

Commodity Highlight: Garlic

Garlic has a long and colorful history with mention in the Bible, ancient Chinese writings, and in various literary works by authors such as William Shakespeare, Dante, and Francis Bacon. Thought to have originated in central Asia around Siberia, garlic was revered by both the ancient Egyptians and the Chinese. In the United States, garlic is primarily used as a food flavoring agent and condiment. In some countries, the green tops are used in a manner similar to scallions. Garlic in its whole raw form has little odor until the cloves are crushed, releasing the pungent scent.

Garlic (*Allium sativum*) is a member of the amaryllis (lily) family and is related to onions, shallots, chives, and leeks. The two main types are hardneck and softneck, with softneck varieties such as California Early accounting for most of the garlic consumed in the United States. Elephant garlic is not true garlic, but a type of leek that is a close relative of garlic and onions.

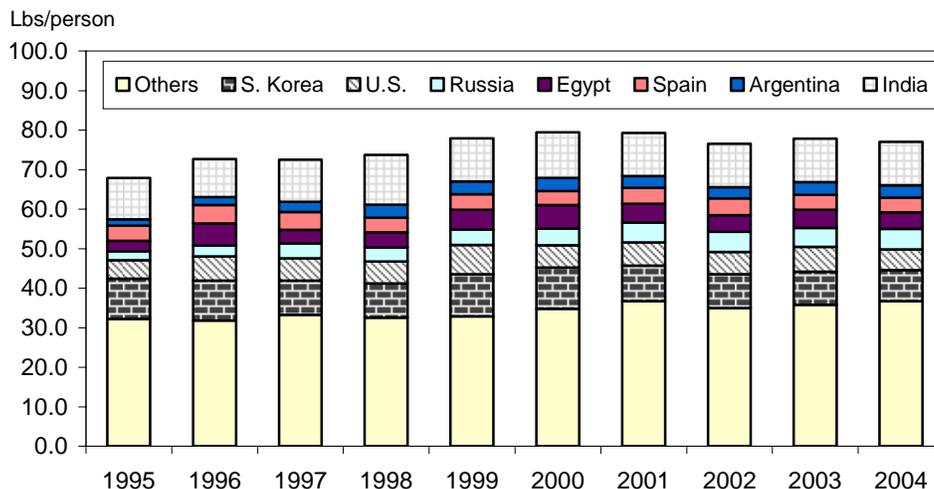
Garlic production is concentrated both internationally and domestically. According to the Food and Agriculture Organization of the United Nations, China is by far the top source of garlic, with an estimated 23 billion pounds annually—75 percent of world output. The majority comes from the Shandong Province—a prime agricultural area located just southeast of Beijing. India (4 percent) and South Korea (3 percent) round out the top three producers worldwide. The United States is the fourth leading garlic producer, with 2 percent of the world crop.

California Is the Dominant Domestic Supplier

In the United States, garlic appears to have gained in popularity as a cash crop over the past 10-15 years. According to the 2002 Census of Agriculture (census), 1,855 farms reported garlic acreage—up from 1,327 farms in 1997 and only 619 farms in 1992. California produces the majority of commercial garlic in the country on just 339 farms—down from a peak of 362 farms in 1997.

According to the census, garlic is now grown in every State except Alaska. California harvests 89 percent of the United States commercial garlic acreage, with

Figure 13
U.S. garlic: World production, excluding China



Source: United Nations, Food and Agriculture Organization, FAOStat (9/2006).

Table 19--U.S. garlic, all uses: Area, production, and value 1/

| | Acres | | Yield per acre | Production | Average price 2/ \$/cwt | Crop value \$ Mil. |
|------|-------------|-----------|-------------------|------------|-------------------------------|--------------------------|
| | Planted | Harvested | | | | |
| | 1,000 acres | | Cwt | 1,000 cwt | | |
| 1985 | 15.0 | 14.6 | 165 | 2,420 | 30.95 | 74.9 |
| 1990 | 20.0 | 19.2 | 179 | 3,413 | 21.25 | 72.7 |
| 1995 | 28.5 | 28.5 | 165 | 4,703 | 31.40 | 147.7 |
| 2000 | 37.9 | 34.8 | 160 | 5,581 | 27.80 | 155.0 |
| 2001 | 37.2 | 35.2 | 167 | 5,877 | 29.40 | 173.0 |
| 2002 | 34.8 | 32.8 | 172 | 5,650 | 27.60 | 155.7 |
| 2003 | 37.0 | 35.0 | 178 | 6,241 | 25.70 | 160.2 |
| 2004 | 33.6 | 31.6 | 165 | 5,224 | 26.50 | 138.6 |
| 2005 | 29.9 | 29.4 | 158 | 4,646 | 40.90 | 190.0 |

-- = Not available. f = ERS forecast.

1/ Data for 1985 and 1990 are for California only. 2/ Season-average farm price.

Source: USDA, National Agricultural Statistics Service, *Vegetables Summary* and the California County Agricultural Commissioners (1985, 1990).

four other States harvesting more than 100 acres—Oregon, Nevada, New York, and Washington. With 3 percent of the Nation's garlic area, Nevada largely produces seed garlic under contract with California firms. Oregon growers account for 6 percent of U.S. garlic area and also produces seed stock for California firms. However, in addition to seed, about two-thirds of the garlic area in Oregon is used for the production of garlic destined for dehydrated products.

In 2005, three California counties accounted for the majority of garlic production—Fresno (76 percent of the crop), Kings (14 percent), and Kern (8 percent). The community of Gilroy in Santa Clara County is billed as the garlic capital of the world because a significant volume of the fresh-market garlic shipped from California is handled in the area.

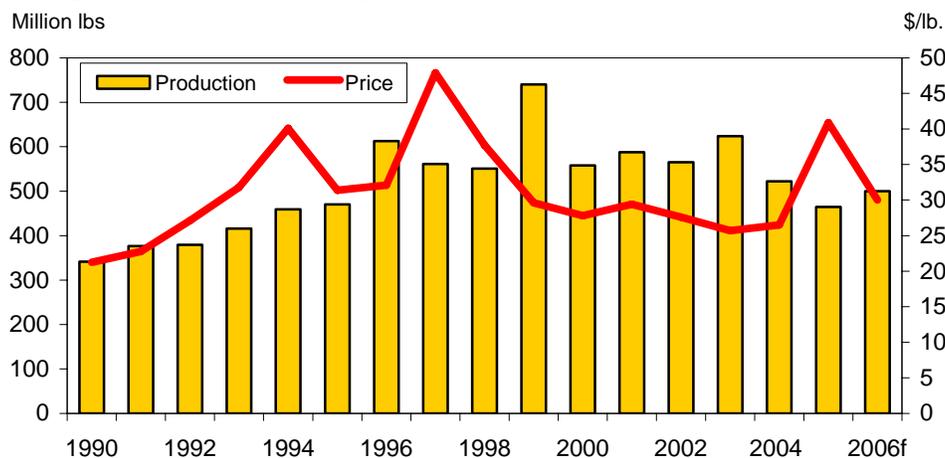
Between 1993-95 and 2003-05, U.S. garlic production increased 20 percent to an average of 537 million pounds. Garlic production in 2005 was the lowest in a decade as unusually cool, wet California weather increased disease pressure and reduced yields. An extreme summer heat wave in California came at the close of the growing season and as a result, the 2006 California garlic crop was still expected to be improved in terms of both quality and quantity from a year ago.

Garlic falls into three broad product segments—fresh-market, dehydrating, and seed stock—with each differentiated by the way the crop is grown, handled, and used. In the mid-1970s, about one-fourth of the U.S. garlic crop was estimated to have entered the fresh market. Reflecting growth in demand over the past several decades, about half of the garlic crop is sold as fresh market produce or used to make “fresh-cut” products. The remainder is sold as various dehydrated products or for certified seed. Under average market conditions, there is little overlap between these 3 markets, although some off-grade fresh market garlic is occasionally sold to dehydrators. Changing relative market prices and stock levels can also prompt some inter-segment sales, particularly between fresh and processing.

While seed and dehydrating garlic are mechanically harvested, fresh-market garlic is hand-harvested. Fresh product is carefully handled to preserve appearance (including sizing, grading, and storing) and is shipped and sold in the same manner

Figure 14

U.S. garlic: Production and grower price



f = ERS forecast.

Source: USDA, National Agricultural Statistics Service, *Vegetables Summary*.

as fresh produce. Fresh-market garlic is used to manufacture crushed, chopped, peeled, and pureed garlic products. Certain varieties of fresh-market garlic can be marketed for up to 3 months from the time of harvest with standard warehouse storage, up to 6 months if kept in cold storage, and up to a year under controlled-atmosphere storage.

Depending on the variety and location, most garlic in California is planted during the fall (October-November) and harvested in summer (June-August). Virtually all garlic produced in the major commercial growing areas is grown under contract. The garlic industry is fairly concentrated in both the fresh and dehydration markets. On the fresh side, there are just a few shippers who account for most of the market volume while three or four firms process nearly all the dehydrated product.

During 2003-05, the U.S. garlic crop had an average farm value of \$163 million—up just 5 percent from 1993-95. With season-average garlic prices averaging 5 percent below those of a decade earlier, crop value increased based on stronger production. After adjusting for inflation, constant dollar garlic prices have declined 22 percent over the past decade due to the price weakness experienced over the last several years. Despite short supplies from the small 2005 crop, wholesale prices for California garlic have been little changed. For example, prices in the Chicago wholesale market averaged just 5 percent above a year earlier during January-September of 2006. This reflected the presence of imports from China that largely filled market gaps with garlic that was priced about a fifth below that of California.

Import Share Continues to Grow

The share of garlic disappearance accounted for by imports has doubled over the past decade. In 1993-95, imports accounted for 22 percent of garlic used in the United States. However, with import volume (expressed on a fresh-weight basis) surging 218 percent between 1993-95 and 2003-05, the share of the U.S. market satisfied by imported garlic and garlic products jumped to 44 percent during 2003-05. It appears that the volume of imports has outstripped domestic demand, which led to the stagnation of domestic production and generally lower f.o.b. shipping-point prices since production peaked in 1999.

Table 20—U.S. garlic imports (product-weight), 1990-06

| Year | Fresh-market | | Powder/flour | | Other dried | | Essential oil | |
|--------|--------------|---------|--------------|---------|-------------|---------|---------------|---------|
| | Volume | Value | Volume | Value | Volume | Value | Volume | Value |
| | Mil. Lbs. | \$ Mil. | Mil. Lbs. | \$ Mil. | Mil. Lbs. | \$ Mil. | Mil. Lbs. | \$ Mil. |
| 1990 | 39.3 | 17.2 | 1.5 | 0.9 | 13.8 | 8.6 | -- | -- |
| 1991 | 41.4 | 22.9 | 2.3 | 1.0 | 9.5 | 4.9 | -- | -- |
| 1992 | 42.3 | 19.0 | 2.5 | 1.2 | 5.9 | 2.6 | -- | -- |
| 1993 | 86.9 | 27.8 | 3.2 | 1.3 | 8.4 | 4.2 | -- | -- |
| 1994 | 47.9 | 21.6 | 6.1 | 1.8 | 12.2 | 4.6 | -- | -- |
| 1995 | 50.2 | 29.0 | 5.2 | 1.6 | 11.7 | 2.9 | -- | -- |
| 1996 | 48.4 | 27.1 | 7.4 | 2.4 | 11.9 | 2.7 | 0.2 | 1.5 |
| 1997 | 38.2 | 20.4 | 3.6 | 1.0 | 13.1 | 2.3 | 0.1 | 1.4 |
| 1998 | 72.7 | 40.7 | 17.2 | 4.2 | 50.7 | 12.4 | 0.2 | 2.2 |
| 1999 | 95.6 | 45.8 | 15.5 | 6.5 | 45.8 | 13.8 | 0.1 | 0.7 |
| 2000 | 63.3 | 27.4 | 8.6 | 3.0 | 35.3 | 7.9 | 0.1 | 0.8 |
| 2001 | 80.6 | 39.9 | 12.9 | 3.4 | 37.9 | 8.2 | 0.2 | 1.6 |
| 2002 | 106.1 | 53.6 | 22.3 | 5.1 | 35.9 | 7.7 | 0.1 | 1.0 |
| 2003 | 100.7 | 43.2 | 19.2 | 4.6 | 58.9 | 11.1 | 0.2 | 1.2 |
| 2004 | 124.9 | 56.9 | 30.4 | 6.6 | 46.1 | 11.4 | 0.2 | 1.8 |
| 2005 | 152.6 | 74.5 | 29.3 | 8.8 | 42.5 | 14.9 | 0.2 | 1.8 |
| 2006 f | 112.4 | 56.6 | 19.3 | 8.3 | 23.2 | 11.1 | 0.1 | 1.5 |

-- = not available. f = ERS forecast.

Source: Derived by ERS from data of the U.S. Dept. of Commerce, U.S. Census Bureau.

Over the past several years, China has begun to ship more fresh garlic into the U.S. market, eroding the market share of domestic producers. Fresh-market garlic imports have about doubled from 62 million pounds in 1993-95 to 126 million pounds during 2003-05. China is now the source for 73 percent of fresh market garlic sold in the United States, with imports now commanding nearly half of the U.S. market. The product-weight volume of dried/dehydrated garlic imports has jumped 384 percent over the past decade. According to ERS estimates, the import share of the processing garlic market has moved from 15 percent in 1993-95 to 42 percent during 2003-05. China has long held the U.S. dried/dehydrated garlic market, accounting for 98 percent of imported dried whole garlic and garlic powder during 2003-05.

Exports claimed about 6 percent of U.S. garlic supply during 2003-05, down from 13 percent a decade earlier. Exports of fresh-market garlic have declined over the past decade, with volume dropping 46 percent between 1993-95 and 2003-05. Mexico, Canada, and Spain are the top markets for U.S. fresh garlic exports with Spain the only one of the top three markets importing more U.S. fresh garlic than a decade ago. Exports of dried/dehydrated garlic have declined 17 percent between 1993-95 and 2003-05 with volume shipped to Canada (the top market) down 15 percent over this period.

Per Capita Use Remains Relatively Strong

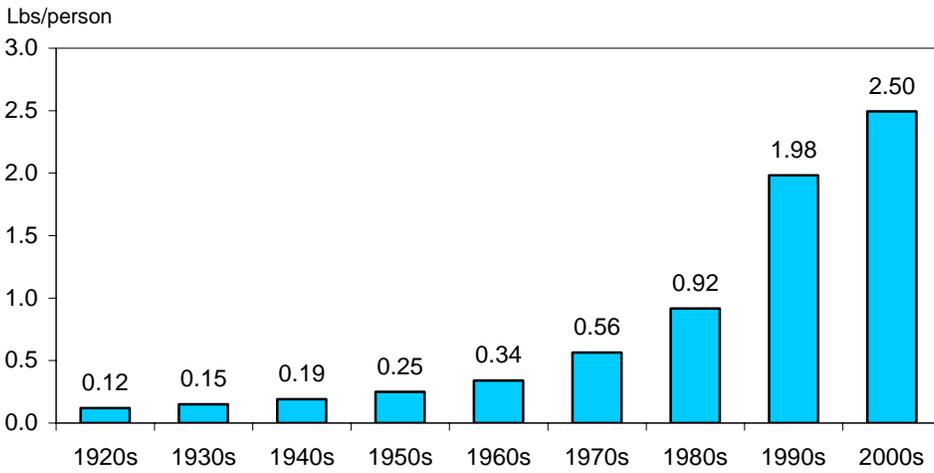
Garlic was introduced into America sometime in the 1700s and adoption and use was slow to catch on. In 1919, when the first estimates were made, per capita use of garlic was less than 0.05 pounds, but use managed to average about 0.12 pounds during the 1920s. Garlic use rose 25 percent in the 1930s and continued to accelerate until it reached an apex in the 1990s with a 115 percent leap over the 1980s. Per capita use of garlic peaked in 1999 at 3.3 pounds, reflecting a record-large California garlic crop that year. Although below the peak, garlic use has remained relatively strong this decade. During the three year period 2003-05, per capita use of garlic averaged 2.6 pounds per person annually—up from 1.8 pounds a

decade earlier. Interest in garlic reflects several factors, including the popularity of various ethnic foods and restaurants, the quest for new taste experiences, health messages circulating about garlic, and demand from the health supplements industry.

These demand factors likely reflect the view of garlic as a so-called “functional food”—a food that imparts both the usual attributes of the food plus certain perceived health-enhancing benefits. Broccoli is another example of such a food. Primarily used in cooking to enhance the palatability of a wide variety of foods, garlic provides vitamins A and C, potassium, phosphorous, selenium, several amino acids, and many different sulfur compounds.

Although the majority of garlic is consumed at home (56 percent), the away from home market is also strong. In the expanding away from home market, fast food accounts for 19 percent of garlic consumption with standard full service restaurants accounting for another 15 percent. The cuisines of many ethnic restaurants (e.g. Italian, Chinese, Korean, and Indian) prominently feature garlic-containing dishes.

Figure 15
U.S. garlic: Average per capita disappearance, by decade



Source: Computed by USDA, Economic Research Service.

Table 21--U.S. garlic, all uses: Estimated supply, disappearance, and price

| Year | Supply | | | Utilization | | | Season-ave. price | |
|----------------------|------------------|---------------|-------|---------------|----------------|----------------------|--------------------------|---------------------------|
| | Production 1/ | Imports 2/ | Total | Exports 2/ | Domestic 3/ | Per capita use | Current dollars 1/ | Constant dollars 4/ |
| -- Million pounds -- | | | | | | | | |
| 1985 | 242.0 | 36.0 | 278.0 | 20.0 | 253.2 | 1.06 | 30.95 | 44.40 |
| 1990 | 341.3 | 80.6 | 421.9 | 63.1 | 352.0 | 1.41 | 21.25 | 26.04 |
| 2000 | 558.1 | 182.0 | 740.1 | 57.3 | 627.0 | 2.22 | 27.80 | 27.80 |
| 2001 | 587.7 | 217.7 | 805.4 | 57.4 | 689.2 | 2.42 | 29.40 | 28.71 |
| 2002 | 565.0 | 263.2 | 828.2 | 51.5 | 720.2 | 2.50 | 27.60 | 26.49 |
| 2003 | 624.1 | 311.5 | 935.6 | 51.0 | 822.2 | 2.83 | 25.70 | 24.18 |
| 2004 | 522.4 | 331.4 | 853.8 | 48.3 | 753.3 | 2.57 | 26.50 | 24.29 |
| 2005 | 464.6 | 346.5 | 811.1 | 54.2 | 710.4 | 2.40 | 40.90 | 36.48 |
| 2006 f | 500.0 | 364.0 | 864.0 | 55.0 | 759.0 | 2.54 | -- | -- |

-- = Not available. f = ERS forecast. 1/ Source: USDA, NASS. 2/ Source: Bureau of the Census, USDC. U.S. exports for 1985 were adjusted using Canadian imports. 3/ Seed use is excluded. 4/ Constant dollar prices are calculated using the GDP deflator, 2000=100.

Source: Compiled and computed by USDA, Economic Research Service.

For more information on garlic, see:

Vegetables and Melons Situation and Outlook Yearbook at:
<http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1212>

Garlic: Flavor of the Ages at:
<http://www.ers.usda.gov/Publications/AgOutlook/jun2000/ao272e.pdf>