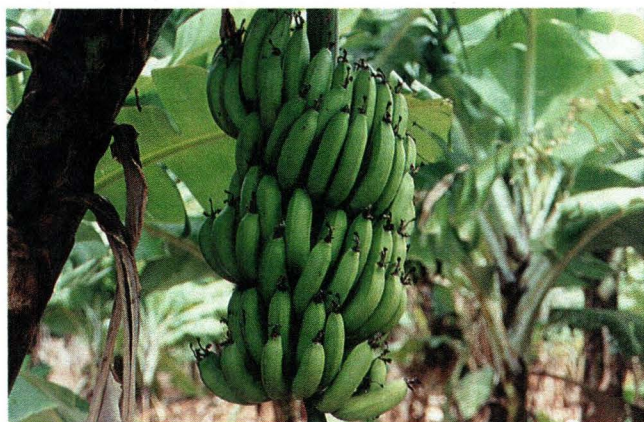


# Banana

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## CROP PROFILE

### VARIETIES

- Banana, *Musa* sp., is a member of the family Musaceae. The plant is a large perennial herb with leaf sheaths up to 9 feet long and 2 feet wide forming the trunklike pseudostem. Originating in the Asian tropics, bananas are distributed throughout the tropics and subtropical regions and consumed throughout the world.
- The Cavendish group is the leading commercial banana variety in the world. 'Bluefields' (syn. 'Gros Michel') was once the major commercial banana in Central and South America before Panama wilt disease destroyed vast plantations.
- Cavendish and Brazilians are the two major groups of dessert bananas in Hawaii. The Cavendish group includes 'Williams', 'Valery', 'Hamakua', 'Grand Nain', and 'Chinese' varieties. The Brazilian bananas are often erroneously referred to as apple bananas in Hawaii. This group includes the 'Dwarf Brazilian'.
- The Bluefields group, which includes 'Dwarf Bluefields', was the leading commercial variety in Hawaii. Currently, this group accounts for less than 1% of banana production in Hawaii due to its susceptibility to the Panama wilt disease. Starchy cooking bananas, or plantains, are also found in Hawaii. Largo, Maia maole, and Popoulu are various plantain groups.

### PRODUCTIVITY

- Bananas are propagated from offshoots (suckers or keikis) or corms (bullheads). Bananas can be harvested 11–15 months after planting a keiki. The economic life of the plant ends when the fruit is harvested and the pseudostem is cut.

- The fruit bunch consists of several clusters, or hands, which contain individual fruits, or fingers. Bananas are harvested when the fingers turn light green and the corners become rounded rather than angular.
- The banana plant requires well-drained soil with a pH between 5.5 and 6.5. Optimal growing conditions include rainfall of 100 inches or more, well distributed throughout the year, average temperature of 81°F, full sun, and wind protection.
- In Hawaii, yields of 12,000, 15,000, and 35,000 lb/ac can normally be obtained for 'Brazilian', 'Bluefields', and 'Cavendish', respectively. Yields of 75,000 lb/ac have been reported under optimal conditions. In the better plantations in Central and South America, yields can exceed 40,000 lb/ac.
- Bananas bruise easily. Careful handling is important during and after harvesting. Bruising can be minimized by the use of plastic sleeves, padding, and limited handling. Three-quarters-mature bananas withstand handling better than fully mature fruit, which bruises easily. Bunches are usually cut into individual hands and washed before boxing.
- Green bananas can be stored for up to seven days at ambient temperature or up to 20 days under refrigeration. Neither green nor ripe bananas should be stored at temperatures lower than 58°F. Cooler temperatures cause surface scalding.
- The quality of bananas is determined by size (finger length and thickness), evenness of ripening, freedom from blemishes and defects, and

the arrangement of the clusters. Quality standards may differ in various markets.

- Ethylene gas can be applied to bananas to start the ripening process and to assure evenness of ripening. Bananas also produce ethylene gas naturally. During the ripening process, pulp temperature should range from 58°F to 64°F, relative humidity should be controlled, and there should be adequate air circulation to ensure high quality fruit.

### USES AND PRODUCTS

- Most bananas are eaten either raw or as a cooked vegetable. A relatively small proportion is processed to obtain a storable product. Bananas become sweeter when mature because starch converts into sugars during the ripening process.
- Bananas contain about 74% water, 23% carbohydrate, and a small amount of protein (1%) and fat (0.5%). A 4-ounce banana without the peel has 105 calories and is a good source of vitamin B<sub>6</sub>, potassium, and fiber.
- Bananas can be processed for a number of products. Ripe fruits can be pulped for puree for use in a variety of products including ice cream, yogurt, cake, bread, nectar, and baby food. Ripe bananas can also be dried and eaten, or sliced, canned with syrup, and used in bakery products, fruit salads, and toppings. Green bananas can be sliced and fried as chips. Whole green fruits can be dried and ground into flour.
- Vinegar and alcoholic beverages, such as beer and wine, can be made from fermented ripe bananas. A spicy sauce, referred to as banana "ketchup," is produced and used with roasted and fried meats in the Philippines.
- Other parts of the banana plant are consumed besides the fruit. In India, the heart of the growing pseudostem is eaten. In Southeast Asia, the male bud is consumed as a boiled vegetable.
- In some producing areas, the banana foliage and pseudostems are used as cattle feed during dry periods. Culled bananas are also used to feed cattle and hogs. Bananas are a good energy source but need to be supplemented with protein. Banana leaves are also used for wrapping food in cooking.

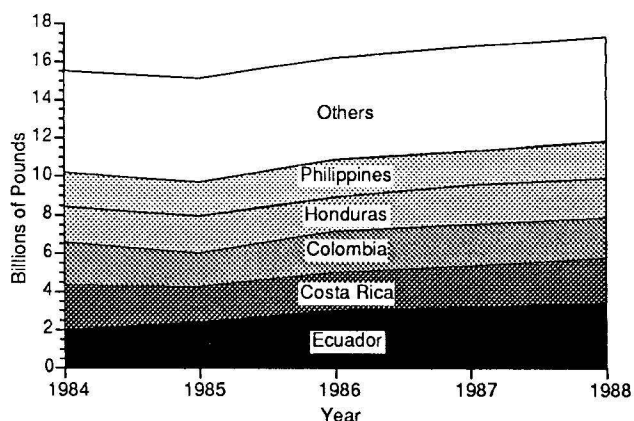
## WORLD SUPPLY AND DEMAND

### WORLD SUPPLY

- World banana production increased from 89.6 billion lb in 1984 to 92.4 billion lb in 1988. In 1988, Brazil, India, the Philippines, China, and Ecuador were the world's top five producers, accounting for 42.9% of the total world production. Most of the world's banana production is consumed domestically.
- World exports of bananas (including plantains) increased at an average annual rate of 2.7% from 1984 to 1988, to 17.3 billion lb. The Central and South American countries of Ecuador, Costa Rica, Colombia, and Honduras accounted for 57% of the world banana exports. Except for Colombia, these countries exported more than half of their production. The largest banana exporter in Asia is the Philippines, which accounted for 11.1% of world exports.

### WORLD DEMAND

- In 1988, the world banana import market (including plantains) was valued at \$3.5 billion. The United States is the world's largest importer, accounting for nearly 40% of the total quantity imported. Other leading importers in 1988 included the Federal Republic of Germany (9.8%), Japan (9.7%), Italy (7.1%), France (5.8%), the United Kingdom (5%), and Canada (2.9%).
- Chiquita Brands International Inc. (formerly United Brands), Dole, and Del Monte are multinational corporations that dominate the world's banana trade. These firms are vertically integrated from production to the wholesale level in importing countries. Chiquita and Dole reportedly account for 35% and 24% of the world market share, respectively.



World banana exports, 1984-88

## SELECTED MARKETS

### THE UNITED STATES

- Per capita consumption of bananas is the highest among fresh fruits in the United States. In 1988, per capita consumption of bananas was 24.2 lb, compared to 19.1 lb/capita for apples, 14.5 lb/capita for oranges, and 6.7 lb/capita for grapes.
- Bananas are popular because they do not require refrigeration, are supplied year-round, and are convenient to eat. Also, unlike apples, bananas are easily eaten by all age groups, including infants and the elderly.
- The United States imports most of the bananas consumed, of which 'Cavendish' is the leading variety. Imports of fresh bananas increased from 5.4 billion lb in 1981 to 6.4 billion lb in 1989. Bananas are also grown in Hawaii, Florida, and California.
- In 1989, the CIF (cost, insurance, and freight) value of U.S. fresh banana imports exceeded \$1 billion. Major suppliers were Ecuador (29.1% of total quantity imported), Costa Rica (21.8%), and Honduras (18.9%).
- The 1989 average U.S. import price (CIF) for fresh bananas was 16¢/lb. The average prices charged by the major suppliers were 14¢/lb in Ecuador, 17¢/lb in Costa Rica, and 19¢/lb in Honduras.
- In 1989, the United States imported over 41 million lb of prepared or preserved bananas, 13 million lb of dried bananas, and 18 million lb of frozen bananas and plantains.

U.S. imports of banana products, 1989

Product	Quantity (mil lb)	CIF Value (mil \$)
Fresh bananas	6424	1039
Dried bananas	13	4
Banana pulp, prepared or preserved	11	3
Bananas (except pulp), prepared or preserved	30	9
Bananas & plantains, frozen	18	6

- In the United States, Chiquita Brands Co. (North America) and Dole Fresh Fruit Co. each account for about one-third of the banana market share. Other companies include Del Monte Tropical Fruit, Turbana Corp., Pacific Fruit, Inc., and Parker Banana Co.

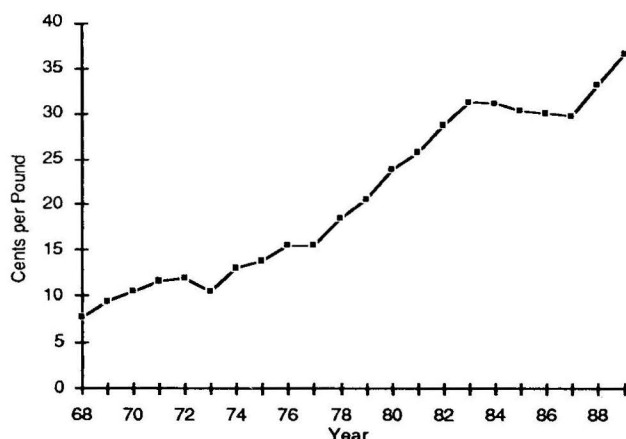
### OTHER MARKETS

- Japan is the leading importer of bananas in Asia. In 1988, Japan imported 1.7 billion lb of bananas, compared to 79 million lb imported by Hong Kong and 65 million lb by Singapore. The Philippines supplied 79% of Japan's banana imports. Other suppliers were Taiwan, Ecuador, Colombia, China, and Malaysia. The average 1988 import price (CIF) of bananas to Japan was about 26¢/lb.
- Chiquita controls about 45% of the \$1.8 billion Western European banana market. In 1988, Western European countries imported 6.6 billion lb of bananas. The Federal Republic of Germany was the largest importer, with 1.7 billion lb, an increase of about 40% over 1984. The average 1988 import price (CIF) for bananas in the Federal Republic of Germany was about 27¢/lb.
- During 1988, the other major banana importers in Western Europe were Italy (1.2 billion lb), France (1 billion lb), and the United Kingdom (860 million lb). The average 1988 import prices (CIF) for these countries were 25¢/lb, 34¢/lb, and 37¢/lb, respectively.
- Eastern European countries and the Soviet Union imported 372 million lb of bananas in 1988. The demand for bananas has increased with the recent opening of these centralized planned markets.

## BANANA IN HAWAII

- There were 150 farms planting a total of 1150 acres of bananas in Hawaii during 1989. 'Cavendish' bananas (625 acres) accounted for most of the planted acreage, followed by 'Brazilian' (485 acres) and 'Bluefields' (25 acres). Sixty-eight percent of the 'Cavendish' bananas were planted on the Big Island, 83.5% of the 'Brazilian' bananas were on Oahu, and practically all of the 'Bluefields' bananas were on Kauai, Maui, and Molokai.

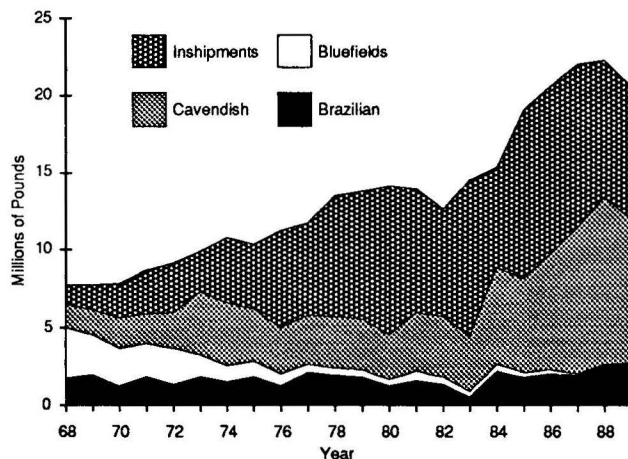
- In 1989, the total farmgate value of banana was \$4.3 million for the 11.9 million lb harvested. Most of the bananas produced were 'Cavendish' (77% of total production); the rest were 'Brazilian' (22.2%) and a small quantity of 'Bluefields' (0.8%).
- Hawaii banana growers received a record average farm price of 36.5¢/lb in 1989, up 11% from 1988. The average annual farm prices for 'Brazilian', 'Cavendish', and 'Bluefields' bananas were 41.1¢/lb, 35.2¢/lb, and 34.9¢/lb, respectively.
- The total market supply of fresh bananas in Hawaii increased from 7.7 million lb in 1968 to 20.6 million lb in 1989. Hawaii's banana industry faces competition from 'Cavendish' bananas produced in foreign countries and inshipped from the U.S. mainland. In 1989, Hawaii bananas provided 57.9% of the market, while inshipments accounted for the remaining 42.1%.
- The quantity of bananas harvested in Hawaii during 1989 reflects an 83% increase over the 1968 harvest of 6.5 million lb. The largest increase was in 'Cavendish' bananas (from 1.5 million lb to 9.2 million lb), while production of 'Brazilian' bananas increased moderately (from 1.8 million lb to 2.6 million lb). 'Bluefields' production declined significantly (from 3.2 million lb to 100,000 lb).
- Black leaf streak, bunchy top virus, nematodes, and Panama wilt are some diseases affecting bananas in Hawaii. The bunchy top virus, found



Average farmgate price of Hawaii bananas, 1968-89

on Oahu in July 1989, has the potential to seriously affect Hawaii's banana industry. Currently it is confined to Oahu. An interisland quarantine ban has been imposed to prevent the movement of banana plants and parts, except fruit, from Oahu to the neighbor islands.

- A 1989 CTAHR market study indicated that Hawaii bananas do not have a well established identity. Some consumers think the only Hawaii-grown banana is the apple banana. Other consumers associate the brand names of Central American bananas with companies operating in Hawaii and assume that they are Hawaii bananas (although labels list the producing country). Although the quality of Hawaii bananas can be comparable to that of imports, some consumers still have a negative image of locally grown bananas, believing they have a poor appearance and smaller size.
- There is interest in exporting some varieties of bananas to the U.S. mainland. Because of concerns about fruit flies, however, a quarantine restriction does not allow fresh Hawaii bananas to be shipped to the mainland.
- The Hawaii Banana Growers Association, the Oahu Banana Growers Association, and the Big Island Banana Growers Association are industry organizations that provide some coordinated research, education, and marketing efforts in conjunction with CTAHR and government agencies.



Market supply of bananas in Hawaii, 1968-89

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.

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A list of references is available from the authors upon request.