

Tea

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Department of Agricultural and Resource Economics
College of Tropical Agriculture and Human Resources
University of Hawaii

By
Trace V. Tipton, Kevin M. Yokoyama,
Kulavit Wanitprapha, and Stuart T. Nakamoto



CROP PROFILE

SPECIES AND VARIETIES

- Tea is the most popular beverage in the world. The drink is prepared from the leaves and buds of *Camellia sinensis*. The taxonomy of the different varieties is unclear. Two general types are commonly recognized, however: China (*C. sinensis* var. *sinensis*) and Assam (*C. sinensis* var. *assamica* Mast.).
- Tea plants are highly heterogeneous, and there have been many cross-pollinations between the China and Assam types. The term “jat” is used by many tea growers to refer to the different groups or types of tea.
- China varieties are slow-growing, dwarf trees that are hardy and that grow in high altitudes. Assam varieties are less hardy than the China teas but are faster growing, have larger leaves, and provide higher yields.

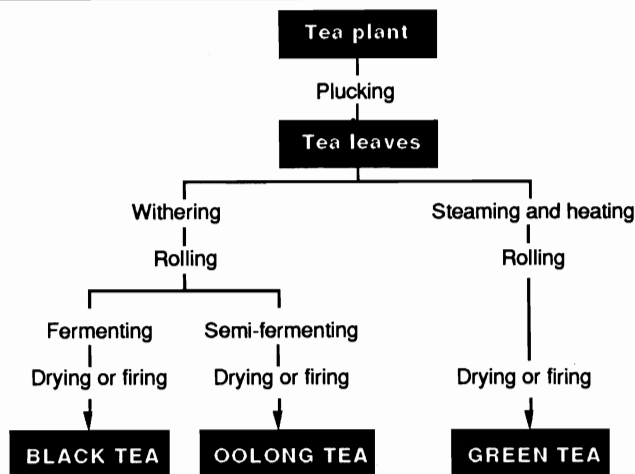
PRODUCTIVITY

- Tea is grown in open fields or on terraced hill-sides; it requires at least 60 in. of rainfall per year, with no extended periods of dry weather. The plant prefers a deep, well drained soil with a pH slightly on the acidic side (4.5 to 6.0). Young plants are pruned to produce a spreading shrub that will grow to a convenient harvesting height.
- Tea leaves can be first harvested three to four years after planting. The plant reaches maturity in nine to 10 years. Some China varieties of tea have been known to have an economic life of more than 100 years.

- It takes about 40 man-hours to harvest one acre of tea in the Assam region of India. Ideally, harvesting consists of plucking the youngest shoots, i.e., the terminal bud and the first two leaves, by hand, with hand shears, or mechanically. Hand harvesting results in the highest quality, because workers are able to select only the youngest shoots.
- The number of times per year that a plantation is harvested varies according to factors such as the variety of tea and climatic conditions. In Japan there are usually four distinct harvests each year, while in tropical areas there may be 30 or more rounds of harvesting.
- The moisture content of fresh tea leaves varies from 74 percent to 82 percent. Therefore, 100 lb of newly plucked tea leaves will yield 18–26 lb of finished tea.
- In 1988, the average yields of finished tea for major tea producers Kenya, India, Indonesia, Sri Lanka, and China were 1740 lb/ac, 1520 lb/ac, 1420 lb/ac, 910 lb/ac, and 380 lb/ac, respectively. Through selection and propagation work, yields of more than 4000 lb/ac have been recorded in Sri Lanka.

USES AND PRODUCTS

- Several tea products are derived from *Camellia sinensis*; they differ by processing method. Black tea is allowed to ferment, oolong is partially fermented, and green tea is unfermented. Black and oolong teas are withered and rolled to initiate fermentation, while green tea is first steamed or pan-fried to destroy the enzymes responsible for fermentation.



Processing of tea

- Black tea is dark in color and strong in taste, while green tea is light in color with a taste closer to that of fresh tea leaves. Oolong tea is intermediate in flavor between black and green tea.
- The two general grades of tea are leaf grades and broken grades. Grade is determined by sifting the leaves through various sized screens. Leaf grades are larger than broken grades, and within each are several subgrades.
- The color and flavor of leaf grades tend to be drawn out more slowly than those of the broken grades, which are used to produce a stronger and darker tea. Broken grades are also used in tea bag manufacturing. To obtain a distinctive tea product, companies often blend 20 or more teas. Instant tea mixes are manufactured by extracting soluble tea compounds from a tea brew and concentrating these into powdered form.
- Tea quality is determined by professional tasters. Among the many factors that influence the flavor and aroma are the particular variety of tea; soil and climatic conditions; speed of growth of the plant (slower growth is normally associated with high elevation and better quality); fineness of plucking (youngest leaves produce highest quality); and handling and manufacturing practices.
- Byproducts such as caffeine, food colors, antioxidants, plant growth regulators, organic fertilizer, and animal feed can be made from tea waste left from tea plantations and tea factories. An oil can also be extracted from tea seeds that

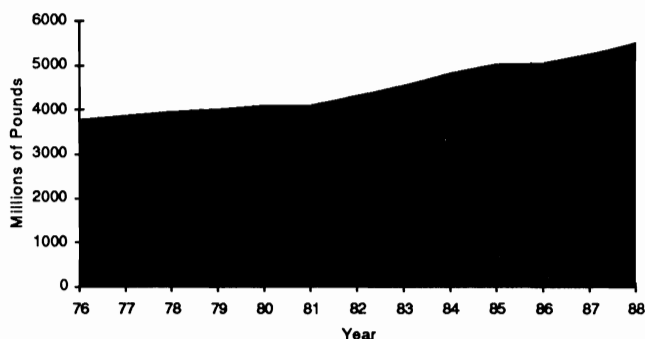
has potential as a substitute for olive oil in the pharmaceutical and cosmetic industries.

- The amount of caffeine in tea varies widely and depends on the type of leaves brewed and the length of time the tea is steeped. One 6-oz cup of black tea averages about 60 mg of caffeine, about half the amount in coffee.

WORLD SUPPLY AND DEMAND

SUPPLY

- World tea production increased from 4.0 billion lb in 1978 to a record high of 5.5 billion lb in 1988. India (1.5 billion lb), China (1.2 billion lb), and Sri Lanka (495 million lb) were the major tea producers, accounting for 58 percent of the total production in 1988. Other major producers were Kenya (361 million lb), Indonesia (317 million lb), Turkey (308 million lb), and Japan (211 million lb).
- Tea prices have been highly volatile. The average annual London auction price for tea in 1988 was 81.3 cents/lb, considerably lower than in 1977 and 1984, when the average prices were \$1.22/lb and \$1.57/lb, respectively. Factors contributing to high prices were expected demand changes for tea, leading to speculative stockpiling in 1977, an export ban by India in late 1983, and low levels of tea stocks in producing and consuming nations in various years.
- Specialty tea includes flavored, blended, and tea grown in specific regions of the world known for high quality. Prices for specialty tea can be exceptionally high. For example, tea from an estate in Darjeeling, India, established a world record price for tea at \$95 per pound in 1987.



World tea production

- There is no international agreement on export quantity or quality standards for tea. However, a producers alliance (Inter-Governmental Group on Tea) meets to review the world tea economy and to discuss various issues pertaining to tea, such as future implementation of tea export quality standards.

DEMAND

- The major producing countries of tea are also the major consumers. In 1988, India produced nearly 1.5 billion lb, two-thirds of which was consumed domestically. China also consumes most of the tea it produces.
- World tea imports increased from 1.9 billion lb in 1976 to 2.4 billion lb in 1987. In 1987, the United Kingdom, the Soviet Union, Pakistan, and the United States accounted for 45 percent of the total world tea imports.
- In the past 50 years, total tea supplies have nearly tripled. Among factors that have helped to avert a serious oversupply problem are large increases in consumption in the major producing countries and substantial increases in imports to such countries as the Soviet Union, Pakistan, Egypt, Iran, and Iraq.

tea was the primary tea product imported (169.5 million lb at a Cost, Insurance, and Freight (CIF) value of \$130.3 million) followed by green tea (18.5 million lb at a CIF value of \$13.3 million). Oolong tea is included with black tea, but is only a small part of the total (less than 1 percent in 1988).

- The major suppliers of black tea to the United States in 1989 were Argentina (22 percent of the total), China (20 percent), Indonesia (16 percent), Kenya (7 percent), and Sri Lanka (7 percent). Green tea is supplied primarily by China (55 percent), Argentina (7 percent), the Federal Republic of Germany (7 percent), Japan (7 percent), and the Netherlands (6 percent).

Average U.S. import prices for black and green tea of major suppliers, 1989.

| Black Tea | | Green Tea | |
|-----------|-------------------|-------------|-------------------|
| Country | CIF Price (\$/lb) | Country | CIF Price (\$/lb) |
| Argentina | 0.44 | Argentina | 0.46 |
| China | 0.58 | China | 0.48 |
| Indonesia | 0.66 | FR Germany | 0.67 |
| Kenya | 0.89 | Netherlands | 0.70 |
| Sri Lanka | 1.02 | Japan | 1.13 |



SELECTED MARKETS

THE UNITED STATES

- Commercial production of tea is limited in the United States. However, the Charleston Tea Plantation in South Carolina produced and mechanically harvested 30 acres of tea in 1988. The tea is marketed on the U.S. East Coast as a novelty product under the name "American Classic."
- In 1989, the United States imported \$127 million worth of black, oolong, and green tea. Black

- Importers in the United States buy tea in the producing country or in London or Amsterdam through auctions or direct negotiation. Uker's International Tea & Coffee Buyers Guide Directory lists tea importers, packers, and associations in the United States. Among the large packers are Thomas J. Lipton, Inc.; Tetley Inc.; The Nestle Co.; The Great Atlantic & Pacific Tea Company; Jewel Companies, Inc.; The Kroger Co.; Salada Foods, Inc.; and Wm. B. Reily & Co.
- Annual per capita consumption of tea in the United States was estimated at 7.3 gal during 1988. This is considerably lower than soft drinks (46.0 gal), coffee (25.0 gal) and beer (23.7 gal), but slightly higher than bottled water (6.4 gal) and juices (6.8 gal).
- About 80 percent of tea consumed in the United States is in the form of iced tea, while in other countries tea is consumed primarily as a hot beverage. Therefore, in the United States, other cold beverages are the primary competition.
- The two major sales outlets for tea are the supermarket and food service sectors. In 1989, the combined sales of tea through these outlets

was estimated at 177 million lb. Supermarkets accounted for 132 million lb, or 75 percent of the total sales.

- For 1988, estimates on sales of various tea products through supermarkets are \$300.1 million for tea bags, followed by \$295.8 million for instant and liquid tea, \$30.2 million for decaffeinated tea, \$25.2 million for loose and bulk tea, and \$11.0 million for specialty tea. Sales of decaffeinated tea and specialty tea were up from the previous year by 13.5 percent and 4.5 percent, respectively.
- The Tea Council of the USA, Inc., New York, consists of members from major tea-producing countries and leading tea-packing firms in the United States. This organization promotes the sale and consumption of tea in the United States.

THE UNITED KINGDOM

- The United Kingdom is the leading importer of tea in the world. In 1932, the United Kingdom accounted for nearly 60 percent of total world imports. The import share had decreased to about 17 percent by 1988, but remains highest among all countries.
- In 1988, the United Kingdom imported 422 million lb of tea. The major suppliers were Kenya (47.3 percent), India (16.0 percent), Malawi (10.0 percent), Sri Lanka (6.8 percent), China (4.2 percent), and Zimbabwe (3.8 percent).
- Tea accounts for about 45 percent of all beverages consumed daily in the country. Per capita consumption of tea in the United Kingdom was estimated at 3.7 cups per day in 1986, considerably more than soft drinks (1.9 cups), coffee (1.7 cups), alcoholic beverages (1.3 cups), and milk (0.2 cup).
- The value of the tea retail market has more than doubled, from \$349 million in 1976 to \$811 million in 1986. In the same period, the volume of tea sales declined more than 20 percent, from 388 million lb to 306 million lb.

- Consumers in the United Kingdom have changed their preference from loose tea to tea bags. In 1976, loose tea composed about 58 percent of total tea sales, while tea bags accounted for about 41 percent. By 1986, tea bags accounted for 73 percent of tea sales, while sales of loose tea declined to 26 percent.
- Among the major manufacturers of tea in the United Kingdom are Unilever Croydon, Lyons Tetley Ltd., Premier Brands Ltd., Co-operative Wholesale Society Inc., and Own Label.

TEA IN HAWAII

- *Camellia sinensis* was first introduced into Hawaii in 1887. In 1892, the Hawaiian Coffee and Tea Co. had about five acres of tea in the Kona district. The effort was eventually abandoned, and the reasons remain unclear. High costs of production in Hawaii compared with costs in other tea-producing regions appears to have been a major concern.
- Recently, some firms in Hawaii have shown interest in tea production. For example, McBryde Sugar Co. (a subsidiary of Alexander and Baldwin) has planted tea in test plots. Mechanical harvesting may be possible to avoid the relatively high cost of manually harvesting tea.
- In 1989, Hawaii imported 22,110 lb of green tea from Japan, at a CIF value of about \$129,420. During the same year, 25,970 lb of black and oolong tea were also imported, at a CIF value of about \$43,130. Taiwan accounted for 52 percent of the volume imported.
- Ito-en Ltd., a large tea company in Japan, has formed a Honolulu firm to process canned oolong tea in Hawaii. The teas used for this product are organically grown in the Fujian province of China.
- A Hawaii-produced tea would have difficulty competing at commodity grade prices. Tea may have more potential in Hawaii if marketed as a higher valued specialty product.

Reference to a company or product name does not imply approval or recommendation of the product by the College of Tropical Agriculture and Human Resources, University of Hawaii.

Hawaii Agricultural Experiment Station, HITAHR, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa. Noel P. Kefford, Director and Dean.

A list of reference sources for this fact sheet is available from the authors upon request.