

Cacao/Cocoa

Economic Fact Sheet #4
September 1989

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University of Hawaii

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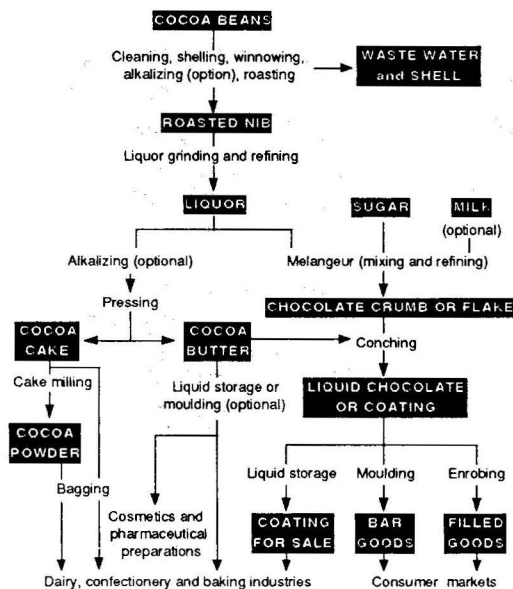
CROP PROFILE

SPECIES

- Cacao (*Theobroma cacao*) is thought to have originated at least 4000 years ago in the Amazon or Orinoco basin of South America. A popular classification scheme recognizes three main subspecies of cacao: Criollo, Forastero, and Trinitario.
- Criollos once dominated the market but are susceptible to certain diseases. Currently only a few, if any, pure stands exist in Mexico, Guatemala, Nicaragua, and Colombia.
- Forasteros are hardier and more productive than Criollos. This group has two major types: Amelonado, which is extensively planted in Brazil and West Africa, and Amazon, which is often used for breeding work.
- Trinitarios are hybrids of the first two subspecies and are found in Trinidad, Venezuela, Ecuador, and in some Southeast Asian and oceanic areas.
- In the marketplace, cocoa is generally divided into two groups. "Bulk" cocoa, primarily Forastero, is the basic stock of the cocoa and chocolate industry. "Fine" or "flavored" cocoas, mainly Criollo and Trinitario, are beans with distinctive flavors. In 1985, less than 3% of the world production consisted of fine cocoas. Fine and bulk cocoas are blended by some manufacturers to produce a distinctive-tasting chocolate.

PRODUCTIVITY

- Cacao trees are capable of bearing pods by the end of the second year, and maximum yields are obtained eight to 10 years after planting. Some cacao trees have been known to produce pods for more than 100 years.
- Cacao is traditionally grown under shade and is sometimes interplanted with coconuts, rubber trees, oil palms, and other crops. High yields have been obtained using a relatively new method in which cacao trees are grown in fertilized, unshaded conditions.
- The world average yield of dry cocoa beans in 1987 was 330 lb/ac. Average yields for major cocoa producers Ghana, the Ivory Coast, Brazil, and Malaysia were 156 lb/ac, 485 lb/ac, 556 lb/ac, and 958 lb/ac, respectively. In fertilized, unshaded conditions over 3000 lb/ac have been obtained.
- Quality is determined by the physical characteristics of the bean and the flavor of the cocoa. Physical characteristics of importance are bean size, fat content, and shell percentage. Small beans are undesirable because normally the percentage of shell is high and the fat content is low. Flavor depends not only on the varieties grown and the soil and climatic conditions, but also on fermentation, drying, and storage practices.
- For 1 lb of dried cocoa beans, seven to 14 cacao pods are required. Dried cocoa beans can be stored for two to three months in tropical climates. For longer periods, special precautions are necessary to prevent mold and insect infestation.



Processing Chain of Cocoa

USES AND PRODUCTS

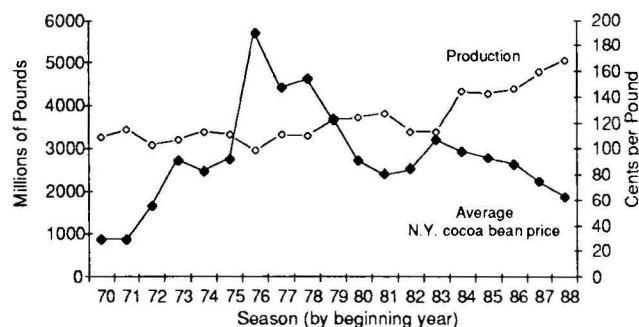
- After cocoa pods are harvested, the beans are removed and fermented. Nine hundred thirty pounds of dried cocoa pod husk are produced with every 1000 lb of dried cocoa beans. Husks can be used as a source of potash or, in limited amounts, can be ground and added to livestock feed.
- During bean fermentation, "sweatings" flow from the pulp surrounding the beans. Approximately 6 gal of the liquid residue can be collected from 1000 lb of wet beans. In Brazil, a jelly is produced from the sweatings. Other possible by-products are juice, alcoholic beverages, vinegar, sugar, and pectin.
- After fermentation, beans are roasted and cracked to separate the nibs from the shell (12% of the weight) and embryo (1%). Cocoa liquor (also known as paste) is produced by grinding the nibs. The liquor is an ingredient used to make chocolate or pressed to obtain cocoa butter and cocoa cake.
- To produce chocolate, cocoa butter is added to the liquor, sugar, and other ingredients. The ratio of liquor to sugar varies from 2:1 to 1:2, depending on the chocolate manufacturer. Milk chocolate uses the same basic ingredients as chocolate, except that milk (often in powder form) is added.

- Cocoa butter has a melting point slightly below body temperature (93.2–95.0°F). This makes it suitable for suntan lotions, soaps, and other pharmaceutical and cosmetic products.
- Cocoa powder is produced by breaking down cocoa cake. It is used to make beverages and to flavor cakes, ice cream, and other chocolate-flavored products.

WORLD SUPPLY AND DEMAND

SUPPLY

- World cocoa bean production increased from 3.3 billion lb in 1970–71 to a record amount of 5.1 billion lb in 1988–89 (forecast). The Ivory Coast is the major cocoa producer, accounting for more than 29% (1.5 billion lb) of the total production in 1988–89. Other major producers are Brazil (847 million lb), Ghana (671 million lb), Malaysia (539 million lb), and Nigeria (286 million lb).
- Peak prices in the mid-1970s stimulated new plantings and increased production. The Ivory Coast and Malaysia are expected to harvest record crops in 1988–89, and production from Ghana is the highest since 1976–77. As production increased, prices have declined. The average yearly price on the New York spot market dropped from \$1.90/lb in 1976–77 to \$0.64/lb during the first five months of the 1988–89 season.
- Cocoa from Ghana is noted for high and consistent quality and is the standard against which other cocoas are measured, particularly in Europe. Recently, however, the country's reputation for quality has somewhat diminished due to problems with product inspection. The closest equivalent cocoa comes from Nigeria, where the fermenting, drying, and marketing practices are similar to Ghana's.

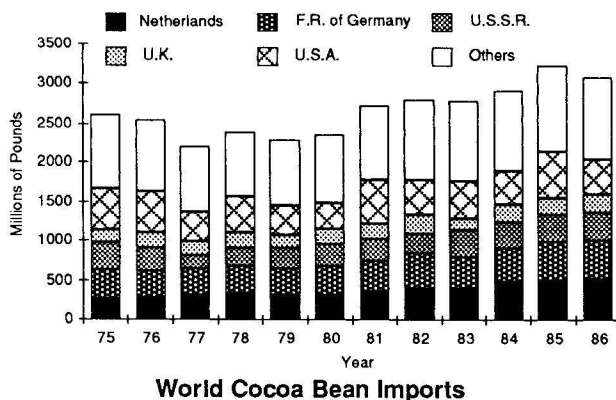


World Cocoa Production

- The International Cocoa Council (ICCO) administers the International Cocoa Agreement (ICCA), whose primary objective is to maintain buffer stocks to stabilize cocoa prices. The buffer stock manager is authorized to buy or sell cocoa beans to control the supply available to the world market.
- Producing countries also process raw cocoa beans into cocoa butter and other intermediate products. In 1986, the Ivory Coast and Brazil accounted for 27.5% of world cocoa butter exports, 31.1% of cocoa powder and cake exports, and 46.8% of cocoa paste exports.

DEMAND

- World cocoa bean imports increased from 2.6 billion lb in 1975 to 3.1 billion lb in 1986. Beans are imported to be ground for domestic consumption or for re-export as intermediate or final products.
- In 1986, the EEC, the United States, and the U.S.S.R. accounted for 78% of the total world cocoa bean imports. Major importers were the Netherlands (517 million lb), West Germany (465 million), the United States (450 million), the U.S.S.R. (359 million), and the United Kingdom (230 million).
- A substantial amount of intermediate cocoa products is also traded among international markets. In 1986, 543 million lb of cocoa butter were imported, in addition to 349 million lb of cocoa liquor and 548 million lb of cocoa powder and cake. The United States is the leading importer, accounting for roughly one-third of the imports for each product. EEC countries are also major importers of these products.



SELECTED MARKETS

THE UNITED STATES

- The United States relies on imports of cocoa beans and cocoa products to meet the demand. In 1988, the United States imported \$1.1 billion worth of cocoa-related products. The major products included cocoa beans and cocoa butter.

1988 Imports of Cocoa Beans and Selected Cocoa Products

Product	Quantity (1000 lb)	FAS Value (\$1000)
Cocoa beans	520,839	405,299
Cocoa butter	172,229	303,600
Sweetened chocolate (cocoa liquor with sweetener and cocoa butter added)	126,927	107,014
Unsweetened cocoa (cocoa cake)	200,988	99,152
Unsweetened chocolate (cocoa liquor)	77,999	73,198

- The major suppliers of cocoa beans in 1988 were the Ivory Coast (21.9% of the total U.S. supply), the Dominican Republic (18.4%), Malaysia (13.6%), Ecuador (13.5%), Brazil (9.3%), and Nigeria (8.6%). During the same year, the primary suppliers of cocoa butter were Brazil (39.6%), Mexico (9.1%), and Malaysia (9.0%).
- At least 413 million lb of cocoa beans were ground in 1988, a substantial increase from the 313 million lb ground in 1980. The increase is actually higher since the 1988 figure excludes grinding by one processor that usually accounts for one-fifth of the total.
- Except for some firms on the West Coast, cocoa processors buy most of their cocoa beans and a large amount of cocoa products from international traders, most of which have their main trading offices in New York. Some of the main cocoa dealers, brokers, agents, and distributors are listed in *Cocoa: A Trader's Guide* by the International Trade Centre UNCTAD/GATT.
- In 1988, chocolate candy consumption was estimated at 2.4 billion pounds. On a per capita basis, consumption was estimated at 9.9 lb in 1988, an increase from 9.7 lb in 1986.
- Major users of cocoa and cocoa products in the United States are Hershey, Nestlé, General Foods, W. R. Grace, Mars, R. J. R. Nabisco, Wilbur Chocolate, Blommer, Guittard, Ghirardelli, and World's Finest Chocolate.
- Hershey and Mars are the major candy bar manufacturers in the United States. Among some of the producers of truffles and other high-

priced premium chocolates are Godiva Chocolatier, Birnn Chocolates, Ghirardelli, and See's Candies. Retail prices for these high quality items can exceed \$20/lb.

WESTERN EUROPE

- Western European countries have the highest per capita consumption of chocolate in the world. In 1986, the Swiss consumed approximately 19 lb of chocolate per person, followed by the Norwegians (14 lb) and the British (14 lb).
- The Netherlands, West Germany, and the United Kingdom together imported about 39.4% of the world's total cocoa bean imports in 1986. During the same year, the United Kingdom, West Germany, and France accounted for 31.4% of cocoa butter imports.
- In 1986, West Germany ground 442 million lb of cocoa beans, an increase of 33% from 1980. This country consistently grinds the largest quantity of beans among the European countries.
- The West Germany cocoa-processing industry is divided into those that produce chocolate for the domestic market and those that produce intermediate cocoa products for export. In 1986, West Germany accounted for 12.5% of the world's cocoa powder and cake exports and 10.2% of the cocoa butter exports.
- Among some of the major buyers of cocoa in West Germany are the Monheim Group, the Imhoff Group, Kascho, Hamester, and Schokinag. Some large buyers such as Kascho and Hamester are also major users of cocoa and cocoa products.
- In 1986, the Netherlands ground 402 million lb of cocoa beans, an increase of 38% from 1980. While the Netherlands is not a major user of cocoa products, it is a major exporter. In 1986, the country led the world in exports of cocoa powder and cake (30.6% of the total) and cocoa butter (28%).
- In the Netherlands, users of cocoa beans and products purchase primarily through dealers and brokers. Major dealers are Continaf, Daarnhouwer & Co., N. V. Theobroma, and General Cocoa. A principal broker is Westermann & Co. Some of the primary users of cocoa and cocoa

products are Berisford, de Zaan, Bendsrop, Gerkens, Blooker, Droste, Mars, and Verkade.

- In 1986, the United Kingdom ground 192 million lb of cocoa beans, primarily for domestic use. Only small amounts of cocoa products are exported from the United Kingdom.
- Among the major users of cocoa and cocoa products in the United Kingdom are Cadbury, Mars, Gill & Duffus, United Biscuits, and Nestlé.

CACAO IN HAWAII

- There was interest in the possibility of growing cacao commercially in Hawaii as early as 1917, but a cacao industry was never established. In 1986, there was renewed interest in the crop, as Hawaii Cocoa, a joint venture of Kekela Enterprises and Hershey Food Corp., was initiated. Kekela Enterprises plans to enlist farmers to grow cacao, while Hershey would process the beans.
- Hawaii Cocoa established cacao test farms in Keaau on the Big Island and on Maui above Kaanapali beach. The relatively dry conditions in the West Maui area differ from the rain forest-like conditions in Keaau, which are similar to the traditional growing habitat for cacao. The Hawaii Natural Resource Information System (HNRIS) developed by the Agricultural Engineering Department at the University of Hawaii can identify potential lands suitable for growing cacao in Hawaii.
- Through an intensive high-density cropping system, Hawaii Cocoa's goal is to obtain a yield of up to 4000 lb/ac of dried cocoa beans.
- Black pod (*Phytophthora*) is the most serious and widely distributed disease of cacao. It is estimated that 10–30% of the world cocoa production can be lost due to this disease, which also attacks seedlings. The occurrence of black pod in Hawaii was first recorded in 1986.
- Hershey plans to develop a premium-priced chocolate and intends to capitalize on the image of a Hawaii-grown product. This venture may result in farm-gate prices for cacao growers in Hawaii that are higher than world market prices.

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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