/ Estimates discontinued in 1997.
3/ Less than 0.05 percent.

Source: National Agricultural Statistics Service, USDA.

Table 30--Almonds: Production, supply, and distribution in selected countries, 1996/97-1998/99

Country/ Marketing Year 1/	Beginning stocks	Production	Imports	Total supply	Exports	Domestic consumption	Ending stocks
				Metric tons, in-shell basis			
Greece							
1996/97	1,153	12,800	480	14,433	260	12,500	1,673
1997/98	1,673	14,500	500	16,673	1,500	12,600	2,573
1998/99 F	2,573	13,100	700	16,373	1,373	12,550	2,450
Italy							
1996/97	500	6,000	14,728	21,228	1,071	19,657	500
1997/98	500	11,000	13,000	24,500	1,000	22,500	1,000
1998/99 F	1,000	9,000	14,500	24,500	1,000	23,000	500
Morocco							
1996/97	957	5,100	43	6,100	0	6,000	100
1997/98	100	11,000	10	11,110	0	10,800	310
1998/99 F	310	8,000	30	8,340	0	8,200	140
Spain							
1996/97	8,500	60,000	20,200	88,700	33,600	51,100	4,000
1997/98	4,000	75,000	25,800	104,800	50,800	47,000	7,000
1998/99 F	7,000	30,000	27,000	64,000	32,000	30,000	2,000
Turkey							
1996/97	2,500	14,300	170	16,970	664	14,706	1,600
1997/98	1,600	11,000	3,000	15,600	100	14,500	1,000
1998/99 F	1,000	14,000	2,000	17,000	200	14,800	2,000
United States 2/ 3/ 4/							
1996/97	42,093	231,332	72	273,497	179,577	72,012	21,908
1997/98	21,908	344,277	62	366,247	205,432	82,798	78,017
1998/99 F	78,017	235,868	110	313,995	190,000	78,455	45,540
Total							
1996/97	55,703	329,532	35,693	420,928	215,172	175,975	29,781
1997/98	29,781	466,777	42,372	538,930	258,832	190,198	89,900
1998/99 F	89,900	309,968	44,340	444,208	224,573	167,005	52,630

F=Forecast.

1/ Marketing Years: August-July for the United States; June-July for Morrocco; September-August for Spain, Turkey; October-September for Greece.

2/ U.S. import data are from Census Bureau with input from the Almond Board of California (ABC). Import forecast originates with Foreign Agricultural Service, USDA.

3/ U.S. export and stock data for 1996/97 and 1997/98 come from the ABC; 1998/99 export forecast based upon preliminary data from the ABC; 1998/99 stock estimate from ABC.

4/ U.S. production forecast for 1998/99 by the National Agricultural Statistics Service, USDA.

Sources: U.S. Agricultural Attache Reports, Bureau of Census, and USDA/NASS.

Table 31--Walnuts: Production, supply, and distribution in selected countries, 1996/97-1998/99

Country/ Marketing Year 1/	Beginning stocks	Production	Imports	Total supply	Exports	Domestic consumption	Ending stocks
				Metric tons, in-shell basis			
Chile							
1996/97	150	10,950	6	11,106	8,880	1,700	526
1997/98	526	9,955	35	10,516	8,570	1,700	246
1998/99 F	246	10,930	10	11,186	9,310	1,700	176
China							
1996/97	0	238,000	50	238,050	50,000	188,050	0
1997/98	0	249,000	124	249,124	45,663	203,461	0
1998/99 F	0	255,000	500	255,500	35,000	220,500	0
France							
1996/97	0	22,050	11,200	33,250	14,200	19,050	0
1997/98	0	23,500	12,500	36,000	15,500	20,500	0
1998/99 F	0	28,000	9,000	37,000	16,000	21,000	0
India							
1996/97	3,200	29,000	0	32,200	13,780	12,000	6,420
1997/98	6,420	25,000	0	31,420	15,000	12,800	3,620
1998/99 F	3,620	30,000	0	33,620	16,000	13,500	4,120
Italy							
1996/97	500	12,000	15,848	28,348	1,000	26,348	1,000
1997/98	1,000	21,000	10,000	32,000	1,200	29,800	1,000
1998/99 F	1,000	15,000	15,000	31,000	1,000	29,000	1,000
Turkey							
1996/97	3,900	66,000	1,254	71,154	952	66,002	4,200
1997/98	4,200	66,000	2,000	72,200	700	67,000	4,500
1998/99 F	4,500	67,000	2,000	73,500	500	68,000	5,000
United States 2/ 3/ 4/							
1996/97	59,002	188,696	6,445	254,143	113,684	96,031	44,428
1997/98	44,428	244,030	319	288,777	103,828	110,850	74,099
1998/99 F	74,099	205,931	6,000	286,030	105,000	114,577	66,453
Total							
1996/97	66,752	566,696	34,803	668,251	202,496	409,181	56,574
1997/98	56,574	638,485	24,978	720,037	190,461	446,111	83,465
1998/99 F	83,465	611,861	32,510	727,836	182,810	468,277	76,749

F=Forecast.

1/ Marketing Years: March-February for Chile; August-July for the United States; September-August for Italy and Turkey; October-September for China, France, and India.

2/ U.S. export and import data are from Census Bureau with forecasts by USDA/Foreign Agricultural Service.

3/ For conversion of shelled exports, U.S. domestic shelling ratios of .410 and .411 for 1996/97 and 1997/98 originate from calculations of data from National Agricultural Statistics Service; U.S. domestic shelling ratio for 1998/99 is .419, based upon a 3-year average. FAS converted imports to an in-shell basis using U.S. shelling ratios.

4/ U.S. stock data comes from the Walnut Marketing Board (WMB).

Sources: U.S. Agricultural Attache Reports, Bureau of Census, and USDA/NASS.

Table 32--Hazelnuts: Production, supply, and distribution in selected countries, 1996/97-1998/99

Country/ Marketing Year 1/	Beginning stocks	Production	Imports	Total supply	Exports	Domestic consumption	Ending stocks
				Metric tons, in-shell basis			
Italy							
1996/97	60,000	95,000	36,491	191,491	55,468	106,023	30,000
1997/98	30,000	77,000	45,000	152,000	27,000	115,000	10,000
1998/99 F	10,000	130,000	30,000	170,000	53,000	115,000	2,000
Spain							
1996/97	5,100	6,500	12,300	23,900	7,900	15,000	1,000
1997/98	1,000	16,000	8,800	25,800	11,800	14,000	0
1998/99 F	0	10,000	12,000	22,000	8,000	14,000	0
Turkey							
1996/97	60,000	440,000	1	500,001	334,637	60,364	105,000
1997/98	105,000	475,000	0	580,000	400,000	55,000	125,000
1998/99 F	125,000	625,000	0	750,000	375,000	175,000	200,000
United States 2/ 3/ 4/							
1996/97	4,788	17,236	9,947	31,971	16,398	15,106	467
1997/98	467	42,640	10,765	53,872	25,365	26,784	1,723
1998/99 F	1,723	14,061	13,000	28,784	12,000	16,284	500
Total							
1996/97	129,888	558,736	58,739	747,363	414,403	196,493	136,467
1997/98	136,467	610,640	64,565	811,672	464,165	210,784	136,723
1998/99 F	136,723	779,061	55,000	970,784	448,000	320,284	202,500

F=Forecast. N/A = Not available.

1/ Marketing Years: July-June for the United States; September-August for Spain, Italy and Turkey.

2/ U.S. export and import data are from Census Bureau with forecasts by USDA/Foreign Agricultural Service.

3/ The shelling ratios for U.S. exports and imports for 1996/97 are 0.3920 and 0.3630 based on the Nationa

Agricultural Statistics Service/USDA. For 1998/99, FAS used a shelling ratio of .405, an average based on the last three years.

4/ The 1998/99 production forecast comes from the National Agricultural Statistics Service (NASS).

Sources: U.S. Agricultural Attache Reports, Bureau of Census, and USDA/NASS.

Table 33--Macadamia nuts: Production, supply, and distribution in selected countries, 1996/97-1998/99

Country/ Marketing Year 1/	Beginning stocks	Production	Imports	Total supply	Exports	Domestic consumption	Ending stocks
				Metric tons, in-shell basis			
United States 2/ 3/ 4/							
1996/97	0	25,628	11,379	37,007	4,593	32,414	0
1997/98	0	26,308	13,555	39,863	3,240	36,623	0
1998/99 F	0	24,040	16,000	40,040	3,000	37,040	0
Australia							
1996/97	0	25,400	0	25,400	15,141	7,759	2,500
1997/98	2,500	24,500	0	27,000	16,959	9,041	1,000
1998/99 F	1,000	30,000	0	31,000	19,000	11,000	1,000
Kenya							
1996/97	700	6,800	0	7,500	6,819	321	360
1997/98	360	7,000	0	7,360	6,900	321	139
1998/99 F 5/	N/A	N/A	N/A	N/A	N/A	N/A	N/A
South Africa							
1996/97	0	5,505	0	5,505	3,916	849	740
1997/98	740	6,390	0	7,130	5,400	500	1,230
1998/99 F	1,230	7,350	0	8,580	6,500	500	1,580
Costa Rica							
1996/97	855	2,800	0	3,655	3,351	265	39
1997/98	39	2,000	0	2,039	1,244	265	530
1998/99 F	530	2,300	0	2,830	2,200	270	360
Guatemala							
1996/97	120	2,507	0	2,627	2,507	15	105
1997/98	105	2,800	0	2,905	2,775	20	110
1998/99 F	110	3,500	0	3,610	3,475	25	110
Brazil							
1996/97	0	1,300	0	1,300	130	1,170	0
1997/98	0	1,600	0	1,600	250	1,350	0
1998/99 F	0	1,760	0	1,760	270	1,490	0
Total							
1996/97	1,675	69,940	11,379	82,994	36,457	42,793	3,744
1997/98	3,744	70,598	13,555	87,897	36,768	48,120	3,009
1998/99 F	N/A	N/A	N/A	N/A	N/A	N/A	N/A

F=Forecast. N/A = Not available.

1/ Marketing Years: July-June for the United States and Australia; January-December for Kenya, South Africa, Costa Rica, and Guatemala; February-January for Brazil.

2/ U.S. export and import data are from Census Bureau with forecasts by USDA/Foreign Agricultural Service with shelling ratios of 0.216 for 1995/96, 0.228 for 1996/97, and 0.23 for 1997/98; a shelling ratio average of 0.224 was used for 1998/99 on an average of the past three years. Shelling ratios originate from the Hawaii Agricultural Statistics Service (HASS).

3/ U.S. exports include only prepared and preserved macadamia nuts. The National Agricultural Statistics Service (NASS) in Hawaii indicates that few U.S. exports are shelled or in-shell macadamias.

4/ Domestic consumption derived from production and exports.

5/ Information on the 1998/99 crop was not available from the FAS office in Nairobi due to a reporting delay caused by the bombing of the U.S. embassy in August 1998.

Sources: U.S. Agricultural Attache Reports, Bureau of Census, and USDA/NASS.