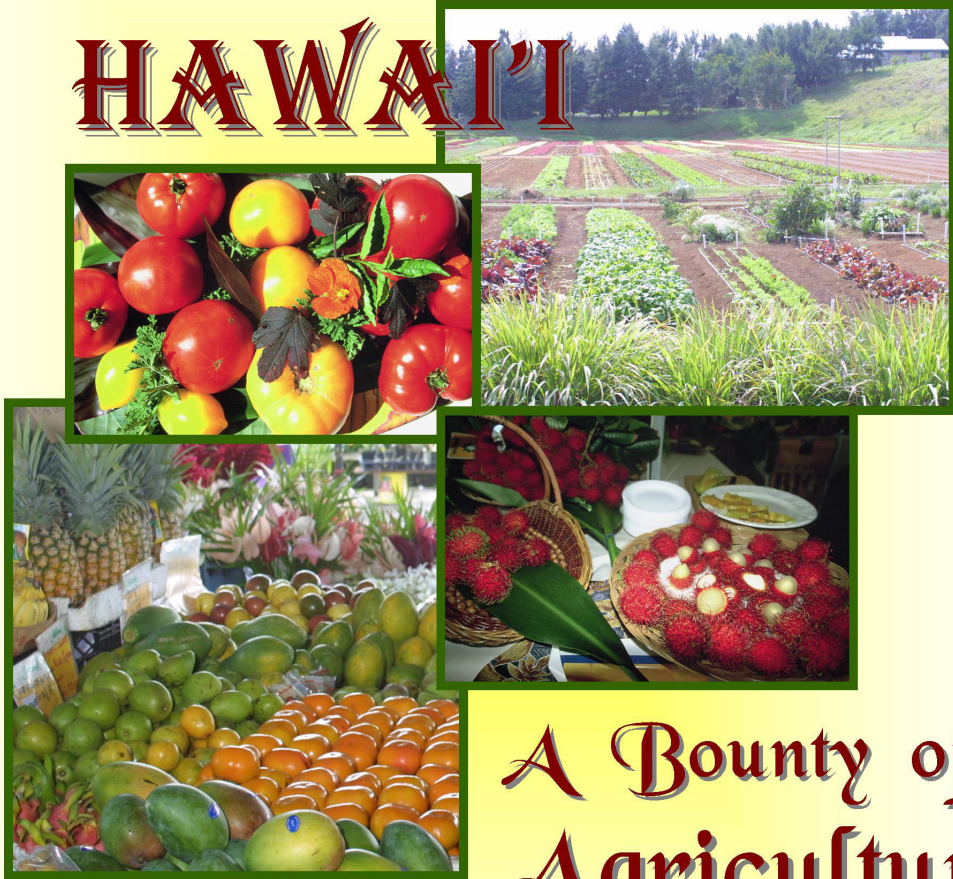


THIS IS  
HAWAII



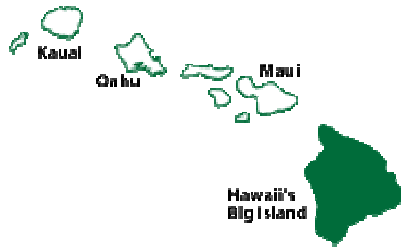
*A Bounty of  
Agriculture*

2005-2006  
AGRICULTURE PRESS KIT

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is made possible to the generous contribution from the County of Hawaii.  
Mahalo!*



## COUNTY OF HAWAII AGRICULTURE OVERVIEW

With estimated overall farm and processed value of island-grown commodities at approximately \$500 million, agriculture is a major force in Hawaii's economy. The bulk of Hawaii's agricultural products are grown and processed in Hawaii County. Our mild, tropical climate allows for year-round agricultural production with minimal seasonal influences. In 1994, around 68,000 acres of former sugarcane lands came available on the Big Island (34,560 acres – Hamakua Sugar Co., 17,860 acres – Hilo Coast, and 16,000 acres – Kau Agribusiness). In spite of the increased availability of land and the fluctuation of agriculture commodities trends towards the diversification of agriculture is on the rise.

According to the Hawaii Agriculture Statistic Report (HAS 2003), diversified agriculture can be defined as all commodities other than sugar and pineapple. The diversification of Hawaii's agriculture industry is becoming an economic power for the County of Hawaii. Hawaii County is the state's agriculture leader accounting for 1 million of the state's 1.8 million acres in diversified agriculture production. Hawaii County's diversified agriculture industry directly employs over 2,550 people, produces \$300 million annual revenue, and supplies at least 50% of the Big Island's fresh fruits and vegetable consumption.

Although Hawaii County is seeing a growing trend toward the expansion of diversified agriculture, farmers are faced with many constraints such as pest infestation, private land development, the availability of water, and the lack of available and reliable transportation for all agriculture products. Hawaii, like many other tropical places, has agriculture pests such as fruit flies that destroy crops. The U.S. mainland and foreign markets prohibit the entry of Hawaii's fresh produce into their markets due to these pests. In coordination with the U.S. Department of Agriculture, Hawaii County is in the process of developing various quarantine treatment programs that will allow for the export of various agriculture commodities.

As the demand for locally grown produce increases, many farms are striving to meet the demands of local consumers. Farmer markets and campaigns are being developed to promote and educate consumers about local produce that is seasonally available. The Buy Fresh, Buy Local campaign is a collaborative effort between the Hawaii State Departments of Agriculture, Hawaii Farm Bureau Federation and the University of Hawaii College of Tropical Agriculture and Human Resource (CTHAR). The goal of the campaign is to encourage consumers to purchase fresh locally grown

produce that in turn keeps money circulating within the community. The campaign is striving to build lasting relationships between consumers and the farmers. In theory by supporting local farmers, buying local supports the local economy and helps preserve green open spaces.

The introduction of Hawaii Regional Cuisine has also caused significant changes within the agriculture industry. Hawaii Regional Cuisine utilizes Hawaii's freshest ingredients of all varieties and incorporates them into wonderfully creative and beautifully presented dishes. Not only has Hawaii Regional Cuisine taken island dining to the highest possible level, it's also established Hawaii-grown products as among the finest in the world, restaurant menus now include the farm's name next to the ingredients provided. The "branding" of Hawaii grown commodities and memorable dining experiences created by Hawaii Regional Cuisine have sparked a desire for consumers to visit the farms in which the ingredients are produced.

Hawaii is experiencing an increase in ag-tourism activities and farms dedicated to supplying the local demand for fresh produce. The Hawaii Department of Agriculture defines ag-tourism as a commercial enterprise on a working farm conducted for the enjoyment, education, and /or active involvement of the visitor, generating supplemental income for the farm. Activities such as producing educational farm tours, offering horseback riding, festivals, concerts, and many other on-farm activities qualify as ag-tourism. According to the HAS 2003, 187 farms state wide have ag-tourism related income that has generated \$33.9 million. Hawaii County accounts for 48% of the farms hosting ag-tourism related activities.

Now, with the decline of the sugar industry, Hawaii's agriculture lands are returning to a new era of small farms growing diversified agriculture products. Crops such as specialty exotic fruits, cacao, coffee, macadamia nuts, strawberries, heart of palm, vanilla, flowers and foliage not only provide fresh produce and flowers to Hawaii's markets, but also can become major exports to destinations around the world. Agriculture in Hawaii is evolving as economic and social factors change here locally. The future of local agriculture remains full of economic potential. Therefore, support for Hawaii agriculture has never been more important than present.

# **HAWAII'S AGRICULTURE :**

## **A HISTORICAL OVERVIEW BY JOAN CLARKE**

### **GEOGRAPHY OF THE BIG ISLAND**

The Hawaiian islands are 2500 miles from land making it one of the most remote inhabited places. The Hawaiian archipelago stretches 1500 miles and includes 132 islands, reefs and shoals. There are eight main islands, two of which are off limits (Kahoolawe and Niihau) that equal the size of Connecticut and Rhode Island. The Northeast sides of all islands are referred to the windward or wet sides; the southwest is the leeward side, usually dry and barren.

The Big Island is 4030 square miles, 93 miles long, 76 miles wide and it is known as the Orchid Island and the Volcano Island. Geologically it is the youngest place on earth at about 1 million years old. (Volcanoes broke the surface of the water 5 million years ago.) The Big Island lives up to its name: it is larger than all the other Hawaiian islands put together.

On this island you will find rain forests and black lava deserts, live volcanos, beaches of black sand and waterfalls of great heights. In terms of activities, you can ski; ride horses; hunt sheep, boar, goats, game birds like pheasant, turkey, dove, quail and Chukar partridge; go deep sea fishing; scuba dive or snorkel and participate in Ironman competitions. In terms of agriculture, the Big Island has more than half of the State's crop farms and livestock operations.

Hilo is the main city of the Big Island, known for one of two deep-water harbors on the island (the other is at Kawaihae). The annual rainfall here is about 135 inches making it a prime spot for orchids, anthuriums, guavas, macadamia nuts and poultry.

Hamakua averages 150 inches a year of rain; bananas, cattle, coffee, ginger, macadamia nuts, papaya, taro, tropical fruit and vegetables are best here. In places like Waimea, rainfall averages 60 inches a year and the climate is cooler. Cattle, flowers and vegetables are well suited to growth here.

Kailua Kona enjoys about 60 inches of rain a year; avocados, cattle, coffee, flowers, honey, macadamia nuts and vegetables do well in this area.

The dry southern area of the Big Island known as the Kau district (Naalehu) has about 50 inches of rainfall a year. Citrus – Kau oranges – do well here as does cattle, coffee and macadamia nuts.

The Puna (Pahoa) district, south of Hilo averages 145 inches of rain. Anthuriums, bananas, citrus, flowers, ginger, guavas, macadamia nuts, papayas, exotic fruits and vegetable thrive here.

### **FIVE MOUNTAINS ON THE BIG ISLAND**

Kohala Mountain at 5480 in the northwest portion of the island, built by the oldest volcano on the island. The climate is sunny and tropical; it's an area made for fishing and farming. The valleys of Pololu and Waipio were once rice fields; Waipio is now used for taro farming.

Mauna Kea at 13796 feet. It is the highest island mountain in the world rising 32,000 feet from the ocean floor. It is a volcano that has been inactive for 2,000 years. The top of Mauna Kea is extremely dry and free from atmospheric pollutants. It is often snow covered in the winter months, hence its name Mauna Kea that means white mountain. (Yes, people do ski in Hawaii.) Clear nights and distance from city lights provide extraordinary viewing of the skies, which is why there are 13 working telescopes at the summit.

Hualalai at 8271 feet. This volcano erupted in the late 1700s and 1801.

Mauna Loa at 13677 feet. This massive mountain has a variety of climactic zones that allow for cattle ranching, coffee farms, sugar cane, macadamia nuts and diversified crops.

Kilauea at about 4,000 feet, sitting on the southeastern slope of Mauna Loa. This is active volcano country; the current eruption started on January 3, 1983. It is the most active volcano on earth: since 1840 it has erupted 60 times.

### **A BRIEF HISTORY OF FOOD IN HAWAII**

The Hawaiian islands are 2500 miles from land making it one of the most remote inhabited places. When the first humans arrived here in the third century there was little here that was edible. Seeds blew to Hawaii by way of great storms or they arrived with migratory birds. But basically, everything Hawaii eats today was brought in, most of it since the 19th century.

### **THE FIRST POLYNESIANS**

The first Polynesians arrived from the Marquesas, making landfall off the southern coast of the island of Hawaii. They brought 30 plants, a dozen of which were significant sources of food. This included taro, breadfruit, sweet potato, yams, sugarcane, coconut, bananas and mountain apple. They also came with pigs, dogs, chicken and rats. In the 6th century, voyages to and from the South Pacific stopped and the islands were isolated for several hundred years. By 1200 A.D. there were permanent settlements on the leeward coasts of all islands. By 1400 taro and sweet potato fields were quite extensive. By 1600, most of the land below 1500 feet had been altered in some way.

### **DISCOVERY**

Captain James Cook, sailing aboard the HMS Discovery, sighted land at Kauai in 1778 and is credited with the discovery of the Hawaiian Islands. This was Cook's third voyage in the South Pacific but the islands had eluded him on his first two voyages. Cook named these islands the Sandwich Islands after his patron, the Earl of Sandwich, another food connection for Hawaii. Cook landed at Kealahou Bay, Hawaii on January 18, 1779 where he was revered as the god Lono. But a month later, he was killed.

When Cook arrived in the Hawaiian Islands there were 300,000 to 800,000 Hawaiians here (no one is sure of the number) and Hawaii was self sufficient in food. The Hawaiians had more than 300 fishponds that provided two million pounds of fish a year and the land was extensively terraced and planted in taro and other foods.

Within a matter of years after Cook's discovery, the Sandwich Isles were a part of international trade with European and American drifters landing here. From 1780 to 1790, fur traders came to the islands to provision and repair their ships on their way

to China. In the process, traders discovered the lush sandalwood forests of the Big Island and by the turn of 19<sup>th</sup> century, Hawaii was known for its sandalwood forests and the harvest was especially heavy on the island of Hawaii.

### **MISSIONARIES AND WHALERS**

The missionaries were Calvinists and they came to Hawaii to Christianize the natives. They were a stern group of people who had little respect for Hawaiian ways. The missionaries had their own pantry of foods, based on English tradition: corn, molasses, root vegetables, dried beef jerky, smoked ham, bacon, turkey, cranberries. Roasted meats, baked pastries, soups, puddings and stews became their island cuisine.

Flour was imported from the mainland but fish, chicken and taro became mainstays of the missionary diet. Sweet potato, onions, lettuce, cabbage and beans grew in backyard gardens. Watermelons, muskmelons, coconuts and tomatoes were cultivated by Hawaiians who traded their produce. The missionary wives were resourceful and adaptable and employed what was grown here with the provisions that survived the long voyage from New England

We have learned from the missionaries through letters and diaries, that there was a good supply of beef on the island, fresh and dried, as well as dairy cattle that supplied milk and butter (but not enough milk for cheese making). Beef stew with potatoes and carrots became a Hawaiian food. By the mid 1800s, Hawaii was a series of communities that had already been impacted by outside influences. The production of food for export was already important. Supplying the many whaling ships that came to call and the need for food in California because of the gold rush and the Civil War made a great impact on food production in Hawaii.

### **THE GREAT MAHELE AND SUGAR**

But by the mid 1800s, the Hawaiian kingdom's economy was not very bright. Sandalwood, an important trade item, was almost gone from the forests of Hawaii. Salt, another important trading commodity, was plentiful but not enough to sustain a kingdom. Whalers who wintered in Hawaii and restocked their boats were fewer in number; one of the factors was that the need for whale oil was diminishing as petroleum became a source of fuel for lamps.

The Great Mahele of 1848 allowed for the private ownership of land for Hawaiians and foreigners. This made way for American and European businessmen to gain control of large tracts of land that led to the development of agriculture and especially the sugar industry in Hawaii. Sugar is a grass brought to the islands by the early Polynesians who chewed on the plant as a source of energy and food. It was growing on Kauai when Captain Cook arrived on Kauai in 1778. The first serious sugar plantation was at Koloa, Kauai in 1835 by Ladd and Co. On the island of Hawaii, Ah Kina, a Chinese planter, began raising cane at Amaulu in 1851.

As land became available from the kingdom, entrepreneurs snapped it up and began planting the sweet crop whose demand was growing. Sugar meant plantations and mills and the need for workers. The native Hawaiian population was down to 70,000 people by the 1850s, diminished greatly by disease. And native Hawaiians were not eager to work in sugar cane fields. Plantation owners turned to factors to search for workers in devastated areas of the world that were ravaged by wars and famine.

## **THE IMMIGRANTS AND WHERE THEY CAME FROM**

From the 1850s to the 1930s, came the parade of immigrants to Hawaii. First came the Chinese, battered by the Opium Wars, the Taiping Rebellion and the struggle for land in the midst of famine and flood. They came from the Southern provinces of China – Guangdong and Fujian – and their numbers swelled to 40,000 over a 100-year period. The Chinese came on five-year contracts and many planned to return to their homeland. But most of them stayed and sixty per cent married Hawaiian women.

In 1882 U.S. Congress passed the Chinese Exclusion Act, prohibiting the immigration of Chinese to the U.S. While Hawaii was still a kingdom, it passed a similar policy leading to immigration from Japan. In the 1880s came the Japanese from poor prefectures, mostly Hiroshima and Yamaguchi in the southern part of Honshu. Within 5 years, the Japanese represented 40% of the plantation workforce; within 30 years, 180,000 of them came as contract workers for the sugar plantations. This included the Okinawans, a culturally distinct group but part of Japan.

The Portuguese were among the first Europeans to come to Hawaii. They hailed from Madeira and the Azores, islands off the western coast of Portugal. Faced with poverty and the failure of vineyards, they came to Hawaii between 1878 and 1887 to fulfill their dreams of owning land and having a good job. A smaller number emigrated between 1906 and 1913 for a total of 26,000 Portuguese who came to the islands. Many of them served as lunas or supervisors on the plantations. Unlike other immigrant groups, the Portuguese came with their families which helped them sustain their traditions in food and culture. The first thing they did was put up their fornos or brick ovens for baking breads.

It's interesting to note that today in Hawaii, Portuguese are distinguished from other Caucasians, a remnant of the plantation era where they were classified unto themselves. The ukulele, a Hawaiian string instrument, was brought by the Portuguese. In 1903, the Korean immigration started, mostly unmarried men from the south who were generally city folks, not farmers. Puerto Rico, India and the American South all contributed to the influx of workers to Hawaii. There was a Norwegian experiment with a hundred arriving in Hilo in 1881. But the climate and culture did not suit them and after they completed their contracts they left.

There were Scots who came to staff positions on the plantations as accountants and mechanics and engineers for the equipment purchased by plantation owners from Scotland. The Hamakua Coast, north of Hilo, was once known as Scotch Coast for the many Scots who resided in the 26 plantations that developed here.

After Hawaii was annexed to the U.S. in 1893, the Japanese and Chinese were excluded by the Oriental Exclusion Act so the factors turned to the Philippines for workers. The first group came from an area near Manila speaking Tagalog; they were followed by the Visayans and later by the Ilocanos from the northwest section of Luzon. This was the last major wave of immigration for the sugar plantations with 110,000 immigrants coming here between 1906 and 1930.

In 1876 a reciprocity treaty between the kingdom of Hawaii and the U.S. allowed for duty free sugar export to the U.S. The sugar industry was further stimulated by annexation to the U.S. and the overthrow of the monarchy in 1893 Unlike the West Indies, no rum industry developed here but Hawaiian sugar became a world-renowned product. Sugar dominated the Hawaiian economy for more than a hundred years.

But in the 20<sup>th</sup> century sugar lost its sweet position in the Hawaiian economy. Contract labor came to an end to be replaced by the rise of labor unions for field workers. Sugar prices began to drop, labor costs went up and competition from other sugar areas in the world took their toll on the industry that was once king. One by one the sugar plantations closed; the last sugar plantation on the island of Hawaii, Hamakua Sugar, closed in 1994. Only two sugar plantations remain in the state: Hawaiian Commercial and Sugar on Maui and Gay and Robinson on Kauai.

### **WHAT EARLY HAWAIIANS ATE**

Early Hawaiians depended on the land and ocean for their food. The bountiful Pacific Ocean supplied them with fish including large fish from deep waters and smaller fish from reefs and shorelines. Spiny lobsters, shrimp, octopus, squid and seaweeds were also part of the ocean's bounty. Land was controlled by the alii or ruling chiefs who gave the right to use the land to common folks. Depending on their productivity, a family's lands could increase or decrease and a family's wealth came from their input into the land.

There was also a system called ahupua'a – the mountain to ocean land division in which families joined together in the production of food for themselves. This division provided for certain crops to be grown in the upper or mountainous area, others in the middle area and fishponds to be maintained at the shoreline. In this system, an entire family or ohana shared in the cultivation and maintenance of the ahupua'a and also in its harvests.

Among Hawaiians, men were at the center of food preparation. They dug the imu or underground ovens, prepared taro root for pounding poi, caught the fish and cooked it and grated the coconut meat. Food was generally prepared to last for more than one meal and the leftovers eaten at room temperature. Men and women ate at different tables; and their foods had to be prepared separately, too, meaning double work for the food preparers. Certain foods were reserved for men or women or chiefs and people ate when they were hungry

### **WHAT WE GROW, PAST AND PRESENT**

#### ***Rice***

Rice is considered the starch staple of the islands along with taro or poi and for this reason it's included in the list of agricultural products. We don't grow rice in the islands anymore but we did at one time.

The Chinese, key to the development of the sugar industry, were also instrumental in the development of the rice industry. When the Chinese emigrated, their contracts specified that the plantation would furnish food for the laborers. But rice was not a part of the foods available in Hawaii. The Chinese brought their rice and eventually planted it. By the 1860s it was an established crop in Hawaii, replacing many taro fields because the demand for taro was decreasing with the diminishing Hawaiian population. Areas like Waikiki on Oahu and Hanalei Valley on Kauai were rice fields. Rice was farmed in Waipio, Pololu and Waimanu Valleys on Hawaii but it was better suited to Oahu and Kauai.

By 1888, 13 million pounds were exported to California, establishing Hawaii as a major rice producer in the late 19<sup>th</sup> century and into the early 20<sup>th</sup> century. By the turn of the 20<sup>th</sup> century there were 5,000 rice farmers in Hawaii, first Chinese then Japanese farmers. But by the 1930s Hawaii was buying 2/3 of the output from California. What happened? Most of the farmers grew long grain rice – a rice favored by the Chinese and Filipinos – and most of the consumers in Hawaii – mostly

Japanese and Korean – liked sticky medium grain rice that was grown in California. So we were importing rice to fulfill most of the demand in the islands. And the mechanization of the industry developed on the mainland, allowing for greater output. The smaller farms in the islands could not afford to mechanize; the Hawaii farmers tried to survive but by the 1960s, rice farming was dead, to be replaced by taro and the growing demand for poi. In Hawaii, we probably eat 60 pounds of rice a year per person, much higher than any other American average.

### ***Pineapple***

Next to sugar, pineapple was the second most important crop in the Hawaiian economy in the 20th century. It is associated with Hawaii because of the marketing savvy of James Dole and William Eames, founders of Dole and Del Monte Pineapple. Pineapples are native to South America and were probably brought to Hawaii by Spanish sailors. In 1886 the smooth Cayenne variety was introduced and became an important cultivar. Pineapples are a bromeliad. A single fruit is made up of a collection of fruitlets that develop from individual flowers. It takes 14 to 17 months for a pineapple to mature. Pineapples have no starch stored in the fruit that will change to sugar so it does not increase in sweetness after harvest. Pineapples are usually sweeter in summer because of the hot weather.

Dole realized that pineapples could not compete with peaches and pears in California because of the long distance to market for fresh fruit. It is a fruit that doesn't ripen after it's picked so it doesn't have a long shelf life like an avocado or banana. Dole decided to turn to canning and established the infrastructure, using Henry Gabriel Ginaca's machine for peeling and coring pineapples at a hundred a minute.

Pineapple was planted throughout the state including North Kohala. But the area proved to be too dry. Another attempt by Kohala Sugar in the 1950s proved uneconomical as did pineapple planted near Hilo. More successful plantings were done on Oahu, Maui and Lanai and during the 20<sup>th</sup> century, as sugar began its decline, pineapple became king.

Canned pineapple became the product Hawaii was known for and "Hawaiian" dishes always included pineapple. But over the years, as with sugar, the cost of growing pineapple in lesser-developed areas of the world proved more economical. Today, with air transportation, it is possible to ship out prime fresh fruit to markets. Pineapple grown on Oahu and Maui is shipped out as fresh fruit and there is only one cannery left on the island of Maui. And the only canned pineapple from Hawaii is found as supermarket brands with a stamp on the top of the can identifying it as 100 per cent Hawaii pineapple.

### ***Beef***

Beef cattle were introduced to the islands by Capt. George Vancouver in 1793. He brought a gift of a bull, 4 ewes and 2 rams for King Kamehameha I. For 10 years they multiplied and were kapu or taboo for consumption except by the king. During that time the herd grew to enormous numbers and became a pest on the island of Hawaii, destroying crops and wreaking havoc among residents.

Stone walls were built to contain the wild cattle and to keep them away from farms and homes. Cattle hunting was encouraged to keep the population under control. But men on foot with knives were not efficient; men on horses were needed. In 1803 horses arrived on Hawaii.

About 30 years later, Mexican, Indian and Spanish vacqueros were brought in from California to train Hawaiians on how to work the range and control the cattle. They became Hawaii's paniolos or cowboys, a vital part of the island's history. They were America's first cowboys.

Beef, known as pipi, became a major trade item, especially salted beef that could be stored on ships that came to the islands for supplies. Beef also became a part of the local diet. Pipikaula, strips of dried seasoned beef became a part of the luau table; today, beef stew is very popular in Hawaii.

In the 1880s and 1890s new varieties of cattle were brought in from the U.S., New Zealand, Australia and Scotland to improve the stock. Beef cattle ranching was a stable industry on the Big Island and there were numerous dairies on the island that produced milk and butter. Much of the beef was shipped to Oahu: there are no deep water wharfs for ships to tie up to so cattle were pulled into the surf to longboats, tied to gunwales and rowed to waiting steamers.

The town of Waimea began to take shape in the early 1800s, stimulated by the cattle industry and the need to tame the wild herds. Located in the foothills of Mauna Kea, this town was also at the crossroads of the sugar mills and farms in the area and its proximity to Kawaihae also played a role in its development into a bustling town in the 1830s and 1840s. To this day, Waimea is known for its cattle ranches and paniolo heritage.

John Palmer Parker was one of the people responsible for the running of the cattle industry under Kamehameha I. He became a major landowner and cattle rancher on Hawaii. Eventually he would have 5,000 head of cattle on his Parker Ranch of 225,000 acres, the largest privately held ranch in the U.S.

Today the beef cattle industry is still a major part of the Big Island's economy. But the cost of shipping in feed for cattle and lower cattle prices in general have made it uneconomical to finish beef in Hawaii. Many ranchers have turned to selling off their lands for housing and other developments. Ranching is still here but calves are often sent off to mainland feed lots for finishing. A few ranches maintain their herds here, allowing cattle to graze on open ranges; grass fed beef is kept here for markets on the island. Many top restaurants on the island serve this naturally raised beef as well as lamb.

### **Coffee**

The state of Hawaii is the only place in the U.S. where coffee is grown and it all began here on the Big Island. Samuel Ruggles, a Connecticut born missionary, first planted coffee in 1828 in Kona. Because of its potential, coffee production was encouraged in the form of coffee as payment for taxes, tariff exemptions on the import of mill equipment, tariff protection and land tax exemptions. Coffee plantations sprang up in Hilo and Puna as well as Kona. Even though the quality was not terrific, coffee farmers did well because the price for green coffee went up in the 1870s and 1880s. The coffee boom established the reputation of Kona coffee but it collapsed at the turn of the century.

As the coffee market collapsed, many Japanese sugar workers who had completed their contracts and were looking for independent farming opportunities, took over the coffee parcels that were being carved out of larger tracts of land in the mid 1890s in Kona. These farmers and their descendents are still the mainstay of the Kona coffee industry today.

Over the years, coffee prices have gone up and down, playing with the fate of the coffee farmers. In the early 1900s blights and molds ruined the Kona crops; during World War I coffee could not be shipped to the mainland because of shortages and during the Great Depression, coffee prices plunged. There was a boom period in the 1950s as world prices rose but they fell a decade later. Cooperatives were formed, helping to stabilize the industry in terms of prices and processing.

Kona coffee is an arabica bean, grown in the rocky soil of the dry uplands from 500 to 2500 feet above sea level. This particular area of Kona is blessed with the morning sun for warmth and clouds and mist in the afternoon. The climate and soil produce a mild, flavorful coffee with unique flavor characteristics. Kona coffee has always been picked by hand and for years school schedules reflected the harvest season when all members of a family were needed to pick the coffee cherries in the fall. Kona Nightingales are the donkeys that transported sacks of coffee beans tied to their backs.

Coffee is now grown on Kauai, Molokai, Oahu and of course Hawaii. There are about 700 coffee farmers in Hawaii; over 600 of them are on the island of Hawaii. Collectively they produce 8 million pounds of coffee in parchment. Only Kona coffee ranks among the top coffees of the world, commanding up to \$30 a pound at retail. It is still grown on a number of small farms. By State law, a Kona blend coffee must have at least 10% Kona coffee beans. Many farmers today harvest and roast their coffee and sell them as estate coffees.

### ***Macadamia nuts***

The creamy buttery macadamia nut was introduced to Hawaii in the early 1870s from Australia. It has been in commercial production since 1948, mostly in the Puna and Kau districts of the Big Island. Honokaa is a center for macadamia nut processing. Hawaii macadamia nuts are known for their quality.

The macadamia nut tree is a majestic one but it takes about 7 years before it will yield a crop of nuts. Harvesting today is done mechanically and the very tough shells are cracked under great pressure. The nuts are processed into roasted nuts, chocolate, caramel or honey covered nuts, used as an ingredients in ice creams and baked goods and used for flavoring coffees and liqueurs

In 2001, the state produced 56 million pounds of macadamia nuts (wet in shell). At the end of 2003, there was a shortage of macadamia nuts due to droughts in Australia, another major producer of macadamia nuts. Supplies are short and prices are up for farmers.

### ***Papaya***

In the U.S, apples, oranges and bananas are the most common fruits, available throughout the year. In Hawaii we add pineapples and papaya to our breakfast tables. Hei is Hawaiian for papayas, an orangey yellow oval fruit that is a good source of Vitamins A and C. It contains a natural protein splitting enzyme called papain that is used to tenderize meats.

There are many varieties of papaya, developed over the years. On Kauai, the red fleshed Sunrise papaya grows well; on Oahu the bulbous round papaya known as X77 or Laie Gold does well on the North Shore of the island. On Hawaii, the Puna or Kapoho papaya, also known as the solo papaya, is the most prolific, especially in the

volcanic soil of the Puna area. This is the heart of Hawaii's papaya industry and it is from this part of the state that papaya is exported.

In the 1980s and 1990s the ring spot virus attacked papaya trees and virtually destroyed the industry. Researchers at the University of Hawaii developed the Sunup and the Rainbow, genetically modified papayas that resist the disease. The Rainbow is grown on this island alongside the Puna and is exported to markets on the mainland U.S., Canada and other parts of the world.

Three quarters of the state's papaya farmers are on the Big Island (approximately 158 of them); they produce over 10 million pounds of fruit a year.

### ***Tropical fruits***

In addition to pineapples and papayas, Hawaii grows a lot of bananas, watermelons, avocados, and recently cantaloupes and honeydew melons. There are also a growing number of exotic tropical fruits being cultivated commercially for local consumption as well as export. Some of the fruits are abiu, atemoya, calmito, canistel, cherimoya, durian, guava, jaboticaba, jackfruit, longan, loquat, lychee, mango, mangosteen, persimmon, poha, rambutan, sapodilla, soursop, starfruit and specialty pineapple.

### ***Ginger***

Hawaii grows some of the best ginger in the world. Ginger is a rhizome, a creeping horizontal stem that grows beneath the surface of the soil. A crop takes about 10 months to grow and requires a lot of water, which is why it grows well along the Hamakua Coast of Hawaii.

Fresh ginger is a basic seasoning in so many Asian cuisines. Flavorful, slightly hot on the palate and refreshing, ginger's brightness adds sharpness to a dish. It also possesses medicinal qualities and is said to aid digestion, alleviate nausea, combat cold and stimulate the appetite for food and sex. Hawaii exports about 18 million pounds of ginger a year.

### ***Citrus***

There is such a thing as a Hawaii orange, a yellow skinned, juicy orange with a light yellow orange flesh. These oranges were developed over many years from the first orange trees brought to Hawaii in 1792 by Captain George Vancouver. Orange trees are especially prolific in the Kona area of the Big Island; they also grow in Waimea on Kauai and Waialua on Oahu. There are lemons, limes and grapefruit grown in Hawaii. And the calomondin, a very small tart citrus used in Filipino cookery.

### ***Hearts of palm***

If you've ever eaten a heart of palm it probably came from a can, a one-inch white spear with the flavor of its brining solution. A fresh heart of palm is quite a bit different: mild flavored, crisp and silky, reminiscent of an artichoke heart. The peach palm which grows wild in the jungles of Peru, is cultivated here on the Big Island along the Hamakua Coast. Trees form a multi stemmed clump and each clump is managed to produce a stalk for harvest each year. At about 6 to 8 feet in height, stalks are harvested by hand and the outer layers are stripped away to get at the heart of the palm. They are served mostly in salad preparations at fine restaurants in Hawaii and the U.S.

## **Avocado**

Avocados are like olives: they contain a large percentage of fat compared to other fruits. Depending on the race and variety of avocado, it can have from 7 to 26 percent fat. Avocados were introduced to Hawaii by Don Francisco de Paula Marin sometime before 1825. Different seedlings were introduced over the years and today we have quite a variety of avocados cultivated on the Big Island. The Sharwill is especially good, a deep yellow fleshed avocado that has a nutty flavor and creamy texture, rivaling the popular Hass from California and Arizona.

## **FORESTRY PRODUCTS**

There are dozens upon dozens of trees in Hawaii's forests, many of them native, many of them introduced to the islands. Three native hardwoods have been important to the forestry industry in Hawaii.

Sandalwood was Hawaii's first forestry product, traded to merchants bound for China. The fine textured, firm wood was not sold as logs or beams but as short pieces to be used as firewood, ornamental woodwork and mostly for joss sticks or incense. The forests of several native Hawaiian sandalwood species were quickly depleted and have never been reestablished in Hawaii.

Koa (acacia koa), a large hardwood timber tree, is native to Hawaii and is prized for its rich red brown to golden brown color for cabinetry and furniture. The trees like higher elevations and can grow to 100 feet in height and 4 to 7 feet in diameter. It was plentiful in Big Island forests in the 19<sup>th</sup> century and many early furniture makers used this wood in their craft. Koa floors, cabinets and furniture are much esteemed in the islands today but there is a limited supply available.

Ohia is another native Hawaiian tree that grows up to 100 feet in height and 4 feet in diameter. The wood has a fine texture and is very dense; it is well liked for flooring, beams and posts. It was exported to the mainland U.S. for use as railroad ties.

Reforestation efforts are underway throughout the state. Eucalyptus, ohia, koa, pheasant wood, mahogany, teak, red cedar, maple, sandalwood and a host of other high value tropical hardwoods are being planted and tended by many landowners on the Big Island on former sugar lands along the Hamakua Coast. As you drive north from Hilo you will most likely see eucalyptus trees gracing the lands close to shore.

## **FLORICULTURE AND NURSERY PRODUCTS**

Potted plants, landscape plants and flowers are a big business in Hawaii and especially so on the island of Hawaii. There are close to 800 farms in the floriculture and nursery products industry and almost half of them are on the island of Hawaii.

What do they grow? Anthuriums, bird of paradise, orchids (cymbidiums, dendrobiums oncidium), as cut flowers and as potted plants, ti leaves, red and other gingers, heliconias, proteas and an assortment of cut flowers like roses, carnations, plumeria, tuberose, pikake and vandas. The industry sold \$88 million worth of these products at wholesale.

Orchids comprise one of the biggest plant families with thousands and thousands of species, some still being discovered in tropical regions. Hawaii orchids are well known throughout the world for their uniqueness and quality.

## **OTHER AGRICULTURAL PRODUCTS**

They say you can grow anything in Hawaii – it's a matter of finding the right spot among the islands' geographical and climatic regions. There were once fruit bearing olive trees on Parker Ranch lands; strawberries do well in the cool regions of Kamuela, Hawaii and Kula, Maui; spice trees like cinnamon, nutmeg, allspice and cloves do well in a number of areas.

We grow lots of tomatoes, cabbage, green peppers, watermelons, cantaloupes, honeydews, a variety of Chinese cabbages, squashes, lettuces and herbs. Farmers throughout the state grow about 25 per cent of what we need to feed our 1.2 million population; the rest is imported from the mainland U.S. and other parts of the world.

With all the agriculture in the state, honey is a big crop for beekeepers and an important part of agriculture in general. Pollination for many seed crops depend on active bee hives. Not only does Hawaii produce a lot of honey, we also cultivate queen bees for export.

We even have a small wine industry in Hawaii. Grapes, tropical fruit and honey become wine at the Volcano Winery, about 3 miles from Volcanoes National Park. Fruit like guava, jaboticaba, passion fruit and honey from macadamia nut blossoms are among the offerings of this boutique and unique winery. The only other winery in the state is Tedeschi Vineyards at Ulupalakua on the island of Maui, known for its wines made from grapes and pineapple.

## **AQUACULTURE**

At Keahole Point, south of Kona airport, the rocky landscape drops off into deep waters. It is here that the state has established the Natural Energy Laboratory where exciting projects for food production are taking place.

Ocean Thermal Energy Conversion or OTEC is a technology that requires a flow of warm water at the ocean's surface and cold water from the depths of the ocean. The differential in temperature creates energy and the nutrient rich deep water is good for growing things.

Water from 2,000 to 3,000 feet below the surface is brought up to create enough energy to cool and power the buildings at the Natural Energy Lab. And the nutrient rich water is a fertile growing medium for algae for pharmaceuticals, shrimp and clam stock, seaweed and abalone and a host of other products. Lobsters from Maine are brought here to rest and recuperate in this water before being shipped off to restaurants throughout the state. Clams are hatched here and sent off to the Pacific Northwest to grow in muddy banks. Big Island Abalone is producing red abalone for sushi aficionados in Japan and elsewhere. Nutrient rich water is being bottled and sold and its salt by product is harvested and marketed. Another project will soon see strawberries and other fruits and vegetables grown with nutrient rich water. It's an exciting laboratory in land-based aquaculture that is gaining momentum here on the island of Hawaii.

**FOOD CROPS  
GROWN IN HAWAII COUNTY**

<b>Abiu</b>	<b>Green Beans</b>	<b>Orchids</b>
<b>Avocado</b>	<b>Guavas</b>	<b>Papayas</b>
<b>Bananas</b>	<b>Heart of Palm</b>	<b>Pineapples</b>
<b>Beets</b>	<b>Herbs</b>	<b>Poha</b>
<b>Cacao</b>	<b>Hogs</b>	<b>Pumpkins</b>
<b>Cattle</b>	<b>Honey</b>	<b>Rambutan</b>
<b>Cheremoya</b>	<b>Jabote Kava</b>	<b>Snap Peas</b>
<b>Chickens</b>	<b>Kava</b>	<b>Squash</b>
<b>Citrus</b>	<b>Limes</b>	<b>Star Fruit</b>
<b>Coffee</b>	<b>Logon</b>	<b>Strawberries</b>
<b>Cucumbers</b>	<b>Long Beans</b>	<b>Surinam Cherry</b>
<b>Dragon Fruit</b>	<b>Lychee</b>	<b>Sweet Potatoes</b>
<b>Eggplant</b>	<b>Macadamia Nuts</b>	<b>Taro</b>
<b>Eggs</b>	<b>Mango</b>	<b>Tomatoes</b>
<b>Figs</b>	<b>Melons</b>	<b>Tree Tomato</b>
<b>Ginger Root</b>	<b>Mushrooms</b>	<b>Vanilla</b>
<b>Goats Milk</b>		

# Agriculture Fun Facts!

## Did you know?

- ✿ There are over 150 types of Avocados, 200 types of Mangos, and more than 100 types of Bananas!
- ✿ Jack Fruit is the world's largest fruit weighing in at over 100 pounds! The pulp constitutes over 40% of its' weight. The Chinese consider the pulp and seed as a cooling and refreshing tonic, "to help overcome the influence of alcohol on the system."
- ✿ When pineapple culture was abandoned on the Florida Keys due to soil depletion, limes were planted as a substitute crop.
- ✿ In Hawaii, seeds of the purple passion fruit A.K.A. as Lilikoi were brought from Australia in 1888.
- ✿ Lychee is one of the oldest of all cultivated fruit. The oldest record of its cultivation was from China dating 1059. Lychee is said to relieve coughing, gastralgia, tumors, and enlargement of the glands. In India the seeds are powdered, and because of their astringency they are administered to those with intestinal troubles.
- ✿ One of the most common tropical fruits, the mango, is a member of the Anacardiaceae, which also includes a number of poisonous plants. Believed to be from eastern India and Burma, the mango has been cultivated since ancient times.
- ✿ When eaten, the Miracle Fruit causes anything that is eaten after to taste sweet.
- ✿ It was recorded, that before the arrival of missionaries in Hawaii, there was no other fruit besides coconuts, bananas, and the mountain apple.
- ✿ There are four main types of pineapple cultivars. The first sizeable plantation of five acres was planted on Oahu in 1885.
- ✿ The somewhat hair like covering of a rambutan is responsible for the common name of the fruit, which is based on the Malay word "rambut" meaning "hair".
- ✿ Oils found in the fruit and peels of tangerines are valued in manufacturing of perfume.
- ✿ There are over 135 types of fruits with thousands of cultivars.
- ✿ The first commercial pumpkin patch opened on Oahu in 2000 and now supplies the state with 80% of its pumpkins sold commercially.

## **BIG ISLAND COMMODITY ADVISORY GROUPS (CAG)**

Updated June 2005

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#### **Hawaii Export Nursery Association**

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### Hawaii Nurseries w/ Specialization in Forestry Trees, continued

#### **State Tree Nursery**

Division of Forestry & Wildlife  
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### Livestock Commodity Organizations

#### **Hawaii State Sheep Producers Association**

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Livestock Commodity Org, continued

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**Hawaii Coffee Association**

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Fruit Commodity Org, continued

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