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U.S. Vegetable Industry in the 1980's

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The recent surge of consumer interest in diet, health, and fitness has increased the demand for vegetables, and the industry has responded by expanding acreage and increasing output.

Per capita consumption of vegetables increased 5 percent between 1970 and 1983, with some items really big gainers—notably broccoli and cauliflower (table 1). Broccoli consumption jumped 160 percent to 4.2 pounds in 1983, and cauliflower saw a 130-percent rise to 2.5 pounds. Preliminary data for 1984 indicate that per capita use of both increased another 11 percent.

Vegetable production is centered in the West (figure 1). However, the growing fondness for some items has brought shifts in the location, size, and number of farms over the last decade. Since the mid-1970's, for example, broccoli has been adopted in many Southeastern States as an alternative crop, while Texas led all States in expanding production. In contrast, the processed tomato crop has concentrated in the West, with its favorable growing conditions, as U.S. consumption has leveled off and competition from European suppliers increased in East Coast markets.

Demand for vegetables is expected to continue increasing for the remainder of this decade. This prospect and the farm sector's responsiveness suggest that the industry will successfully adjust for the rest of the 1980's.

Population, Income, and Tastes Shift Demand

Population growth is the most important demographic factor affecting the long-run demand for food. However, beyond the impact of an increasing number of people, the distribution of the population according to age and sex also

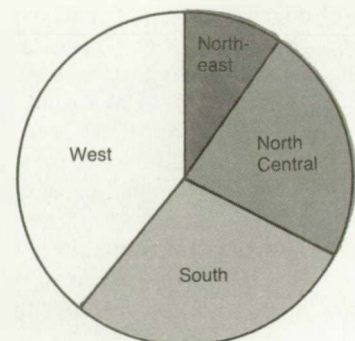
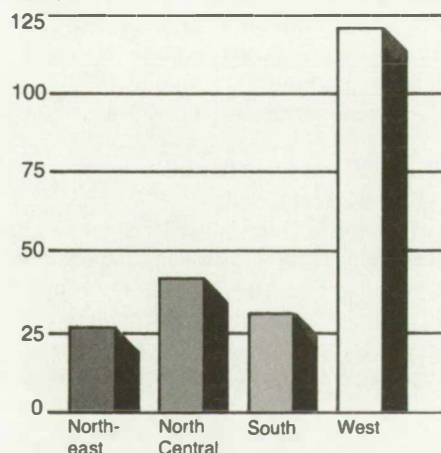
Table 1. Our Changing Tastes for Vegetables

Commodity	1971-73	1974-76	1977-79	1980-82	1983-85 ¹
Pounds per person ²					
Snap beans					
Canned	4.0	4.0	4.0	4.0	3.2
Frozen	1.3	1.1	1.2	1.3	1.3
Broccoli					
Fresh	.7	1.0	1.3	1.9	2.3
Frozen	1.3	1.3	1.7	2.0	2.3
Carrots					
Fresh	6.4	6.6	5.7	7.2	7.5
Canned	.8	.7	.7	.5	.8
Frozen	1.5	1.7	1.8	1.8	2.0
Cauliflower					
Fresh	.8	.9	1.1	1.5	1.8
Frozen	.5	.6	.7	.7	.8
Corn					
Fresh	7.3	7.8	7.4	7.2	7.5
Canned	15.6	13.7	14.6	13.4	12.8
Frozen	5.6	5.7	6.9	7.3	8.5
Green peas					
Canned	7.1	6.3	6.4	5.7	4.5
Frozen	4.9	4.6	4.3	4.0	4.3
Tomatoes					
Fresh	12.1	12.1	12.8	13.5	15.0
Canned	52.7	60.2	56.5	54.0	60.8

¹Preliminary. ²Data are 3-year averages and are on a fresh weight equivalent basis.

Figure 1. Vegetable Industry Is Centered in the West

Average vegetable
acres per farm



Source: 1982 Census of Agriculture.

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plays a major role. Generally, vegetable consumption increases until a person reaches 65 years of age, then tapers off slightly. Households with more women usually show higher vegetable expenditures. As the population becomes more "middle-aged" and more women enter the work force, the demand for nutritious and convenient vegetables is expected to increase.

The demand for vegetables is widely considered to be income inelastic; that is, if income increases by 1 percent, expenditures for vegetables will rise by less than that amount. Thus, the share of total income spent on vegetables shrinks. This relationship between income and demand suggests that a growing economy won't necessarily bring substantial increases in vegetable use. Rather, changes in annual production are more important influences on vegetable prices and consumption.

Consumers demand more than just food, though. They also want convenience, prestige, and other product qualities added by processors. That's why estimates indicate that increases in real (adjusted for inflation) income will mean the biggest gains for frozen vegetables, followed by fresh market and canned vegetables.

After analyzing nationwide surveys of household budgets for the 1970's, researchers agree that American tastes and preferences are also important factors affecting vegetable consumption. Consumer attitudes are often changed by the results of medical, economic, and social research. In the last 10 years, per capita consumption of fresh vegetables rose while that for canned vegetables stabilized, suggesting that consumer preferences shifted with medical evidence indicating that diets high in vitamins and fiber—more readily available in fresh products—provide health benefits.

Because the U.S. population is increasingly concerned about the relationship



The number of farms producing cauliflower increased about 8% a year from 1978 to 1982, and acreage harvested rose 4% a year to more than 50,000 acres.

between health and diet, nutritionists expect consumers to add more vegetables that are high in vitamins and fiber—like broccoli and cauliflower—to their diets. These vegetables are increasingly popular among consumers who demand versatile and nutritious foods.

Broccoli and cauliflower are sold fresh and frozen, although greater demand has pushed the trend toward fresh (*figure 2*). In 1971, roughly 35 percent of broccoli production was fresh. Seven years later, production was evenly split between fresh and frozen and, by 1984, producers sent 66 percent to the fresh market.

Similarly, consumption of fresh cauliflower nearly doubled to an average of 1.8 pounds from the mid-1970's to the early 1980's. Frozen consumption increased less, from about 0.6 pound in 1974-76 to 0.8 pound per person in 1983-85.

Broccoli and Cauliflower Show Biggest Changes

Broccoli is chiefly a California crop, but its widely adaptable growing requirements have allowed many States to expand production. The number of farms harvesting broccoli increased at an average annual rate of 14 percent to 2,609 units between

1978 and 1982, while area increased 4 percent annually to 80,277 acres (*table 2*).

Although Western growers still produce most of the commercial broccoli, acreage there declined to 88 percent of the U.S. total in 1982, down from 95 percent in 1978. California packed over 90 percent of all frozen broccoli in the early 1980's, up from 80 percent in 1971. California's increasing share of the processed market and its declining share of total acreage indicate the important role of other States in expanding production to meet the greater demand for fresh broccoli.

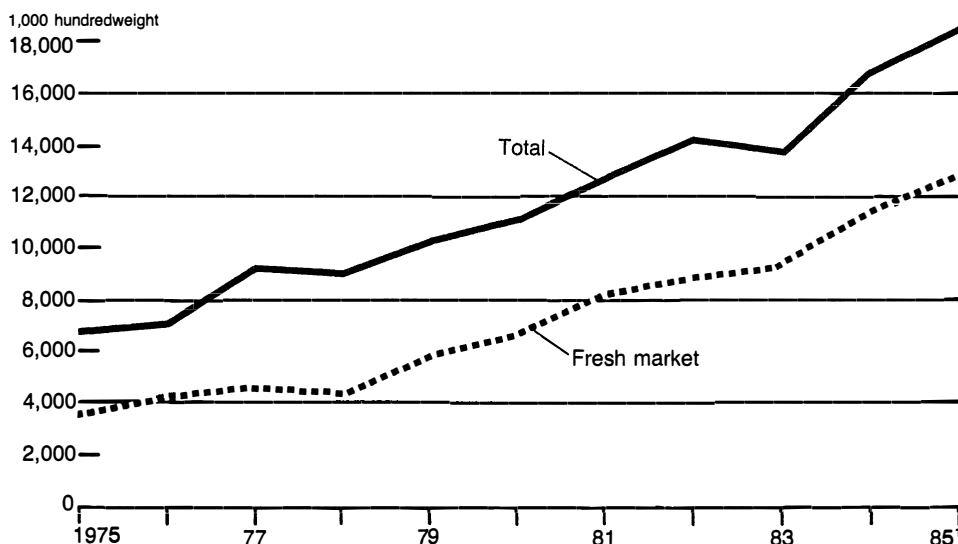
Growers in the Northeastern and North Central States claim about 3 percent of total broccoli acreage, 2,521 acres in 1982, but over 50 percent of the farms. On average, these growers had only 2 acres in 1982, but that was double the size in 1978. Growers in the South increased broccoli acreage at an average rate of 28 percent annually. Texas averaged 18 acres in 1982, up from 14 in 1978, and total production increased 38 percent annually (*table 3*). The share of total U.S. acreage in broccoli increased

the most in the South, rising from 3 percent in 1978 to 9 percent.

Although 73 percent of the 5.4 million hundredweight (cwt) of cauliflower produced in 1981-83 was from California, increasing popularity also meant greater production in other States. Arizona led the acreage increase with a 150-percent jump to 182 acres per farm. At the same time, average yields nearly doubled, raising Arizona's output 29 percent annually from 1978 to 1982. In Texas, the average yield rose from 57 cwt per acre in the late 1970's to 84 cwt in the early 1980's, helping push production up 23 percent annually.

The total number of farms producing cauliflower increased 8 percent annually from 1978 to 2,628 farms in 1982, while area harvested rose 4 percent per year to 50,168 acres.

Figure 2. Broccoli and Cauliflower Use Shifts to Fresh Market



¹Economic Research Service estimate.

Table 2. Where Vegetables Are Grown

	Broccoli		Cauliflower		Celery		Lettuce		Tomatoes	
	1978	1982	1978	1982	1978	1982	1978	1982	1978	1982
Northeast										
Farms	522	928	816	1,195	90	80	779	756	4,881	4,675
Acres	751	1,533	2,239	3,375	638	1,045	8,072	8,019	24,660	23,237
North Central										
Farms	220	572	496	707	85	81	281	235	4,506	4,118
Acres	192	988	1,870	2,603	2,790	3,962	4,764	2,837	44,501	43,769
South										
Farms	172	401	59	104	51	37	207	194	6,804	6,010
Acres	2,396	7,291	1,759	2,222	11,639	10,466	23,438	13,157	85,990	80,892
West										
Farms	484	593	484	529	196	199	1,052	1,158	2,454	2,473
Acres	64,553	70,326	36,953	41,863	22,178	23,454	216,257	204,592	266,808	255,471
United States¹										
Farms	1,471	2,609	1,938	2,628	480	451	2,449	2,451	18,661	17,290
Acres	67,911	80,277	42,924	50,168	37,859	39,455	252,953	229,887	412,960	403,469

¹U.S. totals include farms not in State reports, so regional figures will not add exactly to U.S. totals.

Source: Bureau of the Census, Department of Commerce.

Table 3. Fresh Market Vegetable Production Shifts To Meet Demand

	1976-78 ¹	1981-83 ¹	Average annual growth
	1,000 hundredweight		Percent
Broccoli²			
Arizona	42	62	8
California	4,926	7,460	8
Oregon	77	159	15
Texas	83	549	38
Total	5,128	8,230	9
Cauliflower			
Arizona	78	335	29
California	2,804	3,927	7
Michigan	48	79	10
New York	264	437	10
Oregon	289	478	10
Texas	34	109	23
Total	3,517	5,365	8
Celery			
California	11,487	13,167	3
Florida	3,916	3,586	-2
Michigan	1,009	1,429	7
Other ³	477	503	1
Total	16,889	18,685	2
Lettuce			
Arizona	8,054	10,522	5
California	43,877	44,816	0
Florida	1,677	2,478	8
Michigan	261	287	2
New Jersey	587	568	-1
New York	610	787	5
Texas	858	866	0
Other ⁴	2,788	2,634	-1
Total	58,712	62,958	1
Tomatoes			
California	7,129	7,639	1
Florida	8,411	12,662	8
Michigan	392	397	0
New Jersey	553	676	4
North Carolina	280	282	0
Virginia	325	351	2
Other ⁵	4,268	4,656	2
Total	21,358	26,663	4

¹Three-year averages. ²Includes fresh and processed use. ³Includes New York and Ohio. ⁴Includes Colorado, New Mexico, Ohio, Washington, and Wisconsin. ⁵Includes Alabama, Arkansas, Georgia, Indiana, Louisiana, Maryland, Massachusetts, New York, Ohio, Pennsylvania, South Carolina, Tennessee, and Texas.

Source: Statistical Reporting Service, USDA.

Eating Out Brings Greater Demand for Salad Vegetables

Salad bars in restaurants and other places became very popular by the 1970's, and this popularity shows no signs of decreasing for the remainder of the 1980's. The convenience and visibility of salad bars featuring such vegetables as Belgian endive and garbanzo beans, along with the traditional lettuce, tomatoes, onions, and carrots, served to meet consumer demand for quick, low-cost, low-calorie meals.

Lettuce benefited from increased away-from-home eating and greater concerns about health and diet during the 1960's and early 1970's. Per capita consumption of lettuce increased at an average annual rate of about 1.5 percent during 1962-77, but leveled off at 26 pounds during the late 1970's and early 1980's.

This stability in demand has served to shift the principal sources of supply to the West. Acreage in the South and North Central States declined about 14 percent annually between 1978 and 1982. Thus, California and Arizona, with comparative advantages in weather and irrigation, produce the majority of lettuce for the United States. Western producers accounted for almost 90 percent of the 63 million cwt grown in 1981-83, with California alone claiming 71 percent of the U.S. total.

Though efforts to increase demand for lettuce have spawned new types in supermarket produce sections, such as Butterhead and Cos, iceberg lettuce remains dominant. However, interest in varieties from new technologies continues. In the Northeast, growers closer to populated markets are looking for research and development firms for new ways to produce lettuce, including hydroponic culture—growing the crop in water.

Celery has begun to enjoy a resurgence in popularity. Celery consumption, which dipped during the 1960's to 6.7 pounds

per person, revived in the 1970's and is climbing in the 1980's. The 1980-82 average of 7.8 pounds was the highest level since the early 1960's. However, Texas production is not counted in the estimates of total supply because of its relatively recent entry into the market. Thus, USDA's per capita consumption figure, calculated by subtracting exports from estimates of supply, may understate the recent rise in demand. Signs which point to continued production of celery in Texas indicate that demand is increasing and production regions are shifting to meet it.

Celery production is centered in California, where about 70 percent of the crop is harvested, but Florida and Michigan are important States with 19 and 7.7 percent of production. Although the number of U.S. farms harvesting celery declined from 480 in 1978 to 451 in 1982, total acreage increased about 1 percent a year to 39,500 acres in 1982.

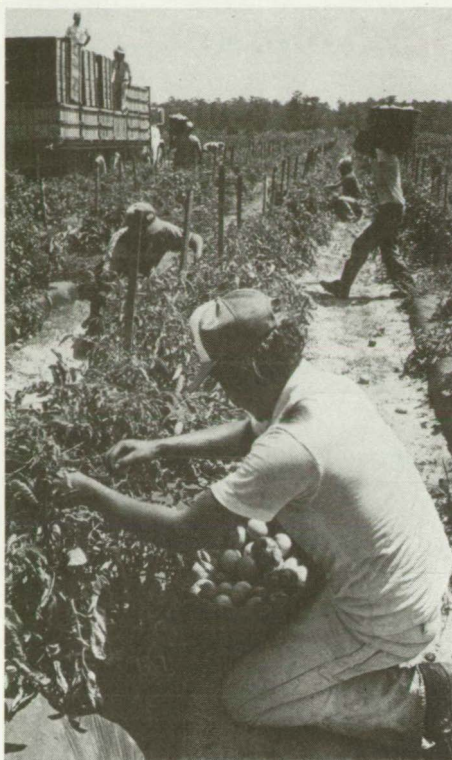
Acreage in Texas expanded from 74 in 1978 to 869 acres in 1982. The number of farms, however, dropped from 6 to 5, increasing the average to 174 acres.

Acreage shifts from 1978 to 1982 reduced the South's share of total U.S. celery area from 31 to 26 percent and raised the share in the Northeast and North Central States from 9 to 13 percent.

Tomatoes Are America's Favorite Vegetable

Tomatoes now rank second only to potatoes in per capita consumption. The tomato did not gain popularity in the United States until about the mid-19th century, probably because it belongs to the nightshade family whose fruits are sometimes poisonous. Once the fears about tomatoes were dispelled, the vegetable quickly became popular.

Per capita consumption of tomatoes increased during the 1960's and 1970's,



More than 60% of the 403,000 acres of tomatoes harvested in 1982 were in the West. Among vegetables, tomatoes now rank second only to potatoes in per capita consumption.

reaching 75 pounds in 1974-76. Growth in demand for processed tomatoes, probably through increased dining away from home and the growing popularity of ethnic foods which use tomatoes, accounts for most of the rise in consumption during the 1960's and early 1970's. Per capita consumption of both fresh and canned tomatoes leveled off by the 1980's, however, averaging about 67 pounds in 1980-82. Preliminary data suggest that consumption will average slightly higher through the rest of the 1980's.

Commercial fresh market production is widespread in many coastal States, including Texas, South Carolina, Virginia, New Jersey, California, and Florida. In addition, the vine's hardy nature and extended harvest period make it a favorite home-gardening item. The processing tomato, also popular for home production, has been the subject of successful breeding programs which adapted it to mechanical harvesting and shifted commercial production to California in the 1970's.

Of the more than 403,000 tomato acres harvested in 1982, over 63 percent were

in the West where both fresh and processing varieties are cultivated. California farms average the largest—162 acres. In Florida, where most of the tomato crop is for fresh market, the share of U.S. acreage increased from 11 percent in 1978 to 13 percent in 1982, and average acreage per farm increased from 111 to 133 acres.

Competition from foreign suppliers for the U.S. tomato market will continue to pressure domestic producers through the 1980's. Winter weather periodically reduces Florida's ability to supply fresh tomatoes just when Mexican producers are approaching peak harvest. The combination of recent weather shocks in Florida and continued high exchange rates for the U.S. dollar encourage Mexican growers to increase fresh tomato acreage, even at the risk of a supply glut. In the European Community (EC), government efforts to increase processed tomato production have led to large supplies which are exported to U.S. markets.

Enlargement of the EC, with the scheduled admission of Spain and Portugal in 1986, and U.S. efforts to lower trade barriers with all countries point to continued pressure on U.S. growers. Increased exports to the United States, largely through the East Coast, have already reduced production there and helped spur greater concentration in the West.

The challenge for the vegetable industry remains one of supplying high-quality produce in cost-effective, timely, and convenient ways. Changing consumer attitudes and shifts in supply regions are just two trends to watch during the 1980's and 1990's. Improved crop selection through biotechnology, advances in electronic marketing, and new packaging techniques are also developments which will aid the industry in a competitive marketplace. □