# MACADAMIA NUTS: ECONOMIC AND COMPETITIVE FACTORS AFFECTING THE U.S. INDUSTRY

Report on Investigation No. 332-320 under section 332(g) of the Tariff Act of 1930

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This report was prepared principally by

Stephen D. Burket Project Leader

Lee E. Frankel and Joan M. Williams Office of Industries

Kyle Johnson and Walker Pollard Office Economics

> L. Marshall Wade Office of Investigations

William W. Gearhart Office of the General Counsel

With assistance from

Marva P. Tinner, Elizabeth N. Lee, Monica Lane, and Zema Tucker Office of Industries

Under the direction of

Lowell Grant, Chief Agriculture Crops and Products Branch

> Cathy L. Jabara, Chief Agriculture Division

Address all communications to Secretary to the Commission United States International Trade Commission Washington, DC 20436

# PREFACE

On December 30, 1991, at the request of the Committee on Finance, United States Senate, the U.S. International Trade Commission instituted investigation No. 332-320, *Macadamia Nuts: Economic and Competitive Factors Affecting the U.S. Industry*, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), for the purpose of providing information concerning the following:

- The competitive factors affecting the domestic macadamia nut growing and processing industry, including competition from imports of macadamia nuts;
- (2) The extent to which trade practices and barriers to trade by other competing countries are impeding the marketing of domestically produced macadamia nuts; and
- (3) An analysis of current conditions of trade in macadamia nuts between the United States and Australia, and the rest of the world and any recent changes in such conditions, including information on prices, cost of production, and marketing practices.

The Senate Finance Committee's request, reproduced in appendix A, asked that the Commission provide a final report not later than November 13, 1992.

Notice of the investigation, reproduced in appendix B, was posted in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and published in the *Federal Register* (57 F.R. 694) of January 8, 1992.

Public hearings on the investigation were held on April 22, 1992, in Kailua-Kona, Hawaii, and on May 12, 1992, in Washington, DC. The Commission also invited interested persons to submit written statements concerning the investigation.

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# **EXECUTIVE SUMMARY**

In crop year 1991/92, the United States produced 5,398 metric tons (60 percent of world production) of macadamia kernels, with a wholesale value of \$55.3 million. Hawaii is the largest producing State, accounting for more than 99 percent of U.S. macadamia production. Over 95 percent of Hawaii's macadamia nut production is located on the large island of Hawaii. Thus production will not be seriously impacted by the recent hurricane that struck the island of Kauai. Macadamias are Hawaii's third-largest agricultural crop, following sugar and pineapples. Hawaiian macadamias have dominated the world macadamia market since the importation of macadamia trees from Australia in the late 1880s. However, Australia also is now a major world exporter of macadamia nuts, exporting 661 metric tons of kernels in 1991, and an unknown quantity of products containing macadamia kernels. Australia's share of world production of macadamia kernels increased from 18 percent in 1987 to 30 percent in 1990 before dropping to 24 percent in 1991. The United States and Australia together accounted for 84 percent of 1991 world production, which totaled 8,988 metric tons of kernels. U.S. exports of macadamia kernels and kernel-containing products in 1991, primarily to the Pacific Rim countries, totaled 1,019 metric tons, valued at \$24.2 million, and were equivalent to 19 percent of domestic production.

As requested by the Senate Finance Committee, the Commission in its investigation has sought to develop information on the competitive factors affecting the U.S. macadamia nut growing and processing industry. The factors analyzed include competition from imports of macadamia nuts and nut products, the effects of trade practices and barriers to trade by other competing countries, and the conditions of trade in macadamia nuts. The following paragraphs summarize the findings of this investigation.

- Worldwide macadamia nut production increased during the period examined (1987-91), and current plantings indicate that production will continue to increase.
   U.S. plantings and production, although also increasing, are doing so more slowly than other areas of production, thereby causing the U.S. share of world production to decline.
- The United States is the major world market for macadamia nuts and nut products, with the majority of domestic consumption supplied by domestic production. Japan is the second-largest market for macadamia nuts and nut products, and it is supplied entirely by imports. Australia is the third-largest market, with virtually all of domestic consumption supplied by domestic production. The EC's market is believed to be the fourth-largest market but is currently relatively minor and is supplied entirely by imports.
- U.S. grower prices rose through 1988 and then declined through 1991. U.S. processor bulk kernel prices rose through 1989 and then declined dramatically through 1990 and 1991. Industry sources attribute price declines to increased supplies of bulk kernels, rising inventory levels, reduced tourism, and slower economic growth since 1989.
- The United States is both a major importer and major exporter of macadamia nuts and macadamia nut products. Imports began in the late 1970s and the 1980s when U.S. processors of macadamias imported macadamias from other world producers because Hawaii's production was insufficient to meet both domestic and export demand. Imports increased as foreign growers and processors subsequently found additional market outlets in the United States, primarily on the mainland. Concurrently, increased tourism to Hawaii from Japan and other Pacific Rim countries introduced consumers from these areas to macadamia nut products, which helped to open new export markets.

- Imports into the U.S. market increased their market share from a low of 24 percent in 1987/88 to a high of 35 percent in 1990/91. Imports declined to 24 percent of the U.S. market in 1991/92. The majority of these imports were bulk macadamia kernels that are used in producing macadamia-containing products, a growing market segment. The 1991/92 decline is attributed to the U.S. industry holding significant volumes of imports in inventory at the beginning of 1991 from the 1990 crop, a collapse in the U.S. pricing structure from the buildup of inventories, and reduced world supplies available for export. It is anticipated that U.S. imports will increase in the near future as importers' inventory levels return to normal levels and foreign supplies available for export increase.
- The U.S. share of the Japanese macadamia market increased erratically from 21 to 39 percent during the period analyzed. Kenya's share decreased from 45 to 38 percent, and Australia's share increased from 22 to 23 percent. The remainder of the Japanese market was accounted for by South Africa and Guatemala. While these data appear to indicate that the United States has become more competitive in the Japanese market compared with other major suppliers, the change in market share has been erratic and thus is not conclusive.
- There are no major Government programs specifically affecting the production of macadamia nuts in the United States or Australia. The State of Hawaii has a general agricultural tax abatement program, and Australia has an Export Market Development Grant Program open to, but not specifically for, macadamia exporters. Australia also has an agricultural income equalization scheme and expenditure write-off provision. Other macadamia-producing countries are not known to possess any macadamia-targeted programs, although the United States and Japan have sponsored production development programs in Costa Rica and Kenya, respectively.
- There are no quotas or other restrictive barriers to trade in the two major macadamia markets—the United States and Japan. General duty rates range from 2.8 to 28 percent ad valorem for the United States and 3 to 8 percent ad valorem for Japan. Health and phytosanitary regulations in the major macadamia producing and consuming countries are not trade distorting, although the United States does maintain a phytosanitary ban on the import of in-shell nuts.
- Though macadamia inventories are traditionally small, U.S. processors and importers experienced significant increases in inventory in 1990 and 1991, largely as a result of increasing imports from Australia. Processors' large inventories of kernels at the end of 1990 and the beginning of 1991 discouraged additional processor purchases of in-shell nuts and caused grower inventories of in-shell nuts to increase from less than 2 metric tons in 1987 to almost 25 metric tons in 1991.
- The United States and Australia have similar costs of production, according to two 1989 studies, one on Australian producers and one on Hawaiian producers. According to the studies, orchard establishment costs and variable production costs for the two countries are very similar.
- The increased nominal value of the Australian dollar relative to the U.S. dollar during the period 1987 to 1991 suggests that Australia's competitiveness in the U.S. market could have been reduced. However, the nominal value of the currencies of Costa Rica and Guatemala declined, suggesting that these countries' competitiveness in the U.S. market may have increased.
- Quarterly exchange rates indicate that Japan's currency was higher in nominal value at the end of 1991 than at the beginning of 1987. This increase in value suggests that the prices of agricultural commodities imported by Japan became more competitive through the 5 years examined.
- Financial information provided by processors responding to the Commission's questionnaire shows substantial profits in 1987 and 1988, decreasing profits in 1989 and 1990, and actual operating losses in 1991. Significant increases in selling, general, and administrative expenses, particularly promotional expenses, contributed to the decreased profitability during 1989-91.

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• A sample of independent macadamia growers responding to the Commission's questionnaire reported aggregate net losses on macadamia operations from 1987 to 1991. Increased costs have been coupled with decreases in revenues, as more plentiful macadamia supplies, including import supplies, contributed to a reduction in the per-kilogram price paid by processors to the growers.

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# CHAPTER 1 Introduction

Macadamia nuts are a minor nut in the world market for edible tree nuts, accounting for less than 0.5 percent of world tree nut production in 1991/92.1 The United States, however, is the world's largest producer and consumer of macadamia nuts, accounting for 57 percent of world production in 1991. U.S. production of macadamia nuts is largely concentrated in Hawaii, which accounts for over 99 percent of U.S. production. Macadamias are Hawaii's third-largest agricultural crop, following sugarcane and pineapples. Over 95 percent of Hawaii's macadamia nut production is located on the large island of Hawaii. Kauai and Maui account for nearly all of the remaining production. Hence, Hawaii's production is not expected to be seriously impacted by the damage caused by hurricane Iniki that struck the island of Kauai.

World production of macadamia nuts more than doubled during the 1980s. U.S. production also increased, but more slowly than that of foreign competitors. Following a decade of rising macadamia nut prices, during which the rapid growth in supply could not keep pace with demand, prices fell sharply in the early part of the 1990s. This sharp decline in price in the early 1990s was due to increased competition in the world macadamia nut markets. The increased competition resulted from a variety of supply and demand factors which will be examined in this report.

# Purpose and Approach of the Report

This study, as requested by the Senate Committee on Finance, will provide an analysis of (1) the factors affecting the competitiveness of the U.S. macadamia nut growing and processing industry, (2) the extent to which trade practices and barriers to trade by other competing countries impede the marketing of U.S.-produced macadamia nuts in both domestic and foreign markets, and (3) the current conditions of trade in macadamia nuts. The investigation was instituted on December 30, 1991, following the receipt of a request on November 20, 1991, from the Committee on Finance, United States Senate. The competitive analysis examines changes in market shares, the cost structures and pricing strategies of the United States and competitor countries, and factors affecting industry growth and demand.<sup>2</sup> Due to the scarcity of public information concerning the world macadamia nut industry, the Commission collected information from a variety of sources to describe the U.S. and foreign industries, as well as foreign markets.

The information in this report was obtained from domestic and foreign macadamia nut growers and processors, U.S. importers, researchers, and other Government agencies. The published work of university researchers and private organizations is also The Commission staff was assisted with used. information on foreign industries and markets by U.S. Department of Agriculture and U.S. Department of State personnel posted abroad and by the Australian Embassy in Washington, DC. Additionally, data concerning the U.S. industry in Hawaii were obtained from questionnaires that were sent by the Commission to 273 members of the U.S. macadamia nut industry, 232 growers, 10 processors, including and 31 importers.<sup>3</sup>

<sup>2</sup> There is no single measure or definition of competitiveness. Van Duren, Martin, and Westgren (1992) define competitiveness as "the sustained ability to profitably gain and maintain market share." Erna Van Duren, Larry Martin, and Randall Westgren, "A Framework for Assessing National Competitiveness and the Role of Private Strategy and Public Policy," paper presented at the International Agricultural Trade Research Consortium on "Competitiveness in International Food Markets," Annapolis, MD, Aug. 7-8, 1992. McCorriston and Sheldon, on the other hand; define competitiveness in terms of economic growth. According to these authors, market shares and other indicators of industry performance are only important insofar as they relate to increasing standards of living. Steve McCorriston and Ian Sheldon, "International Competitiveness: Implications of New International Economics," paper presented at the International Agricultural Trade Research Consortium, Aug. 7-8, 1992.

Aug. 7-8, 1992. <sup>3</sup> The 232 growers and 10 processors included in the Commission's survey are all members of the Hawaii Macadamia Nut Association, which provided member mailing lists to the Commission. According to the Hawaii Department of Agriculture, there are currently 690 macadamia nut growers in Hawaii. The association's processors' list included all known processors as of December 31, 1991. The importers included in the survey were selected by Commission staff from a list developed by the Commission staff that included firms importing a minimum of \$50,000 annually of macadamia nuts and nut products.

<sup>&</sup>lt;sup>1</sup> Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," 31st Annual Meeting of the Hawaii Macadamia Nut Association, May 1991, p. 7.

Information was also collected through public hearings and fieldwork. Public hearings were held on April 22, 1992, in Kailua-Kona, Hawaii, and on May 12, 1992, in Washington, DC. Fieldwork was conducted in California in January 1992 and in Hawaii in conjunction with the April 1992 public hearing. The fieldwork in Hawaii enabled Commission staff to visit production locations and to interview growers, processors, retailers, university researchers, and State Government personnel.

# Scope of the Report

## Industry Defined

The segments of the macadamia nut and nut products industry that are examined in this investigation include (1) growers that cultivate macadamia trees and harvest the nuts for further processing, (2) processors that purchase macadamia nuts and crack the nuts to produce raw kernels, and (3) processors and importers that market raw kernels. The study does not examine the nut roasters, rebaggers, confectionery manufacturers, and bakery and miscellaneous food manufacturers, which are intermediate consumers of raw and roasted macadamia nut kernels. The processing and marketing channels are shown in figure 1-1.

## Industry Products

Macadamia nuts are consumed as roasted nuts (separately or in nut mixes), as confectionery (primarily chocolate-covered kernels), and as an ingredient in bakery and other food products. The products of the macadamia nut industry are categorized and described below:

- (1) Raw in-shell macadamia nuts.---
  - (a) Macadamia nuts that have been husked but not dried (wet-in-shell (WIS) nuts). These nuts may have an internal moisture content as high as 25 percent.
  - (b) Dried in-shell macadamia nuts that have been air dried at either the farm or at the processing plant until the internal moisture level of the nuts has been reduced to about 3.5 percent.



Processing and marketing channels of macadamia nuts



<sup>1</sup> These manufacturers include the larger processors, who produce many of the products shown, and secondary manufacturers, who purchase raw or roasted kernels and then produce the consumer products shown.

- (2) Raw kernels.—the nut meats obtained by breaking (cracking) the hard nut shell. Raw kernels are further dried to about 1 percent moisture to increase their stability; otherwise, the kernels will deteriorate.
- (3) Roasted kernels.—raw kernels that have either been dry- or oil-roasted. Dry-roasted nuts have been subjected to radiant or microwave heat. Oil-roasted nuts have been immersed in hot oil. Honey-roasted kernels are obtained by introducing honey into the poetting process, which regults in a
  - into the roasting process, which results in a honey glaze on the roasted kernels. All of these products may be salted or unsalted. In addition flavoring, such as hickory smoke, may be added in the processing.
- (4) Candy and confectionery products.— Macadamia kernels are used as ingredients in baked goods, brittles, and other candies including chocolate-covered whole nuts, nut halves, and nut clusters and chocolate bars that include macadamia nuts as an ingredient.

## **Production Relationships**

The macadamia nut is produced from a tropical broad-leaf evergreen tree. There are at least six different varieties of macadamia nut trees. However, most of the world's commercial production of macadamia nuts is from two species—Macadamia integrifolia, the smooth-shelled type, and Macadamia tetraphylla, the rough-shelled type. The smooth-shelled type accounts for the majority of the world's output and is preferred because of its higher oil content and superior roasting quality.

Macadamia trees are perennials that generally can be harvested economically within 6 to 8 years of planting and that may produce for 40 to 60 years or more with proper care.<sup>4</sup> World production of macadamia nuts occurs between 34 degrees north and 30 degrees south latitude, with commercial production mainly between 16 degrees and 24 degrees north and south latitudes.<sup>5</sup> Production generally occurs at altitudes below 760 meters, as trees above this elevation grow slower, produce fewer nuts, and produce nuts with thickened shells.<sup>6</sup> Tree damage occurs rapidly when temperatures drop below -2 degrees centigrade for more than several hours, but 'high tropical temperatures also result in trees' failing to

produce nuts. Thus, production in countries with tropical climates is at higher elevations, where temperatures are more moderate.

In Northern Hemisphere countries the majority of the macadamia nut crop is harvested during September-December with the harvest peaking in October, although harvesting continues throughout much of the rest of the year. In Southern Hemisphere countries the harvesting season is from April through September. Macadamia trees primarily compete with crops such as sugarcane, coffee, and pineapples for available land use.

Macadamia nuts are usually gathered by hand, except on large farms that are sufficiently level to allow use of mechanical sweepers and pickup devices. Macadamia nuts on a given tree do not all mature at the same time, thus they are usually allowed to mature on the tree and fall to the ground. The nuts must be gathered and hulled shortly thereafter to prevent deterioration. Under tropical rainforest conditions, nuts may have to be gathered as often as once a week. Once harvested, the nuts are husked and then air-dried at the farm or at the processing plant. Figures C-1 and C-2 in appendix C describe the processing of raw kernels and the production of roasted macadamia products. The drying process shrinks the kernel inside the nut, resulting in less damage to the kernel when the shell is cracked by the processor. Nuts that have been dried can be stored for 4 to 5 months before they must be cracked.

Due to their extremely hard shells, almost all macadamia nuts are cracked by commercial processors. Macadamia nuts have an average kernel recovery rate<sup>7</sup> between 23 and 25 percent in Hawaii, depending on weather conditions, and 28 to 33 percent in Australia.<sup>8</sup> The recovered kernels are then processed through a series of mechanical and electronic sorters that remove shell fragments and off-color kernels before going through a final hand sorting.

Kernels are the main product recovered in the processing of macadamia nuts. However, the husk, the cracked shells, and culled nuts and kernels are also used. The husks are used as mulch or compost and as soil additives. The shells are used as mulch. The culled kernels are used to make macadamia oil. All of these products also can be used by the processor as fuel for boilers or dryers.

Because of quality changes associated with moisture and high temperatures, raw macadamia kernels are almost always vacuum packed in foil pouches and held in cool storage until they are ready to be used in roasted kernels or other macadamia-nutcontaining products. Macadamia kernels can be held in storage for a year or longer with no noticeable loss in quality.

<sup>&</sup>lt;sup>4</sup> Jasper Guy Woodroof, Tree Nuts: Production, Processing, Products, 2nd ed. (Westport, CT: Avi, 1979), p. 301

p. 301. <sup>5</sup> McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," p. 4. <sup>6</sup> Woodroof, *Tree Nuts: Production, Processing,* 

Products, p. 304.

<sup>&</sup>lt;sup>7</sup> Kernel recovery rate is determined by dividing the pounds of kernel production by pounds of net production (wet\_in-shell).

<sup>&</sup>lt;sup>8</sup> It should be noted however that kernel recovery rates calculated from data in table 1-1 for Australia range from 24 to 27 percent.

Discussions of production relationships in the macadamia nut industry usually consider that establishment of macadamia orchards requires a substantial initial investment expense, which is then followed by comparatively low maintenance costs during the productive life of the trees.<sup>9</sup> The high ratio of initial startup costs to total annual costs and the production lags inherent in macadamia nut production make macadamia supply relatively price inelastic in the short run.<sup>10</sup> Moreover, the same high startup costs and production constraints allow prices to vary widely in

<sup>9</sup> Askari and Cummings note that the acquisition of a perennial is very much like the acquisition of a piece of capital in that both last for more than the current time period. Thus, a grower's decision to plant a macadamia orchard is motivated by the income that is expected over the productive life of the trees, rather than any single income or price received in any particular year. See Hossein Askari and John Thomas Cummings, Agricultural Supply Response: A Survey of the Econometric Evidence, (New York: Praeger Publishers, 1976). <sup>10</sup> By the short run we refer to a period of time in

<sup>10</sup> By the short run we refer to a period of time in which producers can make changes in variable factors from a given capacity, such as more careful nut harvesting or more intensive cultivation. Hossein Askari and John Thomas Cummings, Agricultural Supply Response: A Survey of the Econometric Evidence (New York: Praeger Publishers, 1976). the short run without large annual output changes. Prices generally must remain low for several seasons to significantly reduce the quantity of nuts harvested. Similarly, the long period between initial planting of trees and harvesting of macadamia nuts means that high prices over time may result in significant increases of production only after a delay of many years. Hence, there is a considerable time lag associated with expected quantity changes in response to price changes.

## **Major Producers and Markets**

The major world macadamia nut producers and markets are shown in figure 1-2. The United States has traditionally dominated both world production and consumption. The United States is also the world's largest importer of macadamia kernel and is one of the leading exporters of macadamia nuts and nut products. However, in recent years, Australia, Costa Rica, Guatemala, and Kenya have emerged as major producers and competitors to the U.S. industry. Japan is the major consumer market outside the United States. The European Community, Canada, and the Pacific Rim countries are relatively minor importers and consumers of macadamia nuts and nut products.



Note.-Share of world production and consumption are calculated on a kernel basis.

Source: Hawaii Department of Agriculture, U.S. Department of State agriculture attache reports, Australian Macadamia Society, Government of Japan, and Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," 31st Annual Meeting of the Hawaii Macadamia Nut Association, May 1991.

Flaure 1-2

### Study Timeframe

In most instances the period covered by the study is 1987 through 1991. Based on the information collected in this investigation, 1989 was the peak year for the domestic industry in terms of sales value and prices, with subsequent declines in 1990 and 1991. Because of the length of the production process, however, data covering longer time periods are presented when necessary for the purpose of analysis.

## **Organization of the Report**

This report is divided into six chapters. The remainder of this chapter is an overview of the world's macadamia nut producers and markets, including brief discussions of developments in the global market for macadamia nuts and nut products during 1982 to 1991, and expected future developments. Chapter 2 contains information on the U.S. industry and market, and chapter 3 examines the industry and markets in Australia, the major U.S. competitor. Chapter 4 describes the other major foreign suppliers, which include a number of developing countries whose commercially viable macadamia nut production dates only from the early 1980s, and the major foreign markets. Chapter 5 analyzes the competitive position of the U.S. industry in both domestic and foreign markets. Finally, chapter 6 provides a summary of the principal findings of the report.

# Overview of the World Macadamia Nut Industry

Macadamia nuts are a luxury nut with a relatively high income elasticity. The demand for macadamia nuts and nut products, which is derived from consumer preferences for macadamia nuts as a snack food, rose sharply in both the United States and in foreign markets during the 1980s. The increase in consumption of macadamia nuts was largely due to the increase in global incomes that also occurred during this period.

## Global Developments in 1982-91

The production and prices of macadamia nuts during the 1980s and early 1990s followed a pattern that is characteristic of many primary commodity markets, particularly those for tree crops, in which production response lags behind demand changes for a period of years.<sup>11</sup> More specifically, because it takes a full 6 to 8 years for newly planted macadamia nut trees to bear commercially viable quantities of nuts, production changes in any given year largely reflect grower investment decisions made in earlier years.<sup>12</sup> Moreover, demand for tree nuts has been estimated to be price inelastic.<sup>13</sup> This suggests that, in addition to any long-run price trends for macadamia nuts, the industry is also prone to substantial year-to-year price variability because under such conditions, price changes become the primary mechanism through which excess supplies clear.

In 1982 the United States and Australia together accounted for over 90 percent of world macadamia nut production (figure 1-3 and table D-1 in appendix D). During 1982-91, annual world macadamia nut production (WIS basis) almost doubled, rising from 20,320 to 39,133 metric tons, increasing by 7 percent annually during the period. Most of this increase in production was accounted for by countries other than the United States.<sup>14</sup> Australian production increased from 1,900 metric tons, WIS basis, to 12,000 metric tons in 1990 before declining to 9,000 metric tons in 1991. Production in Costa Rica, Guatemala, South Africa, and Kenya also increased substantially over the same period, albeit from much smaller bases. Although U.S. production increased by more than one-third during 1982-91, the U.S. share of world production declined during this period from 82 percent of world production in 1982 to 57 percent in 1991. World macadamia nut production increased sharply starting in 1987, reflecting the maturation of trees that had been planted in the late 1970s and early 1980s (figure 1-3).

High U.S. grower prices for macadamia nuts,<sup>15</sup> relative to alternative crops such as coffee and sugar, helped to stimulate the planting of new macadamia orchards not only in Hawaii, but also in other countries. Figure 1-4 shows how grower prices for macadamia nuts have outperformed not only coffee and sugar prices, but also an International Monetary Fund composite index of world food prices. High macadamia nut prices relative to prices for alternative crops provided incentives for producers to plant macadamias. It is significant to note that since 1982 these price incentives have generally been greater for producers outside the United States, since the world

<sup>13</sup> Cahyono estimated the price elasticity of demand for macadamia nuts to be -.19. See Bambang Cahyono, *The Economic Feasibility of Import Barriers to Protect the Hawaii Macadamia Industry*, Ph.D. Dissertation, University of Hawaii at Manoa, 1988. Islam estimated a global price elasticity of demand of -.54 for all tree nuts. Nural Islam, *Horticultural Exports of Developing Countries: Past Performance, Future Prospects, and Policy Issues*, Research Paper No. 80, International Food Policy Research Institute, Washington, DC., p. 46. <sup>14</sup> McGregor, "A Review of the World Production

<sup>14</sup> McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," p. 7.

<sup>15</sup> Because the United States accounted for over 80 percent of the macadamia nut market in the early 1980s, the U.S. grower price can be considered as the benchmark "world price" for macadamia nuts.

<sup>&</sup>lt;sup>11</sup> Ibid.

<sup>12</sup> Ibid.

Figure 1-3 Macadamia nuts: Production, wet-in-shell (WIS), by major producers, 1982-91



Note.—Direct comparison of WIS production among countries is not possible due to the different moisture contents at which data are gathered.

Source: Hawaii Department of Agriculture, U.S. Department of State agricultural attache reports, and Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," *31st Annual Meeting of the Hawaii* Macadamia Nut Association, May 1991.

price of sugar, an important alternative crop, has generally been below the equivalent price in the U.S. market.<sup>16</sup>

Rapid production growth caused supply to exceed demand at historical price levels during 1989-91 and forced both processors and importers to accumulate excess inventories. The increase in macadamia nut production during this period largely came from Australia, where production almost doubled between 1989 and 1990 (table 1-1). To reduce inventories, macadamia nut processors and importers lowered their offering prices in both 1990 and 1991. This resulted in grower prices falling by 20 percent while world macadamia nut production fell by 10 percent between 1990 and 1991. Industry sources indicate that prices for macadamia nuts will most likely increase in the future as new uses are found for macadamias. However, industry sources do not expect prices to return to the levels achieved in the late 1980s.

<sup>&</sup>lt;sup>16</sup> The difference between the U.S. price for sugar and the world market price is a function of the pricesupporting operations of the U.S. sugar program and the residual nature of the world sugar market.

Figure 1-4 Indexed prices for macadamia nuts, coffee, sugar, U.S. sugar, and world food, 1976-91



Source: Macadamia nuts ["Grower price (Hawaii)"] is reported by the Hawaiian Agricultural Statistics Service, Coffee ["Other milds<sup>1</sup> (New York)"], Sugar ["Caribbean (New York)"], U.S. Sugar ["U.S. Sugar (New York)"], and World Food [composite index of world food commodity prices] are reported by the International Monetary Fund.

<sup>1</sup> "Other milds (New York)" is the arithmetic average of El Salvador Central Standard, Guatemala prime washed, and Mexico prime washed, prompt shipment, ex-dock, New York.

#### Table 1–1 Macadamia nuts: World production, wet-in-shell (WIS) and kernel basis, and planted hectares, 1987–91

Country and item	1987	1988	1989	1990	1991
United States (Hawaii):					
Production (metric tons):					
WIS	19,369	20,639	22,907	22,680	22,453
Kernels	4,445	5.080	5,398	5,307	5,398
Planted hectares	8,701	8.863	9.024	9,146	9,106
Australia:		,			
Production (metric tons):					
WIS	4:400	5.200	6.800	12.000	9.000
Kernels	1.100	1.350	1.800	2,959	2,200
Planted hectares	5.050	5.650	6.000	6,000	6.000
Brazil		+1+		-1	-,
Production (metric tons):					
WIS	(1)	(1)	22	21 100	(1)
Kernels	···· )/{	· · · · /1( - · ·	34	220	>1
Planted hectares	21		2 000	1 300	1 300
Costa Rica		()	2,000	1,000	1,000
Production (metric tons):	· · · · ·				
WIS	689	1 139	1 470	1 459	1 759
Kornele	126	203	244	246	273
	1 200	41 600	2 000	5 000	5 000
Giatomala:	1,200	1,000	2,000	3,000	5,000
Broduction (motric tone):	·. ·				
	560	012	1 1 1 1	21 500	1 261
Kornolo	126	167	220	210	1,301
Plantad bostorea	900	900	230	1 215	52 022
	.900	900	690	1,210	-2,023
Reflyd.					
Production (metric tons);	500	. 2 000	2 000	2 200	2 060
WID	500	3,000	2,900	2,300	2,000
	40.000	390	40.000	330	40 000
Planted nectares	~2,300	2,300	2,300	2,300	~2,300
South Africa;		` <i>.</i>			
	1 000	1 000	4 500	60.000	20 500
WIS	1,000	3240	1,500	2,000	-2,500
	200	°240	50,400	50,000	500
	1,600	2,163	\$2,496	\$2,829	3,163
Production (metric tons):	00 540	00.004	00 740	40.400	
WIS	26,518	32,091	36,740	43,129	39,133
	2,996	7,430	8,3/6	9,780	8,988
Planted nectares	.19,751	21,4/6	24,710	27,790	28,892

<sup>1</sup> Not available.

<sup>2</sup> Estimated from kernel production at a recovery rate of 20 percent.

<sup>3</sup> Estimated from in shell production at a recovery rate of 20 percent.

<sup>4</sup> Estimated by industry sources.

<sup>5</sup> Estimated by USITC staff.

<sup>6</sup> R.A. Stephenson, Australia Macadamia Society News Bulletin, Vol. 17, Number 1, May 1990.

<sup>7</sup> Data on other world producers are not available for 1987–91. Estimates by Andrew McGregor for 1989 indicate that there were 2,200 hectares planted in Malawi, China, and Thailand, with Malawi the only country with plantings of bearing age. McGregor estimated Malawi's production at 700 metric tons WIS or 150 tons of kernels in that year.

Source: Hawaii Department of Agriculture, U.S. Department of State agricultural attache reports, and Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," 31st Annual Meeting of the Hawaii Macadamia Nut Association, May 1991.

## Future Production Developments

As a result of increasing raw kernel yields per hectare from the maturation of trees planted from the late 1970s to the mid-1980s, world macadamia nut production is expected to increase dramatically through the turn of the century, when annual production is estimated to range from 64,000 to 77,000 metric tons WIS, or about 15,000 metric tons of raw kernels.<sup>17</sup> Data on macadamia nut production, planted area, and yields per hectare for the 1987-91 period suggest that the U.S. share of world macadamia production is likely to continue to decline (table 1-1, figures 1-3, 1-5, and 1-6).

<sup>17</sup> McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts." Of the 28,892 hectares of macadamia nuts in orchards worldwide in 1991, the United States accounted for 32 percent of the total (table 1-1, figure 1-5). From 1987 to 1991 over 7,500 hectares of macadamia trees were planted in countries outside the United States, equivalent to more than 25 percent of the total planted hectares in 1991, compared with a net increase of 400 hectares in the United States (figure 1-5). Moreover, as shown in figure 1-6, yields of raw kernel per hectare in major foreign producing countries are currently substantially below those in Hawaii, reflecting the relative maturity of Hawaii's orchards. Industry sources estimate that Hawaii's share of world production could decline to less than 40 percent by the year 2000 as trees planted in Australia, Costa Rica, Guatemala, and South Africa reach maturity.<sup>18</sup>

For example, Australia's share of world production is expected to increase through and beyond the year 2000 since nearly one-half of Australia's total 1991 macadamia nut planted area of 6,000 hectares has been planted since 1986 and hence will not reach maturity before the year 2000. Likewise, Costa Rica's share of world production is expected to dramatically increase by the turn of the century since more than 75 percent of Costa Rica's planted area of 5,000 hectares has been planted since 1987.

<sup>18</sup> Charles Young, Hawaii Macadamia Nut Association, submission to the Commission, Apr. 22, 1992.

#### Figure 1-5 Macadamia nuts: Planted hectares, by major producers, 1987-91



Source: Hawaii Department of Agriculture, U.S. Department of State agricultural attache reports, and Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," *31st Annual Meeting of the Hawaii Macadamia Nut Association*, May 1991.



Figure 1-6 Macadamia nuts: Raw kernel production per hectare, by major producers, 1987-91

Source: Hawaii Department of Agriculture, U.S. Department of State agricultural attache reports, and Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," *31st Annual Meeting of the Hawaii Macadamia Nut Association*, May 1991.

# CHAPTER 2 U.S. Industry and Market

# **U.S. Industry**

The U.S. macadamia nut growing and processing industry is located in two States—Hawaii and California—with Hawaii accounting for over 99 percent of the growing and processing.<sup>1</sup> Hence this chapter focuses on the Hawaiian industry. Macadamia inuts have become increasingly important to the Hawaiian agricultural economy. Due to lower labor and processing costs in other countries, Hawaii's two most important crops, sugarcane and pineapples, are gradually being phased out of production. Thus, production of diversification crops, such as macadamia nuts, coffee, and papaya, has been increasing in Hawaii as growers gradually switch production to these crops.

- This chapter discusses the structure of the domestic macadamia nut and nut product industry in Hawaii. Also examined are factors affecting industry performance, such as the level of production, grower profitability, prices, markets, international trade, and Government programs.

## Number and Location of Growers and Processors

There were 690 growers of macadamia nuts in Hawaii in crop year 1990/91 and 1991/92, up from 550 growers in 1982/83 (table 2-1). Although most growers in Hawaii are relatively small (i.e. less than 4 hectares), the distribution of acreage devoted to macadamia nut production is highly skewed.

As shown in the following tabulation, based on the 1991 annual survey of the Hawaii Department of Agriculture, 2 percent of the macadamia farms had more than 40 hectares and accounted for 82 percent of the planted area:<sup>2</sup>

Farm size	Percentage of farms	<ul> <li>Percentage of planted hectares</li> </ul>		
Greater than 40 hectares	2	82		
4 to 40 hectares	11	.9		
hectares	87	9		

MacFarms of Hawaii<sup>3</sup> is the largest single grower in Hawaii, with nearly 1,600 hectares in production. However, the Hawaiian industry is dominated by Mauna Loa Macadamia Nut Corp., a C. Brewer Company (Mauna Loa). Mauna Loa either owns or has contractual supply agreements with growers that account for over 3,600 hectares, or nearly 40 percent of the planted area in Hawaii. MacFarms of Hawaii and Mauna Loa together account for 57 percent of Hawaii's planted area.

The processing industry in Hawaii is composed of 10 firms, with Mauna Loa, MacFarms of Hawaii, and Hawaiian Host being the leading processors.<sup>4</sup> Mauna Loa is, by far, the largest processor, accounting for 50 to 60 percent of the nuts processed each year. MacFarms of Hawaii is the second-largest processor, accounting for 20 to 25 percent of the nuts processed. Hawaiian Host is the third-largest processor, accounting for 10 to 15 percent of the nuts processed annually. The remainder of the industry consists of small firms that purchase in-shell macadamia nuts primarily on the spot market or through contractual arrangements and that process nuts for their own use or for food manufacturers under contract. Most of these small processors are not involved in growing macadamia nuts. A notable exception is the Kona Farmers Cooperative, a processing cooperative owned by macadamia nut growers.

2-1

<sup>&</sup>lt;sup>1</sup> There are approximately 300 growers in California of which the majority are hobbyists with 5-100 trees. It is estimated that there are 120 hectares planted in macadamia nuts in California, with an annual output of 136 metric tons, in-shell basis. Most of California production is marketed by growers through farmers' markets. However, some growers have formed a marketing cooperative, Gold Crown Macadamia Association, that processed about 27 metric tons of nuts in 1991, yielding around 9 tons of raw kernels.

<sup>1991,</sup> yielding around 9 tons of raw kernels. <sup>2</sup> Yukio Kitagowa, Chairperson of the Board of Agriculture, State of Hawaii, transcript of hearing, Apr. 22, 1992, Kailua-Kona, HI, pp. 30 and 31.

<sup>&</sup>lt;sup>3</sup> MacFarms of Hawaii, Inc., and Macadamia Nuts Pty. Limited (MacFarms of Australia) are subsidiaries of MacFarms International, Inc. MacFarms International, Inc., is a subsidiary of Arnott's Biscuits Investments (USA), Inc., which is a subsidiary of Arnotts Limited. As of September 1991, Campbell Investment Co. held 32 percent of Arnotts Limited's shares.

<sup>&</sup>lt;sup>4</sup> Since January 1, 1992, one additional firm, Kernel Co. of Hawaii, has begun processing macadamia nuts and one processing plant, Mrs. Field's, was purchased by Mauna Loa.

#### Table 2-1 Macadamia nuts in Hawaii: Number of farms, planted hectares, yield, production, and farm value of production, crop years 1982/83 to 1991/92

			Bear-	Yield per	Productio	on	Net farm	)
Crop year <sup>1</sup>	Farms	Planted	ing ,	hectare <sup>2</sup>	Gross	Net <sup>3</sup>	Price	Value
	Number	Hecta	røs		Metric tons	· · · ·	(\$/ka)	1,000 dollars
1982/83	550	6,313	4,128	4.03	17,554	16,656	1.63	27,136
1983/84	600	6,637	4,290	3.85	17,463	16,520	1.45	23,928
1984/85	605	7,082	4,856	3.53	18,371	17,132	1.52	26,088
1985/86	610	8,458	5,463	3.49	20,276	19,051	1.60	30,450
1986/87	645	8,580	5,828	3.42	21,138	19,958	1.76	35,200
1987/88	650	8,701	6,313	3.07	20,684	19,369	1.85	35,868
1988/89	660	8,863	6.718	3.07	22,226	20,639	1.98	40,950
1989/90	675	9.024	7.365	3.11	24,494	22,907	1.96	44,945
1990/91	690	9,146	7.446	3.05	24.630	22,680	1.81	41,000
1991/92	690	9,106	7,365	3.05	24,449	22,453	1.59	35,640

<sup>1</sup> The crop year begins July 1 and ends June 30 the following year.

<sup>2</sup> Yield per hectare is calculated by dividing net production by bearing hectares.

<sup>3</sup> Net production is gross tons delivered for processing less total spoilage through cracking, but before roasting.

Source: Hawaii Agricultural Statistics Service, Final Season Estimates, Hawaii Macadamia Nuts.

### Trends in Production

The Hawaii Agricultural Statistics Service estimates that Hawaii's net production of in-shell macadamia nuts increased almost steadily from 16,656 metric tons, wet-in-shell (WIS) basis, valued at \$27.1 million, in 1982/83<sup>5</sup> to a high of 22,907 metric tons, valued at \$44.9 million, in 1989/90 (figure 2-1). Increased in-shell macadamia output during 1982/83 to 1989/90 has been attributed primarily to an increase in bearing hectares and to the maturation of bearing-age trees over the period. Hawaii's production fell gradually to 22,453 metric tons, valued at \$35.6 million, in 1991/92. The decline in the farm value of production over the period 1989/90 to 1991/92 reflects the sharp decline in the prices (-19 percent) received by growers for WIS macadamia nuts as well as reduced production (-2 percent) (table 2-1).

Production data reported by respondents to the Commission's questionnaire<sup>6</sup> also confirmed that Hawaii's macadamia nut production increased steadily during 1987/88 to 1990/91, before declining to 20,698 metric tons (gross WIS basis) in 1991/92 (table 2-2). Production reported by independent growers<sup>7</sup> increased over this period, from 6,886 metric tons in 1987/88 to 11,512 metric tons in 1991/92, or by two-thirds. On the other hand, production reported by processors declined erratically over the period, from a peak of 9,993 metric tons in 1989/90 to 9,186 metric tons in 1991/92, or by 8 percent.

Bearing hectares in Hawaii increased steadily from 4,128 hectares in 1982/83 to 7,446 hectares in 1990/91 (figure 2-2), before declining slightly in 1991/92 to 7,365 hectares. The Hawaiian macadamia nut industry planted nearly 4,800 new hectares of macadamia nuts during 1979/80 to 1991/92 (table 2-3). The increased plantings in the early and mid-1980s were primarily in areas that had been devoted to sugarcane growing but had been abandoned because of low returns. The large plantings in 1985/86 were almost entirely on land that had previously been devoted to sugarcane.

Factors that affect macadamia nut yields include maturity of trees, grower prices, the volume and distribution of annual rainfall, night temperatures, diseases,<sup>8</sup> pests, and horticultural practices such as pH maintenance, fertilization, and orchard care. For instance, the large number of new plantings between 1979/80 and 1990/91 have lower productivity than more mature trees. These relationships contributed to a decline in the average yield per hectare of Hawaiian macadamia nuts from 4.03 metric tons (WIS) in 1982/83 to 3.05 metric tons in 1990/91 (table 2-1).<sup>9</sup> Reportedly, yields also decreased because the lower prices offered to growers in recent years made it

 <sup>&</sup>lt;sup>5</sup> The split year refers to the crop year, which begins
 July 1 and ends June 30 of the following year.
 <sup>6</sup> The Commission received usable data from 87

<sup>&</sup>lt;sup>o</sup> The Commission received usable data from 87 growers, representing 47 percent of gross WIS production and from four processors, representing 38 percent of gross WIS production as reported by the Hawaiian Agricultural Statistics Service for the 1991/92 crop year. In addition, these four processors represent 84 percent of the kernel produced in that year as reported by the Hawaiian Agricultural Statistics Service.

<sup>&</sup>lt;sup>7</sup> Independent growers represent those firms that are not owned either directly or indirectly or leased by processors of macadamia nuts.

<sup>&</sup>lt;sup>8</sup> James Kendrick of Mauna Loa Macadamia Nut Corp. indicated that his firm had lost approximately 15 percent of its producing trees to macadamia quick decline (MQD) since 1989. MQD causes the leaves to turn brown and the tree to rapidly die. Stress is believed to be the principal factor causing a tree to become susceptible to MOD.

to MQD. <sup>9</sup> Macadamia nut trees do not begin to bear nuts until 6 to 8 years after they are planted. Production per tree rises steadily for the next 5 to 6 years and more slowly thereafter as the trees reach full production at about 16 years of age. Trees may continue to produce commercial quantities of nuts for 40 years or more.





Note .-- The crop year begins July 1 and ends June 30 the following year.

Source: Hawaii Agricultural Statistics Service, Hawaii Macadamia Nuts, Final Season Estimates.

#### Table 2-2

Macadamia nuts: Reported gross and net production in Hawaii, by types of growing operation, crop years 1987/88 to 1991/92

Metric tons (wet-in-shell basis)						
Type of grower	1987/88	1988/89	1989/90	1990/91	1991/92	
Gross production:						
Independent growers	6,886	8,164	9,703	11,184	11,512	
Processors	9,641	9.862	9,993	9,756	9.186	
Total	16,527	18,026	19,696	20,940	20,698	
Net production: <sup>1</sup>		• •		•		
Independent growers	6.486	7.691	9.041	10.344	10.569	
Processors <sup>1</sup>	9,195	9,334	9,398	9,058	8,423	
Total	15,681	17,025	18,439	19,402	18,992	

<sup>1</sup> Gross production delivered for processing less total spoilage through cracking, but before roasting.

Source: Compiled from data submitted by 87 growers and 4 processors in response to questionnaires of the U.S. International Trade Commission.



Figure 2-2 Macadamia nuts: Bearing hectares and production in Hawaii, crop years 1982/83 to 1991/92

Note .--- The crop year begins July 1 and ends June 30 the following year.

Source: Hawaii Agricultural Statistics Service, Hawaii Macadamia Nuts, Final Season Estimates.

 Table 2-3

 Macadamia nuts:
 New commercial plantings in Hawaii, crop years 1979/80 to 1991/92

Crop year	Hectares planted	Crop year	Hectares planted
1979/80	458	 1986/87	121
1980/81	650	1987/88	121
1981/82	277	1988/89	162
1982/83	534	1989/90	162
1983/84	324	1990/91	121
1984/85	445	.1991/92	(')
1985/86	1,376 .	lotal	4,751

<sup>1</sup> No new area planted.

Source: Compiled from official statistics of the Hawaii Agricultural Statistics Service.

uneconomical for some growers to harvest nuts as often, if at all.<sup>10</sup> In addition, the Hawaii Agricultural Statistics Service has indicated that above average precipitation in the Hilo, Hawaii, growing area resulted in increased spoilage of in-shell nuts both at the farm and at the processing plant in the 1989/90 and 1990/91 seasons. The Hawaii Agricultural Statistics Service reported that yields also declined because of drought conditions in the Kona growing region.

It is anticipated that macadamia nut yields and production in Hawaii will increase gradually as trees planted during 1980/81 to 1985/86 reach maturity. In 1991, 58 percent of the macadamia nut trees were under 14 years of age with 28 percent still less than 7 years old for those firms responding to the Commission's questionnaire (table 2-4).<sup>11</sup> These numbers reflect the particularly large plantings of macadamia nut trees during the 1985/86 season that are approaching bearing age as well as the trees planted during 1979/80 through 1984/85, which are now in a period of rapidly increasing production.<sup>12</sup>

Most of these young trees are owned by independent growers. In 1991, 80 percent of the trees owned by independent growers were under 14 years of age. On the other hand, 89 percent of the trees owned or leased by the processors were 14 years of age or over. The age difference of these respective orchards suggests that production from the processors' orchards will not have much potential for future increases, barring any significant new plantings. Therefore, the expected increases in production will come primarily from orchards that are not controlled by processors.

While it is clear that the processors will have less control over the supply of in-shell macadamia nuts, the implications of this likelihood are uncertain. Some of the major issues that the industry will have to address are the ability of the existing processors and their facilities to handle the increased volumes in a timely manner, the ability of the processors to market larger crops, and the share of the processing burden, such as husking and drying, that the independent grower will have to assume to alleviate any capacity problems.

## **Processors' Recovery of Kernels**

Macadamia nut processors' recovery<sup>13</sup> of raw kernels from in-shell nuts followed a trend similar to

<sup>11</sup> Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

<sup>12</sup> See table 2-3. Officials of the Hawaii Department of Agriculture noted, however, that over 1,600 hectares that were planted in 1984/85 and 1985/86 were not harvested, due to inadequate cultural care and the poor condition of the trees.

<sup>13</sup> Recovery rate is equal to kilograms of kernel recovered divided by kilograms of gross production delivered for processing less total spoilage through cracking, but before roasting. that for in-shell macadamia nut production. Production of raw kernels rose from 3,719 metric tons in 1982/83 to a peak of 5,398 metric tons in 1989/90 before declining in 1990/91 to 5,307 metric tons (table 2-5). Raw kernel production recovered in 1991/92 to 5,398 metric tons.

t in a second

The rising trend in kernel production was not as smooth as that for in-shell production as a result of losses that were detected at the processors' plant, but not at the farm. Such losses include nuts that were not of acceptable quality because they were moldy, rotten, immature, germinating, or had other defects such as insect damage. In recent years insects, in particular "the tropical nut bore,"<sup>14</sup> have accounted for an increasing share of the nuts rejected at the processing plants.

The equivalent wholesale value of bulk macadamia kernel production at the processor level rose from \$34.0 million in 1982/83 to a high of \$71.4 million in 1989/90 and then fell dramatically to \$52.7 million in 1990/91. The reduction in value reflects a 2-percent drop in volume and a 25-percent drop in the average wholesale price. Industry sources stated that the decline in the bulk kernel price resulted from competition from low-priced bulk kernel imports, primarily into the U.S. mainland market.<sup>15</sup> These same sources also noted that demand for retail products had declined because of the slower economic growth in the United States, including Hawaii, which had resulted in a drop in the number of tourists traveling to Hawaii and, thus, a corresponding drop in the purchases of macadamia nut products by tourists.

The equivalent wholesale value of macadamia kernel production recovered marginally in 1991/92, to \$55.3 million. This increase resulted from higher wholesale prices for kernel and from an increased recovery rate, which more than offset the slight decline in wet-in-shell nut production from 1990/91 to 1991/92.

# Macadamia Nuts and Kernels Used by the U.S. Processing Sector

### In-shell macadamia nuts

U.S. processors can procure raw in-shell nuts for further processing from three sources: (1) orchards that are owned or leased by the processor, (2) from independent growers, or (3) from imports. However, for all practical purposes, there are no imports of in-shell macadamia nuts because of U.S. phytosanitary

<sup>&</sup>lt;sup>10</sup> Mr. Charles Young, Hawaii Macadamia Nut Association, transcript of the hearing, Apr. 22, 1992, Kailua-Kona, HI, p. 67.

<sup>&</sup>lt;sup>14</sup> Formerly called "the macadamia shothole bore."

<sup>&</sup>lt;sup>15</sup> Mr. Rick Vidgen, president in charge of marketing, MacFarms of Hawaii, and Mr. James Kendrick, executive vice president of operations, Mauna Loa Macadamia Nut Corp., transcript of hearing, Apr. 22, 1992, Kailua-Kona, HI, pp. 72 and 119.

				<u> </u>	
Ownership type and age	1987	1988	. 1989	1990	1991
		Quantity	(1,000 trees)		
Independent grower holdings: 7 years and younger 8-13 years 14 years and older	536 104 148	483 188 149	433 255 172	387 309 169	315 381 170
Total Processor holdings: 7 years and younger 8-13 years 14 years and older	788 8 4 361	820 8 0 365	860 12 0 366	866 10 8 366	866 36 8 336
TotalTotal holdings:7 years and younger8-13 years14 years and older	373 544 108 509	373 491 188 515	378 445 255 538	383 > 396 317 535	410 351 388 536
Grand total	1,161	1,193	1,238	1,249	1,275
		Percent	of total trees		
Independent grower holdings: 7 years and younger 8-13 years 14 years and older	68 13 19	59 23 18	50 30 20	45 36 20	36 44 20
Total Processor holdings: 7 years and younger 8-13 years 14 years and older	100 2 1 97	100 2 0 98	100 3 0 97	100 3 2 95	100 9 2 89
	100	100	100	100	100
Iotal holdings:         7 years and younger         8-13 years         14 years and older	47 9 44	41 16 43	36 21 43	32 25 43	28 30 42
Grand total	100	100	100	100	100

#### Table 2-4 Hawalian macadamia trees: Age distribution of trees devoted to macadamia nut production, by ownership types, 1987-91

Source: Compiled from data submitted by 87 growers and 4 processors in response to questionnaires of the U.S. International Trade Commission.

regulations. (See discussion in the section on "Import Restrictions" for more detail.) U.S. processors' procurement of in-shell macadamia nuts are shown by sources in table 2-6 for the 1987/88 to 1991/92 seasons. Procurement of in-shell macadamia nuts from processor owned or leased orchards as a share of total procurement declined steadily over the period, from 56 percent to 42 percent.

#### **Raw kernels**

Processors may also purchase raw macadamia kernels from other macadamia processors or from

foreign sources. Purchases of raw kernels from other macadamia processors are negligible; however, purchases of raw kernels from foreign sources are substantial (table 2-7). During 1987/88 to 1991/92, domestic processors' purchases of raw kernels from foreign sources increased from a low of 382 metric tons in 1987/88 to a peak of 685 metric tons in 1989/90; purchases then decreased to 438 metric tons in 1991/92. As a share of processors' total kernel supply, purchases from foreign sources increased from 10 percent in 1987/88 to a peak of 13 percent in 1989/90. The share of such purchases then declined to 9 percent in 1991/92.

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#### Table 2-5 Macadamia nuts: Kernel recovery by processors, average wholesale prices and wholesale values, crop years 1982/83 to 1991/92

Gran		Kornol	Bacovon	Kernel (bulk shelled	Equivalant
مۇن	year <sup>1</sup>	recovered	rate	sale price	wholesale value <sup>2</sup>
		Metric tons	Percent	Dollars/kilogram	Million dollars
	1982/83 1983/84 1984/85 1985/86 1986/87 1987/88	3,719 3,719 3,901 4,309 4,491 4,309	22.3 22.5 22.8 22.6 22.5 22.3	9.14 ( <sup>3</sup> ) 9.78 10.67 10.91 12.58	34.0 ( <sup>3</sup> ) 38.2 46.0 49.0 54.2
	1988/89 1989/90 1990/91 1991/92	5,080 5,398 5,307 5,398	24.6 23.6 23.4 24.0	13.13 13.22 9.92 10.25	66.8 71.4 52.7 55.3

<sup>1</sup> Crop year beginning July 1 and ending June 30 of the following year.

<sup>2</sup> Equivalent wholesale value is calculated by multiplying kernel recovered times the reported average wholesale price reported to the Hawaii Agricultural Statistics Service by processors in Hawaii.
<sup>3</sup> Not available.

Source: Compiled from official statistics of the Hawaii Agricultural Statistics Service.

#### Table 2-6

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In-shell macadamia nuts: Processors' procurements from owned or leased orchards and from independent growers, crop years 1987/88 to 1991/92

Procurement method	1987/88	1988/89	1989/90	1990/91	1991/92
· · ·		Quan	ntity (metric tor	ns) <sup>1</sup>	· .
Orchards owned or leased	9,641 7,585	9,862 9,773	9,993 11,742	9,756 12,828	9,186 12,603
Total	17,226	19,635	21,735	22,584	21,789
·		Per	cent of total nu	ts	
Orchards owned or leased	56 44	50 50	46 54	43 57	42 58
Total	100	100	100	100	100

<sup>1</sup> Gross metric tons.

Source: Compiled from data submitted by four processors in response to questionnaires of the U.S. International Trade Commission.

#### Table 2-7

Macadamia kernels: Production of raw kernels and purchases of imported kernels by domestic processors, crop years 1987/88 to 1991/92

Item	1987/88	1988/89	1989/90	1990/91	1991/92
		Quar	ntity (metric tor	ns) <sup>1</sup>	
Raw kernels produced from domestic nuts	3,592	4,050	4,464	4,479	4,287
raw kernels	382	570	685	558	438
Total supply of kernels	3,974	4,620	5,149	5,037	4,725
		Perce	ent of total kerr	nels	
Raw kernels produced from domestic nuts Procurement of imported	90	88	87	89	91
raw kernels	10	12	13	11	9
Total supply of kernels	100	100	100	100	100

Source: Compiled from data submitted by four processors in response to questionnaires of the U.S. International Trade Commission.

# Employment in the U.S. Macadamia Nut and Nut Products Industry

#### **Growing operations**

The average number of persons employed in macadamia nut growing operations varies, largely depending on the size of the operation. Orchards under 6 hectares in size are usually operated by the owner and family members, and hired employment, if any, is used during the peak harvesting season. Orchards between 6 and 15 hectares also rely primarily on owner/family labor, with seasonal labor hired during the harvest season. Orchards over 15 hectares in size rely on full-time hired labor to perform most of the orchard operations (planting, spraying, fertilizing, etc.) with seasonal labor hired during the harvest season.

Data on average hours worked by full-time and seasonal hired employees and unpaid hours worked by owners/family workers as reported in the Commission's questionnaire are presented in table 2-8. The information was reported by orchards that accounted for 84 percent of the macadamia nuts harvested in 1991/92. Total hours worked, including hours of unpaid owner/family workers, rose steadily from 960,003 hours in 1987 to 1,161,718 hours in 1989 and then declined to 1,069,218 hours in 1991. Total hours worked in 1991 were 11 percent above those in 1987. Although total hours worked declined over the final 2 years of the period, total unpaid hours worked by owners and their families rose steadily, as did the number of hours worked by seasonal employees for independent growers. Employment by independent growers increased as a result of higher WIS production from newly bearing acreage. Employment in growing operations of processors during the final 2 years of the period declined, reflecting the lower WIS production by these firms. Total employment by processors in 1991 was at about the same level as it was in 1987.

### **Processing operations**

The average number of workers, hours worked, and wages paid by domestic macadamia nut and nut product processors during 1987-91, as reported in the Commission's questionnaire, are presented in table 2-9. average number of production The and production-related workers engaged in the processing of macadamia kernels and kernel products increased steadily over the period, from 477 workers to 625 workers. Total wages paid to these workers increased from \$5.5 million in 1987 to \$8.4 million in 1991. Processors reported that production and production-related workers worked a total of 827,000 hours in 1987 at an average wage rate of 6.69 per hour, compared with a total of just over 1 million hours in 1991 at an average wage rate of \$8.05 per hour.

# **U.S.** Prices

## **Price Determination**

Prices in the U.S. macadamia market are set at each of three levels: (1) the farm production level, at which in-shell nuts are delivered to processors (farm prices); (2) the intermediate or wholesale level, at

#### Table 2-8

Growing operations: Number of hours worked by full time production and related workers, number of hours worked by seasonal employees hired for harvesting macadamia nuts, and number of unpaid hours worked by owners/family in growing macadamia nuts, 1987-91

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(in nours)						
Item	1987	1988	1989	1990	1991	
Growers:						
Full time paid	276,626	285,201	305,200	311,157	282,703	
Seasonal paid	237,306	284,733	303,507	305,729	316,103	
Unpaid man-hours by	~~ ~~~					
owners/tamily	38,676	46,167	52,527	57,822	61,350	
Total	552,608	616,101	661,234	674,708	660,156	
Processors' growing	•	•	,	··· , · · ·	,	
operations:						
Full time paid	140,663	161,280	180,048	169,564	154,929	
Seasonal paid	266,732	297,717	320,436	287,412	254,133	
Unpaid man-hours by		_		· _	-	
owners/family	0	0	0	0	0	
Total	407.395	458,997	500,484	456,976	409.062	
Total:	,,		,			
Full time paid	417,289	446,481	485,248	480,721	437,632	
Seasonal paid	504,038	582,450	623,943	593,141	570,236	
Unpaid man-hours by						
owners/family	38,676	46,167	52,527	57,822	61,350	
Grand total	960.003	1.075.098	1.161.718	1,131,684	1.069.218	
	,	.,	.,	.,	.,	

Source: Compiled from data submitted by 52 growers that reported both current production and hours worked \_\_\_\_\_\_ representing 46 percent of WIS production as reported by the Hawaiian Agricultural Statistics Service for the 1991/92 crop year and four processors in response to questionnaires of the U.S. International Trade Commission.

#### Table 2-9

Processing operations: Average number of workers employed in the reporting establishments in which macadamia nuts were processed, hours worked by production and related workers for all products and for macadamia processing operations, and wages paid, 1987-91

Item	1987	1988	1989	1990	1991
Average number employed in the reporting establishments in which macadamia nuts were processed:					
All persons (number)	802	941	1,010	1,037	1,073
All operations (number)	687	814	883	902	940
Macadamia nuts (number)	477	542	563	589	625
Hours worked by production and related workers producing-					
All products (1,000 hours)	1,224	1,417	1,547	1,594	1,516
Macadamia nuts (1,000 hours)	827	907	957	1,030	1,037
Wages paid to production and related workers producing-					
All products (1,000 dollars)	8,742	10,546	12,045	13,507	13,454
Macadamia nuts (1,000 dóllars)	5,531	6,277	6,987	7,958	8,351
Average wage rate paid to production and related workers producing-			·	·	·
All products (dollars)	7.14	7.44	7.79	8.47	8.87
Macadamia nuts (dollars)	6.69	6.92	7.30	7.73	8.05

Source: Compiled from data submitted by four processors in response to questionnaires of the U.S. International Trade Commission.

which processors deliver raw kernels to brokers, reprocessors, rebaggers, or product manufacturers (wholesale prices); and (3) the final distribution level, at which retailers and institutions distribute finished macadamia-containing products (retail prices).

## Price Levels and Trends

### Farm prices

Data on farm prices for macadamia nuts on a WIS basis, as reported by the Hawaii Agricultural Statistics Service, are presented in table 2-1, for the crop years 1982/83 to 1991/92. The net farm price received by farmers for in-shell nuts delivered to processors fell from 1982/83 to 1983/84, but then increased steadily through 1988/89 (figure 2-3). Farm prices subsequently began to decline in 1989/90, and then fell faster in 1990/91 and 1991/92. The 1991/92 price, in current dollar terms, was about the same as the 1982/83 farm price.

In addition, the Commission requested U.S. macadamia nut growers to report the price they received for WIS macadamia nuts for the 1987/88 to

1991/92 crop years from processors. The net farm price reported by 76 growers (representing 43 percent of WIS production for the 1991/92 crop year) responding to the Commission's questionnaires are shown in the tabulation below (in dollars per kilogram). This price reflects the same general trend as that reported in table 2-1.

Crop year	Average net price		
1987/88	1.67		
1988/89	1.87		
1989/90	1.82	•	
1990/91	1.69		
1991/92	1.54		

### Wholesale Prices

The annual average wholesale prices for bulk kernels as reported by the Hawaii Agricultural Statistics Service are shown in table 2-5. The average bulk kernel price increased steadily from \$9.14 per kilogram in 1982/83 to a peak of \$13.22 per kilogram in 1989/90. The bulk kernel price declined dramatically in 1990/91, to \$9.92 per kilogram, representing a 25-percent decline, and then recovered slightly in 1991/92, to \$10.25 (figure 2-3).

Figure 2-3





Note.—The crop year begins July 1 and ends June 30 the following year.

Source: Compiled from official statistics of the Hawaii Department of Agriculture.

The Commission also requested U.S. processors to provide information on their quarterly shipments and sales. from January-March 1987 through October-December 1991, for a variety of processed macadamia products (two sizes of roasted kernels in retail packs, chocolate-covered kernels, and chocolate bars containing macadamia kernels) and three grades of bulk industrial containers. The Commission received usable questionnaire responses from three processors.<sup>16</sup> These three processors are estimated to have accounted for 89 percent of the macadamia kernels processed from in-shell nuts in Hawaii in 1991. In most categories one of the responding firms dominated the product category; hence, the data are not reported here to avoid disclosing confidential business information. As shown in table 2-10, the prices received by U.S. processors for bulk industrial containers of macadamia kernels (style 1, 2, and 4) increased from \$11.50 per kilogram in 1987 to \$13.11 per kilogram in 1989 before declining to a low of \$10.37 per kilogram in 1991.

# Financial Experience of U.S. Growers and Processors

#### Growers

Financial data applicable to macadamia nut operations were provided by 69 growers who responded to the Commission's questionnaires. Of these 69 respondents, 3 are members of the C. Brewer (Mauna Loa) affiliated group.<sup>17</sup>

<sup>16</sup> Mauna Loa, MacFarms, and Hawaiian Host. <sup>17</sup> Ka'u Agribusiness, Mauna Kea Orchards, and Wailuku Agribusiness. These three growers also account for the vast majority of the reported net sales of macadamia nuts. Accordingly, the financial results of these affiliated growers are omitted from the financial tables so as to avoid disclosing confidential business information. Therefore, data are presented only for the 66 unaffiliated (independent) growers responding to the Commission's questionnaire.<sup>18</sup>

Table 2-11 shows the net income or loss of responding independent macadamia nut growers on their macadamia nut operations during 1987-91. The responding independent growers reported aggregate net losses on macadamia nut farm operations in each period. Income and loss experience reported by macadamia growers on all operations is shown in table 2-12. Total farm operations appeared to have been profitable in 3 of the 5 crop years during 1987-91, thus indicating that some independent growers were able to offset some of their macadamia losses with income earned on other operations (table 2-12). As a share of net sales for total farm products, macadamia nuts represent approximately 8 percent. However, this percentage is relatively low because one large grower reported very large sugar revenues and comparatively minor macadamia nut revenues. Many independent macadamia growers actually have small operations with few or no other products involved in their total farm operations.

Table 2-13 shows major expenses incurred by independent growers and net income as a percent of net sales. The major expenditure reported by independent growers is interest expense, which nearly doubled during 1987-91.

Telephone calls by Commission staff confirmed that these expenses are chiefly related to loans used to purchase land for orchard operations, and in most instances, the orchards are not yet of bearing age. In 1991, interest expenses were equivalent to 113 percent

<sup>18</sup> These 66 firms accounted for 6 percent of Hawaii's WIS macadamia nut production in 1991.

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#### Table 2-10

Macadamia kernels: Prices received by processors for macadamia kernels,<sup>1</sup> by quarters, 1987-91

(Dollars per kilogram)

	<u> </u>	_			
Quarter	1987	1988	1989	1990	1991
January-March April-June July-September October-December	9.09 11.38 11.37 12.13	12.64 12.15 12.97 13.51	13.19 12.60 13.44 13.47	13.29 12.91 12.33 11.88	11.09 10.53 10.21 10.03
Weighted average	11.50	12.89	13.11	12.50	10.37

<sup>1</sup> Sales of style 1, 2, and 4 kernels are estimated to account for 90 percent or more of total kernel sales.

Source: Compiled from data submitted by 4 processors in response to questionnaires of the U.S. International Trade Commission.

#### **Table 2-11**

Income and loss experience of 66 U.S. independent growers on their macadamia nut farm operations, 1987-91

Item	1987	1988	1989	1990	1991		
:	• •	Quantity (1,000 kilograms)					
Net sales of macadamia nuts	674	761	832	1,109	1,269		
	Value (1,000 dollars) <sup>1</sup>						
Net sales of macadamia nuts: Sales to processing outlets Sales to other outlets	1,375 0	1,722 10	2,000 1	1,698 1	1,272 2		
Total sales Growing and operating expenses: Materials and supplies:	1,375	1,732	2,001	1,700	1,274		
Fertilizer	182	170	201	224	251		
All other materials and supplies	144	40	20	4/ 610	47		
All other materials and supplies	430	293	204 632	707	024		
Partners' or officers' salaries	140	110	150	172	170		
Depreciation	135	332	510	172	300		
Interest expense	766	911	1 130	1 212	1 436		
Repairs and maintenance	114	104	152	146	114		
Land rent	13	17	35	28	26		
Land taxes	19	21	28	35	53		
All other taxes and insurance	71	86	98	94	143		
Other expenses	517	581	606	664	862		
Total expenses	2,587	3,212	3,864	4,380	4,999		
Net income or (loss) before income taxes	(1,212)	(1,480)	(1,863)	(2,681)	(3,725)		

<sup>1</sup> Because of rounding, figures may not add to totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

of sales. Labor was the next largest expense item in that year, equivalent to 69 percent of net sales (table 2-13). The condition of high expenditures and minimal revenues was common to many of the independent growers that had immature trees during the period of investigation.

#### U.S. processors

Financial information was provided to the Commission by three processors,<sup>19</sup> which represent 89 percent of the macadamia nut processing industry. Reported income and loss on macadamia nut operations and on total product operations is shown in tables 2-14 and 2-15, respectively. Table 2-16 shows income and expense as a percentage of net sales.

Income and loss data reported on total operations and macadamia nut product operations alone show similar profitability trends between 1987 and 1989-an increase in operating income between 1987 and 1988 and a decrease in operating income in 1989. Reported processors' income on macadamia nut operations fell steadily from 1989 to 1991. Operating income on total

<sup>19</sup> Hawaiian Host, MacFarms of Hawaii, and Mauna Loa.

operations increased in 1990 but fell again in 1991. Contributing to the decreased profitability on macadamia operations during 1989-91 was the significant increase in selling, general, and administrative (SG&A) expenses. The largest SG&A expense increase was attributed to promotional programs.

# **U.S. Market**

Based on available information, the Commission calculated that U.S. apparent consumption of macadamia nut kernels increased from 5,305 metric tons in 1987/88 to a high of 6,905 metric tons in 1990/91 before declining to 5,741 metric tons in 1991/92 (table 2-17).<sup>20</sup> It is estimated that the State of Hawaii accounts for about one-half of U.S. retail sales of macadamia nuts and nut products in any year.<sup>21</sup> However, a substantial portion of these sales are accounted for by tourists who buy gift-packed macadamias either to mail home or to carry home in their suitcases.

 $<sup>^{20}</sup>$  Apparent consumption = U.S. production + imports exports.
 <sup>21</sup> McGregor, "A Review of the World Production and

Market Environment for Macadamia Nuts.'
#### Table 2-12

Income and loss experience of 66 U.S. independent growers<sup>1</sup> on their total farm operations, 1987-91

(In the used of dellare)

	(m m	Jusano or donarsj			
ltem	1987	1988	1989	1990	1991
Net sales: Macadamia nuts Other farm products	1,375 24,231	1,732 20,516	2,001 22,220	1,700 19,341	1,274 15,029
Total sales Other income	25,606 692	22,248 751	24,221 821	21,040 930	16,303 1,901
Total net sales and other income	26,299	22,999	25,042	21,970	18,203
Growing and operating expenses: Materials and supplies: Fertilizer Pesticides All other materials and supplies Labor Partners' or officers' salaries Depreciation Interest expense Repairs and maintenance Land rent Taxes and insurance: Land taxes All other taxes and insurance Other expenses	1,928 58 2,374 7,335 2,052 1,765 767 2,261 13 502 72 6,993	2,204 49 2,070 7,124 2,111 2,029 912 2,532 18 411 87 4,087	2,064 38 3,447 6,948 2,055 2,127 1,135 2,476 38 425 101_ 2,679	1,798 47 1,718 5,966 2,134 2,085 1,217 2,612 30 521 - 96 2,655	1,493 47 1,755 5,816 2,117 1,956 1,439 2,523 29 601 
Total expenses	26,119	23,636	23,534	20,879	19,110
Net income or (loss) before income taxes	180	(637)	1,508	1,091	(907)

<sup>1</sup> The growers of this group are generally on a cash basis of reporting; therefore, for any given period, there may not be exact matching of quantities, revenues, and expenses as on an accrual or crop basis.

Note.—Because of rounding, figures may not add to totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Inventory adjustments by both processors and importers helped to smooth out the trend in U.S. apparent consumption of macadamia kernels during 1987/88-1991/92. Changes in inventory-adjusted U.S. apparent consumption appear to be less erratic when compared to the unadjusted apparent macadamia nut consumption (figure 2-4). Inventories held by processors and importers generally rose during 1987/88-1990/91. Thus, U.S. apparent consumption, when adjusted for changes in inventories, was generally lower than the unadjusted consumption. In 1991/92, inventories held by importers declined. The inventory-adjusted apparent consumption was therefore higher than the unadjusted consumption in that year.

Data in table 2-17 also show the importance of international trade to the U.S. macadamia nut industry. The import share of U.S. apparent consumption of macadamia nuts increased steadily from 1987/88 to 1990/91. At the same time, however, the export share of U.S. production also increased from 1987/88 to 1991/92.

Macadamia nut consumption is highly responsive to changes in income. The income elasticity of macadamia nuts has been estimated to be over 4, while that for almonds, a substitutable nut, was estimated at 0.80.<sup>22</sup> Although industry sources generally regard the demands for different tree nuts to be highly interrelated, the U.S. market for macadamia nuts is still largely undeveloped.<sup>23, 24</sup> Macadamia nuts have been found to be a strong substitute for almonds and a complement to walnuts, pecans, and hazelnuts.<sup>25</sup> Both almonds and macadamia nuts are increasingly being used as roasted and mixed nuts and as ingredients in bakery and ice-cream products.

The U.S. Department of Agriculture (USDA) estimates that U.S. per capita consumption of macadamias in the 1991/92 season was 0.02 kilogram—significantly less than the U.S. per capita

<sup>22</sup> Bambang Cahyono, "The Economic Feasibility of Import Barriers to Protect the Hawaii Macadamia Industry"

Industry." <sup>23</sup> William Wright, "Domestic Tree Nut Market," Manufacturing Confectioner, Apr. 1983.

<sup>24</sup> McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts."

<sup>25</sup> Bambang Cahyono, "Economic Feasibility of Import Barriers to Protect the Hawaii Macadamia Industry."

### Table 2-13

# Expenses and net income expressed as a percent of net sales by U.S. independent macadamia nut growers, 1987-91

	(1	n percent)			
Item	1987	1988	1989	1990	1991
Growing and operating expenses: Materials and supplies;				x	-
Fertilizer	13.2	9.8	10.0	13.2	19.7
Pesticides	4.1	2.8	1.9	2.8	3.7
All other materials and supplies	10.5	16.9	14.2	36.0	49.0
Labor	31.3	30.7	31.6	41.6	68.6
Partners' or officers' salaries	10.2	6.9	7.5	10.1	13.4
Depreciation	9.8	19.2	25.5	25.9	31.3
Interest expense <sup>1</sup>	55.7 <sup>-</sup>	52.6	56.5	71.3	112.7
Repairs and maintenance	8.3	6.0	7.6	8.6	8.9
Land rent	0.9	1.0	1.7	1.6	2.0
Taxes and insurance:					
Land taxes	1.4	1.2	1.4	2.1	4.2
All other taxes and					
insurance	5.2	5.0	4.9	5.5	11.2
Other expenses	37.6	33.5	30.3	39.1	67.6
Total expenses	188.1	185.4	193.1	257.6	392.4
Net income or (loss) before	(88.1)	(85.4)	(93.1)	(157.7)	(292.4)
	\··/	(	(	(,	()

<sup>1</sup> Interest expense primarily includes interest on loans incurred to purchase land for orchard operations that currently are not in the mature production cycle.

Note.-Because of rounding, figures may not add to totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

#### **Table 2-14**

Income and loss experience of U.S. processors<sup>1</sup> on their macadamia nut products operations, 1987-91

Item	1987	1988	1989	1990	1991
		Qua	ntity (1,000 kil	ograms)	
Net sales	22,580	21,482	21,512	19,533	22,209
		V	alue (1,000 do	llars)	
Net sales Intra-intercompany transfers	106,445 0	111,756 0	118,236 0	120,340 0	119,406 0
Total	106,445	111,756	118,236	120,340	119,406
Cost of goods sold: Raw materials Direct labor Other factory costs	39,330 8,666 22,478	44,506 10,122 19,212	50,699 11,331 18,623	49,678 12,200 22,907	45,284 13,158 23,783
Cost of goods sold	70,474	73,840	80,653	84,785	82,225
Gross profit	35,971	37,916	37,583	35,555	37,181
expenses	26,786	26,640 .	31,778	32,089	40,176
Operating income or (loss)	9,185	11,276	5,805	3,466	(2,995)

<sup>1</sup> The processors and their respective fiscal yearends are Hawaiian Host—June 30, MacFarms of Hawaii—June 30, and Mauna Loa—last Sunday in December.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

#### Table 2-15 Income and loss experience of U.S. processors<sup>1</sup> on their total operations, 1987-91

(In thousands of dollars)									
liem	1987	1988	1989	1990	1991				
Net sales Intra-Intercompany transfers	106,445 0	111,756 0	118,236 0	125,876 0	129,387 0				
Total Cost of goods sold:	106,445	111,756	118,236	125,876	129,387				
Raw materials Direct labor Other factory costs	39,330 8,666 22,478	44,506 10,122 19,212	50,699 11,331 18,623	49,678 12,453 25,446	45,284 13,488 29,203				
Cost of goods sold	70,474	73,840	80,653	87,577	87,975				
Gross profit	35,971	37,916	37,583	38,299	41,412				
Selling, general, and administrative expenses	26,786	26,640	31,778	33,716	44,105				
Operating income or (loss) Interest expenses Other income or (expense)	9,185 2,704 3,396	11,276 3,069 1,484	5,805 3,629 1,188	4,583 4,108 3,702	(2,693) 2,888 1,594				
Net income or (loss) before income taxes	9,877	9,691	3,364	4,177	(3,987)				
Depreciation/amortization	3,975	4,268	4,286	4,922	5,156				
Cash-flow <sup>2</sup>	13,852	13,959	7,650	9,099	1,169				

<sup>1</sup> The processors and their respective fiscal yearends are Hawaiian Host—June 30, MacFarms of Hawaii—June 30, and Mauna Loa—last Sunday in December. <sup>2</sup> Cash-flow is defined as net income or (loss) plus depreciation and amortization.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

### **Table 2-16**

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Expenses and operating income expressed as a percent of net sales by U.S. processors on their macadamia nut products, 1987-91

(In percent)								
Item	1987	1988	1989	1990	1991			
Cost of goods sold: Raw materials Direct labor Other factory costs	36.9 8.1 21.1	39.8 9.1 17.2	42.9 9.6 15.8	41.3 10.1 19.0	37.9 11.0 19.9			
Total	66.2	66.1	68.2	70.5	68.9			
Gross profit Selling, general, and administrative expenses	33.8 25.2	33.9 23.8	31.8 26.9	29.5 26.7	31.1 33.6			
Operating income or (loss)	8.6	10.1	4.9	2.9	(2.5)			

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

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### **Table 2-17**

#### Macadamia kernels: U.S. production, exports, imports for consumption, and apparent consumption, crop years 1987/88 to 1991/92

· · · · · ·		·				Ratio of-		
	•	• • • •	Imports <sup>3</sup>		·	Imports to appar consum	ent otion	· · · · · · ·
Crop year <sup>1</sup>	Pro- duc- tion	Ex- ports <sup>2</sup>	Total	Aus- tralia	Apparent consump- tion	Total	Aus- tralia	Exports to pro- duction
			Metric tons				- Percent	
1987/88 1988/89 1989/90 1990/91 1991/92	4,445 5,080 5,398 5,307 5,398	388 604 733 797 1,019	1,248 1,728 1,909 2,395 1,362	676 820 890 1,526 695	5;305 6,204 6,574 6,905 5,741	23.5 27.9 29.0 34.7 23.7	12.7 13.2 13.5 22.1 12.1	8.7 11.9 13.6 15.0 18.9

<sup>1</sup> The crop year begins July 1 and continues through June 30 of the following year.
 <sup>2</sup> Data from questionnaire responses of 4 U.S. processors of macadamia nuts and nut products.
 <sup>3</sup> Data include imports of shelled and prepared or preserved macadamia nuts.

Note.—Data do not include imports of confectionery products such as chocolate-covered macadamia nuts and candy bars containing nuts.

Source: Compiled from official statistics of the U.S. Departments of Agriculture and Commerce, except as noted.





Source: Calculated by Commission staff based upon information from the U.S. Department of Agriculture, U.S. Department of Commerce, and industry responses to Commission questionnaires.

consumption of other major tree nuts except hazelnuts (table 2-18). Almonds are considered to be the closest consumer substitute to macadamias, thus providing the best indicator of future consumption for macadamia nuts. However, it should be noted that the difference between per capita consumption of macadamia nuts and almonds has widened instead of narrowed over the last 5 years, with almond consumption increasing to nearly 18 times that for macadamia nuts. The principal reason for the widening gap was that the U.S. almond industry had record or near-record supplies during this 3-year period. Such an abundant supply resulted in substantially lower consumer prices for almonds and increased consumption.

### Inventories

### Growers

U.S. macadamia nut growers traditionally have had almost no inventories of in-shell macadamias. Historically, processors would pick up in-husk or in-shell nuts from growers according to a specified schedule and growers would only have on hand nuts that were gathered since the last pickup date. However, in their responses to the Commission's questionnaire, growers indicated that the quantity of unsold in-shell nuts on hand, or nuts for which they could not find a buyer, increased from less than 2 metric tons as of yearend 1987 to almost 25 metric tons in 1991.

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### Processors

U.S. processors' end-of-year inventories of macadamia kernels and kernel products increased from 1,636 metric tons in 1987 to 3,178 metric tons in 1991, or nearly 100 percent (table 2-19). Inventories of bulk industrial kernels accounted for the majority of the inventory growth over the period, increasing from 1,225 metric tons in 1987 to 2,490 metric tons in both 1990 and 1991. Inventories of retail macadamia-containing products increased over the same period from 411 metric tons in 1987 to 885 metric tons in 1990 and then declined to 688 metric tons in 1991. As a proportion of kernel production for the responding firms, inventories increased from 37 percent of production in 1987 to 70 percent in 1991.

### Importers

In their responses to Commission questionnaires,<sup>26</sup> U.S. importers reported that end-of-year inventories<sup>27</sup>

of macadamia kernels and kernel products were relatively insignificant during 1987-89, ranging from none in 1988 to 81 metric tons in 1989 (table 2-20). Importers' inventories increased dramatically in 1990 and totaled 727 metric tons at yearend. Nearly all of the inventory was of Australian kernels. Inventories declined in 1991 and totaled 372 metric tons at yearend. The rise in U.S. inventories in 1990 reflects the substantial increase in imports from foreign occurred because processors that Australian macadamia processors had to find new market outlets for kernels. Australian production increased in that year by 1,159 metric tons over the 1989 output of 1,800 metric tons. Also, one Australian processor had to market a significant quantity of kernels that in previous years had been contracted to a Hawaiian processor, a substantial portion of which was still in storage in the United States at the end of 1990.

## Marketing Channels

Macadamia nut processors have a wide array of marketing channels for their various products. The majority of processed macadamia nuts are sold by processors, either directly or through brokers or jobbers, as roasted kernels in consumer-size containers to retail outlets. The second most important outlet for processed macadamia kernels is in confectionery manufacturing as an ingredient in consumer products—chocolate-covered kernels and chocolate bars containing roasted macadamia nuts. Candy manufacturers also sell either directly or through jobbers and brokers to retail outlets.

Another outlet for macadamia nut processors is the bulk market. Bulk sales, usually in 11- to 25-kilogram vacuum-packaged foil pouches placed in fiberboard cartons, are marketed to nut roasters and salters, confectionery manufacturers, and to specialty ingredient users such as ice cream manufacturers and bakeries.

### Trade in Macadamia Nuts

Because of changing market conditions over the last 25 years, the U.S. macadamia nut industry has found itself a major importer and exporter of macadamia nuts and nut products. U.S. processors began importing in the 1970s and 1980s because Hawaii's production of in-shell nuts was insufficient to meet demand. Hawaiian processors developed alternative sources for macadamia kernels-primarily Australia, Costa Rica, and Guatemala-and growers and processors from these countries began exporting to the United States, primarily to the U.S. mainland. Concurrently, increased tourism to Hawaii from Japan and other Pacific Rim countries opened new markets for processed macadamia nuts and nut products. As a result, export and import opportunities are mixed, depending on availability, timing, and product end use.

<sup>&</sup>lt;sup>26</sup> The Commission received usable data from 10 importers, representing 48 percent of imports as reported by the U.S. Department of Commerce. Imports by the four reporting processors represent 32 percent of imports as reported by the Department of Commerce.

as reported by the Department of Commerce. <sup>27</sup> Imported macadamia kernels and kernel products held by processors are included in inventory data reported by those firms.

# Table 2-18Tree nuts: U.S. per capita consumption (kernel weight basis), crop years 1987/88 to 1991/92

(In kilograms)								
Crop year	Al- monds	Hazəl- nuts	Mac- adamias	Pecans	Pista- chios	Wal- nuts	Other <sup>1</sup>	Total
1987/88 1988/89 1989/90	0.26 .30 .32	0.03 .03 .02	0.03 .03 .03	0.24 .23 .21	0.04 .05 .04	0.21 .22 .22	0.19 .18 .22	1.00 1.04 1.06
1990/91	.35 .37	.03	.03	.22	.06	.22	.22	1.12

<sup>1</sup> Includes Brazil nuts, pignolias, chestnuts, cashews, and miscellaneous.

Source: United States Department of Agriculture, Economic Research Service, Commodity Economics Division.

#### **Table 2-19**

# Macadamia kernels: U.S. processors' inventories of macadamia kernels and kernel products, by types, 1987-91

1987	1988	1989	1990	1991
	Quantity (n	netric tons, kernel	weight basis)	
1,225 411	1,293 727	1,782 727	2,232 885	2,490 688
1,636	2,020	2,509	3,117	3,178
	Ratio of inve	entories to produc	tion <sup>2</sup> (percent)	
37	43	48	66	70
	1987 1,225 411 1,636 37	1987         1988           Quantity (n           1,225         1,293           411         727           1,636         2,020           Ratio of inve           37         43	1987         1988         1989           Quantity (metric tons, kernel-         Quantity (metric tons, kernel-           1,225         1,293         1,782           411         727         727           1,636         2,020         2,509           Ratio of inventories to product         37         43         48	1987         1988         1989         1990           Quantity (metric tons, kernel-weight basis)           1,225         1,293         1,782         2,232           411         727         727         885           1,636         2,020         2,509         3,117           Ratio of inventories to production <sup>2</sup> (percent)           37         43         48         66

<sup>1</sup> Includes roasted kernels, chocolate-covered kernels, and other retail size packs.

<sup>2</sup> Inventory/production ratio is based on data from those firms responding to the processor questionnaire. Source: Compiled from data submitted by four processors in response to questionnaires of the U.S. International

Trade Commission.

#### **Table 2-20**

#### Macadamia kernels: U.S. importers' end-of-year inventories, by types, 1987-91

Турө	1987	1988	1989	1990	1991
		Quantity	r (metric tons, keri	nel weight)	
Raw kernels Bulk industrial kernels	0 23	0 0	17 64	412 315	239 133
Total	23	0	81	727	372
		Ratio of in	ventories to impo	rts (percent)	
Total	9	0	13	63	75

Note.—U.S. importers reported that they had no end-of-year inventories of retail packs of macadamia nuts during 1987-91.

Source: Compiled from data submitted by 10 importers in response to questionnaires of the U.S. International Trade Commission.

U.S. imports of macadamia nuts consist largely of raw shelled kernels and small quantities of roasted macadamia kernels. U.S. imports of shelled and prepared or preserved macadamia kernels totaled \$12.0 million in 1991. Imports of chocolate-covered macadamia kernels and chocolate bars containing macadamia kernels are not separately provided for in the Harmonized Tariff Schedule. It is believed that there have been imports of these products in recent years, but quantity and value data are not readily available. U.S. exports of macadamia nuts and nut products, which consist primarily of roasted macadamia kernels, were valued at \$6.7 million in 1991.<sup>28</sup> Data on exports of macadamia nut confectionery products such as chocolate-covered macadamia kernels and chocolate bars containing macadamia kernels are not separately available from official statistics. However, data submitted by macadamia nut processors indicate that such exports are nearly as large as those of roasted

<sup>28</sup> Data are from official statistics of the U.S. Department of Commerce. Data from questionnaires show an export value of \$12.5 million for raw and roasted kernels in 1991 plus an additional \$11.8 million for macadamia-containing products such as chocolate-covered kernels and other confectionery products containing macadamia kernels. For further discussion see "Trends in U.S. exports of macadamia nuts and nut products," below. macadamia kernels. Japan is the major market for U.S. exports of both roasted macadamia kernels and confectionery products containing macadamias.

# Trends in U.S. imports of macadamia nuts and nut products

Fresh or dried shelled macadamia nuts constitute the majority of macadamia nut and nut product imports into the United States (table 2-21).<sup>29</sup> Imports of fresh

<sup>29</sup> U.S. Census data indicate that the United States imported \$243,000 of in-shell macadamia nuts in 1991. These data, and data from previous years indicating U.S. imports of in-shell macadamia nuts, are believed to be erroneous, the result of misclassifications. Unit values for

#### **Table 2-21**

Shelled fresh or dried macadamia nuts: U.S. imports for consumption, by principal sources, 1987-91

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Source	1987				. 1991
· · · · · ·		· · · · · · · · · · · · · · · · · · ·	Quantity (kilogi	ams)	
Australia Costa Rica Guatemala Malawi South Africa Kenya Zimbabwe All other	627,175 30,618 155,417 111,057 (1) 0 9,600 92,048	666,791 59,462 191,669 108,157 ( <sup>1</sup> ) 8,000 32,833 103,412	1,111,816 68,772 283,404 429,927 (1) 14,000 12,000 3,960	1,391,169 190,976 268,929 254,320 ( <sup>1</sup> ) 14,000 4,200 36,371	833,308 185,929 183,161 122,933 74,193 14,560 4,100 7,040
Total	1,025,915	1,170,324	1,923,879	2,159,965	1,425,224
معنی میں د ، ، . د	andra a characha Antonio anna	n i iniri	Value (1,000 dolla	ars)	,
Australia Costa Rica Guatemala Malawi South Africa Kenya Zimbabwe All other	6,394 341 1,359 1,028 ( <sup>2</sup> ) 0 82 444	7,170 682 1,787 1,337 ( <sup>2</sup> ) 99 372 483	11,866 797 2,867 4,097 ( <sup>2</sup> ) 181 121 28	14,468 1,766 2,711 2,509 ( <sup>2</sup> ) 181 27 346	7,153 1,356 1,065 1,160 382 160 26 52
Total	9,648	11,930	19,957	22,008	11,357
• • • • •		U	nit value (per kilog	ram)	
Australia Costa Rica Guatemala. Malawi South Africa Kenya Zimbabwe All other	\$10.19 11.14 8.74 9.26 ( <sup>2</sup> ) ( <sup>2</sup> ) 8.54 4.82	\$10.75 11.47 9.32 12.36 ( <sup>2</sup> ) 12.38 11.33 4.67	\$10.67 11.59 10.12 9.53 ( <sup>2</sup> ) 12.93 10.08 7.07	\$10.40 9.25 10.08 9.87 ( <sup>2</sup> ) 12.93 6.43 9.51	\$8.58 7.29 5.82 9.44 5.15 10.99 6.34 7.39
Average	9.40	10.19	10.37	10.19	7.97

<sup>1</sup> Executive Order 12769 of July 10, 1991, implemented section 311(a) of the Comprehensive Anti-Apartheid Act, which terminated sanctions imposed by title III and sections 501[c] and 504[b] of the act.
<sup>2</sup> Not applicable.

Note.-Data for 1987 and 1988 are estimated and most likely overstate imports in those years.

Source: Compiled from official statistics of the U.S. Department of Commerce.

or dried macadamia nuts (primarily raw macadamia kernels) increased yearly from 1987 through 1990 but declined by 48 percent in value and 34 percent in volume from 1990 to 1991. During the 5-year period examined, Australia was the major import source, in terms of both value and volume, of fresh or dried

29-Continued the reported imports are low for macadamia kernels and seem to show that products other than macadamias may have entered under HTS subheading 0802.90.80.

Therefore, data for in-shell imports have not been

included in these assessments.

shelled macadamia nuts. Imports of prepared or preserved macadamia nuts (primarily roasted macadamia kernels) have declined yearly since 1987 in ..... terms of value with no supplier dominant throughout the examined period (table 2-22). Imports of prepared or preserved macadamia nuts are almost entirely from developing countries that are eligible for preferential 12.5 rates of duty. The high general rate of duty (28 percent ad valorem) on prepared or preserved macadamia nuts ·., from developed countries, such as Australia, effectively precludes imports of such products into the United States. . . . .

#### Table 2-22

Prepared or preserved macadamia nuts, not elsewhere specified or included: U.S. imports for consumption; by principal sources, 1987-91 (accessed Ball (Ball (Ball))) and the second seco

Source	1987	1988		1990	. 1991
		and the second	Quantity (kilogram	s)	
Keyna	0	0	14,900	63,145	73,225
Guatemala	27,508	25,300	6,190	, <b>O</b>	9,482
Costa Rica	~ 43,691	18,144	238,154	32,150	7,272
Indonesia	1,190	3,184	612	3,069	4,711
	41,804	10,155	0	. 0	0
Theiland	30,707	21,012	0	2,211	
	32 638	59.876	23.508	5,000	0
All other	128,011	52,453	22,276	21.060	0
Total	362,643	231,496	305,730	126,735	94,690
	· •		alue (1,000 dollars	 )	
Konva	0		······································	458	550
Guatemala	234	CC 111	69		44
Costa Rica	389	197	698	321	48
Indonesia	· 3	·	e a, <b>1</b> .	8	10
China	62	37	<b>0</b>	0	0
Taiwan	as 155	106	0	. 0	0
	105	58	0	5	· 0
All other	328	588 127-	- 250	125	0
Total	1,568	1,235		964	652
		Unit	value (per kilogran	1) 11	-
Kenva	(1)	(1)	\$7.45	\$7.25	\$7.51
Guatemala	. \$8.51	\$4.39	11.15	(1)	4.64
Costa Rica	8.90	10.86	2.93	9.98	6.60
Indonesia	2.52	. 3.45	2.35	2.61	2.12
China	1.48	2.29		(')	(')
Theilead	4.22	4.90		2 (1)	(;;)
	8.95	0.82	10.59	2.10	R
All other	2.56	2.42	2.68	5.94	8
Average	4.32		3.89	7.61	6.89

<sup>1</sup> Not applicable.

Note.-Data for 1987 and 1988 are estimated and most likely overstate imports in those years.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Data are not separately available on U.S. imports of chocolate-covered macadamia kernels or on chocolate bars containing macadamias, but it is believed that such imports are relatively small.

### Trends in U.S. exports of macadamia nuts and nut products

U.S. exports of macadamia nuts as reported by the U.S. Department of Commerce increased from 1987 to 1988, decreased in 1989, and increased yearly through 1991.<sup>30</sup> Between 1990 and 1991, U.S. exports of shelled and prepared or preserved macadamia nuts increased by 55 percent by quantity and 57 percent by

value. During 1987-91 U.S. exports consisted mostly of prepared or preserved macadamia nut products. Such exports were valued at \$6.4 million in 1991 (table 2-23). Japan was by far the largest single market for U.S.-produced macadamia nuts, accounting for 54 percent of prepared or preserved macadamia exports in terms of value in 1991. Most of the exports are believed to have been roasted macadamia kernels. U.S. exports of shelled, fresh, or dried macadamia nuts are relatively minor, and industry sources indicate that such exports are probably raw kernels (table 2-24). Japan was the principal market for such exports.

#### 30-Continued

prepared or preserved, n.e.s.o.i.). In order to calculate what part of the Schedule B subheadings 0802.90.91 and 0802.90.95 were comprised of macadamia nuts, exports from the customs district of Honolulu, Hawaii were used with the assumption that these exports consisted exclusively of macadamia nuts.

#### Table 2-23

Prepared or preserved macadamia nuts, not elsewhere specified or included: U.S. exports of domestic merchandise, by principal markets, 1987-91

Market	1987	1988	1989	1990	1991
· · · · · · · · · · · · · · · · · · ·		· · · ·	Quantity (kilogi	rams)	
Japan	130,476	221,986	103,243	220,394	286,401
Taiwan	11,081	8,194	13,371	50,169	37,074
Germany	7,503	12,653	28,233	21,324	26,845
Singapore	2.923	25 366	5,712	20.007	20,089
South Korea	5.258	2,647	2,116	1,186	21,731
All other	90,928	53,814	70,440	38,436	61,940
Total	286,546	368,588	256,046	391,511	567,539
	•	· · · ·	Value (1,000 doll	ars)	
Japan	1,827	3,345	1,119	2,596	3,417
Hong Kong	412	528	330	350	897
	106	96	108	456	547
Bermany	103	191	235	244 19	290
Singapore	29	318	44	242	219
South Korea	65	37	36	19*	216
All other	776	674	595	370	518
Total	3,318	5,191	2,501	4,295	6,369
		Ui	nit value (per kilog	ram) <sup>1</sup>	· .
Japan	\$14.00	\$15.07	\$10.84	\$11.78	\$11.93
Hong Kong	10.73	12.04	10.77	9.01	10.29
Taiwan	9.57	11.73	8.07	9.08	14.77
Germany	13.73	15.10	8.32	11.44	10.80
	- a 61	10.23	12.34 8.29	15.63	13.20
South Korea	12.31	13.91	16.87	16 27	9.05
All other	8.53	12.52	8.45	9.62	8.37
Average	11.58	14.08	9.77	10.97	11.22

<sup>1</sup> Unit values are calculated from unrounded numbers.

<sup>2</sup> Not applicable.

Note.—Data for 1987 and 1988 are estimated and most likely overstate exports in those years. Source: Compiled from official statistics of the U.S. Department of Commerce.

<sup>&</sup>lt;sup>30</sup> U.S. exports of macadamia nuts were derived from the Schedule B subheadings 0802.90.91 (Nuts, n.e.s.o.i., fresh or dried, in shell), 0802.90.95 (Nuts, n.e.s.o.i., fresh or dried, shelled), and 2008.19.90 (Macadamia nuts,

Table 2-:	24 👘	· · ·	· ·							
hollod	frach	ör dried	macadami	nine	ILS AVNO	ne of don	nostic m	orchandise	hy mar	kote
Juenca	116311	of uneu	macagamin	a muto.	olo: evho	113 01 001	licone il	ierenanaise,	sy man	vêra,

1987-91		· • •		به و م	•• 2
Market	1987	1988	1989	1990	1991
Alto ya Charles di Maria da La La tradicio di Maria			Quantity (kilo	gřams) 💷 📫 🖞	
Japan Singapore	8,399 0	1,579 0	16,415 0	10 0	27,137 , 11,088
Hong Kong Italy South Korea	0 0 . 770	1,294 0 0	6,634 935	0. 0. 1	
Taiwan	. 0	4,321,	<u>- 1900 - 0</u>	0 "	0
Total	9,169	7,193	23,984	0	38,225
an a	ا قاری اس	/a _ * * *	Value (1,000 dc	ollars)	میں بی میں دی۔ ہے
Japan Singapore Hong Kong	105 0 0	26 0 19	225 0 18	0 0 0	257 122 0
Italy South Korea Taiwan	0 2 0	0 0 11	6 0 0	´ 0 0 0	
Total	107	57	249	0	379
a chair ann an t-t-t-t-t-t-t-t-t-t-t-t-t-t-t-t-t-t-t-		۲۰ ۲۵ ۲۰۰۰ ۲۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰	Unit value (per kil	ogram)	
Japan Singapore Hong Kong Italy South Korea Taiwan	\$12.55 (1) (1) (1) 2.65 (1)	\$16.66 (1) 14.92 (1) 2.65	\$13.71 (1) 2.65 6.81 (1) (1)	(1) (1) (1) (1) (1) (1) (1)	\$9.47 11.00 (1) (1) (1) (1) (1)
Average	11.72	7.92	10.38	(1)	9.91
1 A	···· · · ·		1		

5 11 6 30

<sup>1</sup> Not applicable.

Note.—Data for 1987 and 1988 are estimated and most likely overstate exports in those years.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Exports of in-shell nuts are almost nonexistent, with ---- containers increased over the period from 116 metric only 1,217 kilograms, valued at \$7,000, going to Thailand in 1991. The only other export shipment of in-shell nuts in recent years was 4,990 kilograms, valued at \$22,000, going to Japan in 1988.

In response to questionnaires of the Commission. U.S. macadamia nut processors reported that exports of macadamia nuts and nut products during 1987-91 increased steadily from 388 metric tons, valued at \$10.1 million, in 1987 to 1,019 metric tons, valued at \$24.2 million, in 1991. Japan was by far the most important export market, accounting for 74 percent of total reported exports in 1991 (kernel weight basis) (table 2-25). Hong Kong and Taiwan were also important destinations for U.S. exports during the period. Processors' exports of chocolate-covered kernels increased from 127 metric tons, valued at \$6.4 million, in 1987 to a peak of 229 metric tons, valued at \$11.9 million, in 1989. Exports of chocolate-covered kernels totaled 211 metric tons, valued at \$11.8 million, in 1991. Exports of "other retail packs" increased from 145 metric tons, valued at \$2.3 million, in 1987 to 441 metric tons, valued at \$8.6 million, in 1991. The responding processors also reported that exports of macadamia kernels in bulk industrial

tons, valued at \$1.4 million, in 1987 to 367 metric tons, valued at \$3.9 million, in 1991. 197 . 23

It should be noted that the export data reported to the Commission, although significantly higher than official statistics, may still understate total U.S. exports of macadamia kernels and kernel-containing products because of unaccounted foreign tourist purchases. It has been reported that purchases in Hawaii by Japanese tourists are estimated to be at least \$15 million annually and that they may be considerably higher.<sup>31</sup> The magnitude of the underestimation of exports is reduced, however, due to U.S. processors' use of imported macadamia kernels in some of the products that are exported to foreign markets.

### **Tariff Treatment**

U.S. imports of macadamia nuts and macadamia nut products (HTS subheadings 0802.90.80, 0802.90.90, and 2008.19.90) have different general and

<sup>&</sup>lt;sup>31</sup> John O'Connell, "U.S. Macadamia Nut Industry Taps Export Markets," Ag Exporter, Apr. 1990.

#### Table 2-25 Macadamia kernels: Exports of retail and bulk industrial products by U.S. processors, by types, and by maior markets. 1987-91

Item	1987	1988	1989	1990	1991				
······································	·····	Quantity (metric tons) <sup>1</sup>							
Chocolate-covered kernels: Japan All others	67 61	113 65	123 106	151 57	148 63				
Total All other retail packs: <sup>2</sup>	127	179	229	208	211				
Japan All others	68 77	169 104	216 127	190 150	278 163				
Total Bulk industrial containers:	145	274	343	340	441				
JapanAll others	105 12	136 15	145 16	225 25	326 41				
Total	116	151	161	249	367				
Grand total	388	604	733	797	1,019				
· · ·		Va	lue (1,000 dollars)	• •					
Chocolate-covered kernels: Japan All others	3,301 3,066	5,796 3,301	6,589 5,359	8,563 3,058	8,514 3,269				
Total	6,367	9,097	11,948	11,621	11,783				
All other retail packs: Japan All others	1,095 1,223	2,907 2,680	3,744 2,193	3,604 2,863	5,227 3,354				
Total Bulk industrial containers:	2,318	5,587	5,937	6,467	8,581				
Japan All others	1,297 144	1,759 196	1,660 184	2,602 285	3,412 458				
Total	1,441	1,955	1,844	2,887	3,870				
Grand total	10,126	16,639	19,729	20,975	24,234				

<sup>1</sup> Kernel weight of finished product.

<sup>2</sup> "All other retail packs" includes roasted kernels, chocolate candy other than kernels, and all other retail-size packs.

Note.—Because of rounding, figures may not add to totals shown.

Source: Compiled from data submitted by four processors in response to questionnaires of the U.S. International Trade Commission.

column 2 rates of duty. For HTS subheading 0802.90.80—macadamia nuts, fresh or dried, in shell—the general rate of duty is 2.9 cents per kilogram and the column 2 rate of duty is 5.5 cents per kilogram.<sup>32</sup> U.S. imports of fresh or dried shelled macadamia nuts enter under HTS subheading 0802.90.90 and have both a general and a column 2 rate of duty of 11 cents per kilogram. Prepared or preserved macadamia nuts, not elsewhere specified or included, enter the United States under HTS subheading 2008.19.90. Prepared or preserved macadamia nuts have a general rate of duty of 28 percent ad valorem and a column 2 rate of duty of 35 percent ad valorem. Under the Caribbean Basin Economic Recovery Act and the United States-Israel Free-Trade Area Implementation Act, eligible imports of all of these products are free of duty. In-shell fresh or dried macadamia nuts and prepared or preserved macadamia nuts may also be imported free of duty under the Generalized System of Preferences. The United States-Canada Free-Trade Agreement provides for duty-free imports of fresh or dried, in-shell and shelled macadamia nuts and a 1992 special rate of duty of 16.8 percent ad valorem for prepared or preserved macadamia nuts. Whenever eligibility for special tariff treatment is not claimed and established, goods are dutiable at general rates.

Chocolate-covered macadamias and chocolate bars containing macadamia nuts are classified under HTS subheading 1806.90.00 and have a general rate of duty of 7 percent ad valorem and a column 2 rate of duty of

<sup>&</sup>lt;sup>32</sup> Imports are subject to phytosanitary regulations of the U.S. Department of Agriculture. See the discussion of phytosanitary regulations that follows.

40 percent ad valorem. These chocolate macadamia products enter the United States free of duty under the second from placing land in agriculture in Hawaii are Generalized System of Preferences, the Caribbean Basin Economic Recovery Act, and the United States-Israel Free-Trade Area Implementation Act. Eligible imports from Canada are subject to a 4:2-percent ad valorem rate of duty during 1992.

### Import Restrictions

# Phytosanitary restrictions

U.S. phytosanitary regulations (7 CFR 319.56) prohibit the import of in-husk or in-shell macadamia nuts from all countries other than St. Eustatius in order to prevent the spread of injurious plant pests. Imports from St. Eustatius require a written permit issued by the Animal and Plant Health Inspection Service of the USDA.

### Food and Drug Administration restrictions

U.S. imports of macadamia kernels and kernel products are subject to the same health and sanitary regulations that apply to domestically produced macadamia kernels and kernel products. Part A of section 801 of the Federal Food, Drug, and Cosmetic Act of 1938 authorizes the Food and Drug Administration (FDA) to examine imported products. The FDA routinely inspects imported processed food products, including macadamia nuts, for compliance with health and sanitary standards. Importers have reported that although the inspections can cause delays in the liquidation of import entries, in general the inspections have caused no major problems.

## Hawaiian labeling law

In May 1991 Hawaii enacted a labeling law requiring that any product containing macadamia nuts offered into intrastate or interstate commerce in Hawaii and labeled as containing Hawaiian-grown macadamia nuts must contain 100 percent Hawaiian-grown macadamia nuts.

# **Government Programs**

There are no known Government programs that specifically benefit the U.S. macadamia nut industry. However, as with every other State in the United States, Hawaii has preferential tax assessment statutes for farmland.<sup>33</sup> These statutes provide tax incentives for placing or keeping land in agriculture (See appendix E, "Summary of State Preferential Tax

Assessment Laws".) However, some of the benefits mitigated by restrictive agreements, such as prior usage and land dedication,<sup>34</sup> attached to the preferential tax assessment (See appendix F, "Hawaii County Code Pertaining to Land Dedication".)

Under Hawaii's preferential tax program any parcel of land within an agricultural, rural, conservational, or urban district in Hawaii may be dedicated for ranching or other agricultural use-including the cultivation of macadamias-and may be assessed at the value that such land has for agricultural use without regard to any value that the land may have for other purposes. This agricultural assessment is generally lower than other assessments. However, all buildings and other real property on the land are separately valued and assessed. To qualify for preferential tax assessment, the land must be substantially and continuously used for agriculture during the 5 years preceding the request and must gross at least \$1,236 annually in return per hectare from agricultural production.

On the island of Hawaii all agricultural tax assessments are \$10 per \$1,000 assessed value. Assessed value per hectare for selected agricultural land uses is shown in the following tabulation (in dollars):

Land use	Nondedicated and 10-year dedicated parcels	20-year dedicated parcels
Macadamias <sup>1</sup>	3,707	1,853
Sugar <sup>2</sup>	1,194	598
Coffee, good	6,178	3,089
Coffee, poor	3,089	1,544

<sup>1</sup> Some macadamia orchards are assessed a rate of \$0 per hectare due to the carry-over of a former State of Hawaii orchard development program repealed in 1987. The last of the development program carryovers ends in 1994.

<sup>2</sup> Average rates for the three sugar- producing areas on the island of Hawaii.

The tax assessment program in Hawaii discourages changes in land use from agricultural to nonagricultural activities as well as subdivision of land into smaller parcels. In the event of a change in land use classification<sup>35</sup> or the subdivision of the land into parcels of 2.02 hectares (5 acres) or less, a deferred (rollback) tax at the rate for the new use is imposed retroactively for the period the land was dedicated to agriculture, but not to exceed the last 10 years. Additionally, all taxes are due by the end of the year, with a 10-percent per annum penalty for the preceding years. Immediate payment of retroactive taxes

<sup>34</sup> Land dedication, achieved in Hawaii by successfully petitioning the director of finance, is a landowner's forfeiture of any right to use a given property for any purpose other than agriculture for a specified period in return for having the land assessed at its value in a particular agricultural use.

<sup>35</sup> There are nine general land classifications used in Hawaii: improved residential, unimproved residential, apartment, hotel and resort, commercial, industrial, agricultural, conservation, and homeowner.

<sup>&</sup>lt;sup>33</sup> Applicable State statutes: Hawaii Rev. Stat. 205-2, -5, 246-10, -12 (1985 & supp. 1988).

and penalties may be avoided if the owner states at the time of the change in dedication that the land will be dedicated to agricultural or ranching uses within 3 years of the initial change. With such intent to dedicate, any applicable deferred tax is not due until after the change in usage and is not subject to penalties. When an owner of dedicated land wishes to change its agricultural use, such as switching from the cultivation of macadamias to the cultivation of ginger root, the owner must petition the Real Property Tax Division for such a change, and the owner is subject only to the actual change in tax rates.

Because of the Hawaiian tax abatement program, and the restrictions and penalties it involves, dedicated land that otherwise would have left the industry in response to unfavorable market conditions may remain in macadamia production. However, it is not known to what extent the tax abatement program has encouraged the inefficient production of macadamias or has discouraged the establishment of new orchards. The breakdown of dedicated versus nondedicated macadamia hectares was not available to Commission staff.<sup>36</sup> Moreover, because land for sugarcane is taxed at a lower rate than land for macadamias and other competing crops, the program would appear, at the margin, to discourage diversification from sugar to macadamias or other crops.<sup>37</sup>

<sup>36</sup> The Real Property Tax Division of the County of Hawaii was not able to comply with Commission staff requests to provide this information.

<sup>37</sup> Ms. Marguarite Hopkins, program specialist, Hawaii Department of Research and Development, conversation with USITC staff, Sept. 14, 1992.

# **CHAPTER 3 Australian Industry and Market**

The Australian macadamia nut industry is highly export oriented, exporting about 80 percent of its production, while the U.S. industry exports less than 20 percent of its production. This chapter provides information on the structure, annual production, and the major markets of the Australian industry.<sup>1</sup>

# Australian Industry

## Number and Location of **Growers and Processors**

The macadamia nut is indigenous to Australia and has long been known as the "Australian Bush Nut." The Proteaceae (macadamia family) grow in subtropical climates and require precise climatic conditions. Macadamia integrifolia, the main commercial species accounting for about 98 percent of total production, naturally occurs within 15 miles of the coast from lower Beechmont to Mt. Bauple. Australian commercial production is centered in New South Wales and southeastern Queensland, which provide the rich soils and large amount of annual rainfall needed to promote maximum growth.

Although the macadamia is native to Australia, commercial development of the macadamia industry in Australia only began about 25 years ago with the introduction of a reliable nut-cracking machine and the involvement of Colonial Sugar Refiners (CSR).<sup>2</sup> Over the last decade Australian farmers increased plantings, and these plantings may make Australia's share of the world market substantially greater by the beginning of the 21st century.<sup>3</sup> Today approximately 600 farms produce macadamia nuts commercially in Australia. On average the majority of Australian orchards are

around 40 hectares, which is significantly larger than the Hawaiian 4-hectare average.

According to Australian Macadamia Society (AMS) estimates, the Australian industry employs around 1,600 persons. Almost 1,000 of these employees are believed to work on the growing side of the industry, including owners, harvesters, and consultants. The processing and marketing sector is estimated to employ 600 workers.<sup>5</sup>

There are approximately 40 processors of macadamia nuts in Australia. However, the processing industry is dominated by two processors and one marketing group that comprises several processors. MacFarms of Australia, the largest processor, accounts for approximately 35 percent of Australia's processed product.<sup>6</sup> MacFarms has six orchards, with roughly 1,500 hectares planted in Australia.<sup>7</sup> The company processes only its own product and does not contract out to other growers. MacFarms' processing plant is in Woombye, Queensland.

International Macadamias Ltd., a joint venture between Macadamia Processing Co., Ltd., and Sun Coast Gold Pty. Ltd., also accounts for around 35 percent of the annual Australian-processed kernel. Macadamia Processing Co., Ltd., was founded in 1983, and by 1988 it was the second-largest macadamia processor in Australia. The company's combined shareholder plantations now account for one-quarter of the Australian crop. Its processing plant is near the coastal city of Lismore in New South Wales. Sun Coast Gold Pty. Ltd. represents over 150 growers and was established in 1985. The company is a grower-owned cooperative in southeastern Queensland. Most of International Macadamia's sales are to confectionery manufacturers, retail gift packers, roasters and salters, and some bakery interests.<sup>8</sup>

<sup>&</sup>lt;sup>1</sup> The Australian Macadamia Society, Ltd. was requested to provide the Commission with data on Australia's production of macadamia nuts and nut products, cost of production, and export markets. <sup>2</sup> CSR sold its macadamia interests to MacFarms of

Australia in 1986. <sup>3</sup> K.J. Ainsbury, "Macadamia Industry in Australia: AMS and the Market," *31st Annual Meeting, Hawaii* Macadamia Nut Association, May 1991.

<sup>&</sup>lt;sup>4</sup> R.A. Stephenson, "The Australian Macadamia ustry," Journal Australian Institute of Agricultural Industry,' Science, Sept. 1990, p. 13.

<sup>&</sup>lt;sup>5</sup> Australian Macadamia Society, Ltd., submission to the Commission, May 21, 1992, p. 2. <sup>6</sup> For discussion of the relationship between

MacFarms of Australia and MacFarms of Hawaii, see

p. 2-1. <sup>7</sup> Mr. Rick Vidgen, president in charge of marketing, USITC staff, Apr. 23 MacFarms of Hawaii, interview by USITC staff, Apr. 23, 1992.

<sup>&</sup>lt;sup>8</sup> Retail gift packers consist of mail order houses and corporate sales packers.

Macadamia Plantations of Australia (MPA) represents around 10 to 12 percent of annual Australian processing of macadamia nuts. Originally MPA was a major plantation owner. In the mid-seventies, the company set up a subsidiary, Macadamia Plantation Management Pty., Ltd., to guide investment in plantation ownership and management services. The company at first simply produced cracked, raw kernels, but since the mid-1980s, MPA has operated its own processing facility at Dunoon. In 1988 the processing capacity of the facility at Dunoon was doubled in size to enable it to meet the projected growth in macadamia nut supplies.

In recent years there has been an increase in the number of small processing plants—"backyard" processors—in Australia that are composed of one or two growers marketing their own product.<sup>9</sup> Industry analysts believe that in the short run this increase in small plants may benefit growers by increasing competition among processors attempting to purchase the limited supply of in-shell nuts, thus forcing up raw kernel prices. However, there is concern that these small processors may introduce an inferior product into the market and damage Australia's reputation for high-quality product. At the same time there is concern that the proliferation of small processors will undermine the current marketing structure by undercutting the prices quoted by the large processors, . .<sup>2</sup> . possibly starting a price war.

## Trends in Production

Australia is one of the fastest growing macadamia production areas in the world. Production area

<sup>9</sup> McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," p. 13.

New Strategies and

increased from 2,400 planted hectares in 1982 to 6,000 hectares in 1991.<sup>10</sup> Macadamia production increased from 1,900 metric tons, wet-in-shell (WIS) in 1982 to 12,000 metric tons WIS (about 3,000 metric tons of raw kernels) in 1990. (See table 3-1 and figure 3-1.) The increase in production in 1990 was a result of increased in-shell nut yields per hectare owing to ideal growing conditions, maturation of trees, and increased recovery of kernel from in-shell nuts. In 1990 Australia accounted for 28 percent of world production.

However, the 1991 crop was down from the 1990 crop by approximately 25 percent, and Australia accounted for only 23 percent of world production in that year. The crop reduction was believed to be the result of (1) drought conditions that have existed in Australia since mid-1990 and (2) the decline in the in-shell price paid to growers in 1990, which resulted in the demise of some of the smaller farms.

Actual Australian nut yields historically have been substantially below those of Hawaii, though some of the higher-producing trees in Australia are near the standard Hawaiian yield of 45 kilograms WIS per tree.<sup>11</sup> Current yields average approximately 29 kilograms per tree in Australia.<sup>12</sup> It is believed that yields are lower in Australia and in other macadamia-producing areas outside of Hawaii because temperatures in these areas vary more by season and from day to night than they do in Hawaii. Hawaii also has more mature trees. However, Australia is now leading the world in new macadamia varieties, including trees that allow commercial harvest 4 years

 <sup>10</sup> R.A. Stephenson, "The Macadamia—From Novelty Crop to New Industry," Journal Australian Institute of Agricultural Science, Sept. 1990, p. 73.
 <sup>11</sup> Ibid., p. 76.
 <sup>12</sup> Ibid.

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# Table 3-1

Australian macadamia production: Wet-in-shell and kernel production, planted and bearing hectares, and yield, 1982-91

Year	Production	Planted	Bearing	Yield per hectare	Raw kernel production
	Metric tons	—— Нес	stares	— <i>I</i>	Metric tons ———
1982         1983         1984         1985         1986         1987         1988         1989         1990         1991	1,900 2,450 3,000 3,200 3,600 4,400 5,200 26,800 12,000 9,000	2,400 2,800 3,100 3,750 4,400 5,050 5,650 6,000 6,000 6,000	1,010 1,170 1,210 (1) 2,500 (1) 3,600 (1) 4,000	1.9 2.1 2.5 ( <sup>1</sup> ) ( <sup>1</sup> ) 1.8 ( <sup>1</sup> ) 1.9 ( <sup>1</sup> ) 2.2	(1) (1) (1) (1) 1,100 1,350 1,800 2,959 2,200

<sup>1</sup> Not available.

<sup>2</sup> Revised from data submitted by the Australian Macadamia Society, Ltd.

Source: Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," 31st Annual Meeting of the Hawaii Macadamia Nut Association, May 1991, and the Australian Macadamia Society, Ltd., response to USITC requests.



Figure 3-1 Australian macadamia production and planted area, 1982-91

Source: Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," 31st Annual Meeting of the Hawaii Macadamia Nut Association, May 1991, and the Australian Macadamia Society, Ltd.

from planting as opposed to the traditional 6 to 8 years.<sup>13</sup> Furthermore, some of these new varieties reach maturity in 10 rather than 15 to 16 years and have kernel yields of almost 40 percent WIS compared with the current Australian industry standard of 33 percent.<sup>14</sup>

High rates of return on macadamias in the early 1980s due to high prices spurred plantings, which peaked at 150,000 trees per year (between 607-748 (hectares) in 1987.<sup>15</sup> Currently the AMS estimates that Australia has about 2 million trees, of which 40 percent are mature, 40 percent are in the early bearing stage, and 20 percent are yet to bear.<sup>16</sup> Due to the excess supply situation in 1990, which resulted from the bumper crop in that year and which reduced returns to growers in 1990 and 1991, the number of new Australian plantings has now diminished. Because such a large portion of Australia's trees are in the early bearing stage and yet-to-bear stage, Australia's macadamia nut production is expected to significantly increase in the next decade without any new plantings. Australian production is expected to increase to 15,000-20,000 metric tons WIS (5,000 metric tons of kernels) by 1994 and to exceed 10,000 metric tons of kernels by 2005.<sup>17</sup>

# The Australian Market

### Trends in Consumption

At the present time around 1,800 metric tons, or 20 percent, of Australia's annual in-shell macadamia nut production is consumed domestically. The Nut Trading Company of Sydney reports that in 1988,

<sup>&</sup>lt;sup>13</sup> Nut Trading Co., "Macadamia Nut Industry in Australia," Sydney, N.S.W., Australia, p. 6.

<sup>&</sup>lt;sup>14</sup> Ibid., p. 6.

 <sup>&</sup>lt;sup>15</sup> Ainsbury, "Macadamia Industry in Australia," p. 71.
 <sup>16</sup> Australian Macadamia Society, Ltd., submission to the Commission, p. 2.

<sup>&</sup>lt;sup>17</sup> Nut Trading Co., "Macadamia Nut Industry in Australia," p. 4.

Australian wholesalers were paying \$16.00/kg for top-grade macadamia kernels.<sup>18</sup> This price put the product out of reach for many Australian consumers. However, in 1991, wholesalers were paying only \$9.50/kg, and domestic demand subsequently increased.<sup>19</sup>

# Australian Imports of Macadamia Nuts and Nut **Products**

### **Tariff treatment**

Macadamia nuts enter Australia under heading 08.02.90.00, "Fresh or dried nuts, not elsewhere specified, other," and are subject to a 2-percent ad Macadamia preparations valorem rate of duty. containing cocoa are subject to a 20-percent ad valorem rate of duty for products of all countries other than those considered developing, imports from which are subject to a 15-percent ad valorem rate of duty.

### **Trends in imports**

Australian imports of macadamia nuts enter in a basket category containing "Fresh or dried nuts, not elsewhere specified." The two largest suppliers of nuts to Australia in this category are the United States and China. However, imports of macadamias are believed by industry sources to be negligible or nil.

# Australian Exports of Macadamia Nuts and Nut **Products**

Australia's exports largely consist of kernels and macadamia nut products.20 Although exact export values are not available prior to 1991, McGregor calculated that about 80 percent of Australia's exports have gone to North America in recent years, 15 percent to Japan, and 5 percent to Europe.<sup>21</sup>

Australian exports of shelled macadamias in 1991 584,025 kilograms, valued at consisted of \$7.9 million.<sup>22</sup> The United States accounted for 60 percent of this export volume and 71 percent of this export value.<sup>23</sup> Japan was the second-largest export

20 McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," p. 13. 21 Ibid.

22 Australian Bureau of Statistics.

<sup>23</sup> This figures take into account 32,412 kilograms of macadamias originally reported as exports of in-shell macadamias to the United States that were subsequently

destination, with 110,090 kilograms, valued at \$935,154. Data on Australia's exports of macadamia confectionery are not available, but industry sources indicate that the destinations of confectionery exports closely follow those of exports of macadamia kernels.<sup>24</sup>

As with Hawaii a large percentage of domestic consumption in Australia consists of "suitcase exports," as visitors to Australia purchase retail gift packs that are taken out of the country. In fact, MPA, which produces retail packs under the "Pacific Gold" label, states that most retail packs in the Australian market are purchased as suitcase exports rather than by Australian consumers. Industry sources indicate that many Australian companies found in recent years that cutting out some of the middlemen in the tourist product trade can increase sales and profits.<sup>25</sup> To this end Australian companies now have some export products packed outside of Australia and offered for sale directly to foreign consumers through phone sales and direct order forms.

# **Government Programs**

No known Australian Government programs directly target macadamia nut growers. The Australian Government has an Export Market Development Grant, which is available to, but not targeted specifically for, macadamia exports. The Export Market Development Grant promotes export development by providing grants to offset expenses incurred by Australian exporters in developing new export markets. The grant has a time span of 8 years exporters have per exporter. and must export-promotion expenses of at least A\$15,000 before they are eligible. Qualifying expenses include samples, various travel fares, and some daily expenses for market development travel.

Australia also has limited tax advantages that are available to the agriculture industry in general. These advantages are in the form of an income equalization scheme, which protects growers from income volatility, and an ability to write off nondirect income-earning capital expenditures.<sup>26</sup>

The AMS has successfully applied for research grants from the Australian Horticultural Research and Development Corporation (HRDC). The AMS receives dollar-for-dollar matching funds from the HRDC and in 1990 and 1991 paid about A\$188,000 to the HRDC for research. In 1992 the AMS estimates that it will spend about A\$123,000 on research.

<sup>&</sup>lt;sup>18</sup> Ibid., p. 7.

<sup>19</sup> Ibid.

<sup>23-</sup>Continued

determined to be shelled macadamia nuts by the Australian Bureau of Statistics.

<sup>&</sup>lt;sup>24</sup> Macadamia Plantation of Australia, information

<sup>&</sup>lt;sup>25</sup> Keith Ainsbury, Macadamia Plantations of Australia Pty. Ltd., interview by USITC staff, Jan. 25, 1992. <sup>26</sup> These capital expenditures include items such as

irrigation equipment and structures to prevent erosion.

# **CHAPTER 4 Other Foreign Suppliers and Markets**

In recent years both the United States and Australia have faced increased competition in the macadamia market from relatively new producing countries. Macadamia nuts from Kenya, Costa Rica, Guatemala, Brazil, Malawi, and South Africa are now familiar to purchasers in the world market. Much of this production began to reach the world market in the 1980s, and many of these countries have significant planted areas that have not yet reached bearing age. Together these countries have close to 14,000 planted hectares of macadamias, which yielded an estimated 1,610 metric tons of kernels in 1991 (table 1-1). Relatively little information is available on the macadamia industries in several of these countries, partially because much of the planted area that has yet to bear is interplanted with other crops.

# **Other Foreign Suppliers**

### Kenya

Kenya is one of the leading world macadamia producers behind the United States and Australia. Macadamia trees are grown primarily on small-scale farms on the slopes of Mt. Kenya and are frequently interplanted with coffee. About 10 percent of the crop is grown on large-scale farms operated by the Kenya Nut Co. (KNC). There are now an estimated 2,300 hectares of macadamias planted in Kenya, divided between 2,000 macadamia nut farmers and KNC,1 Many of the small farms are organized into cooperatives in order to facilitate purchases of fertilizers and other chemicals in large quantities on credit.

In 1977 the Japanese International Cooperation Agency (JICA) introduced a research/promotion program to encourage farmers to increase plantings of macadamias. The dissolution of the International Coffee Agreement and the subsequent decline in world prices reportedly have prompted some growers in Kenya to rely increasingly on macadamias as a cash crop. However, current Kenyan legislation prohibits uprooting coffee trees and is thus an obstacle to increased planting of macadamias.

Kernel production in Kenya has averaged around 364 metric tons annually (table 1-1), with production in the most recent years declining due to reduced rainfall. The kernel recovery rate in Kenya ranges from 12 to 17 percent.<sup>2</sup> Kenyan macadamias are all processed by KNC, which has a monopoly on processing. The processing facility is reported to operate at only 20 to 25 percent of capacity.<sup>3</sup>

Aside from the 2,000 small farmers growing macadamias and interplanted crops, KNC has 1,700 employees.4 Japan is the dominant importer of macadamias from Kenya, followed by the United States and Germany. The Government of Kenya is not known to provide any direct subsidies to growers, processors, or exporters of macadamia nuts.

### Costa Rica

The macadamia industry in Costa Rica took off in the late sixties and early seventies as part of a 3-year project by the Food and Agriculture Organization of the United Nations. This program, initiated in 1972, promoted agricultural diversification through tree crops. Until this time Costa Rica had not been successful in developing commercially viable macadamia production. $^5$  The firm in charge of the venture, Macadamias de Costa Rica, set up the industry structure and infrastructure, and it established 500 hectares of plantings. In 1991 Costa Rica had 522 macadamia nut growers with 5,000 hectares of planted macadamias.<sup>6</sup> Macadamias in Costa Rica are often interspersed with coffee trees, for which they provide needed shade.

Costa Rica has three processing plants: one has the ability to process 500 hectares of production; one has sufficient capacity to process the entire Costa Rican crop; and one was not operating as of 1991.<sup>7</sup> Kernel production in 1991 was 273 metric tons (table 1-1). Costa Rican macadamia producers, processors, and exporters do not receive any known subsidies.

<sup>5</sup> Dr. Herster Barres of Macadamia of Costa

<sup>&</sup>lt;sup>1</sup> U.S. Department of State Telegram, Apr. 1992, Nairobi, message reference No. 101017Z.

<sup>&</sup>lt;sup>2</sup> Ibid.

<sup>&</sup>lt;sup>3</sup> Ibid.

<sup>&</sup>lt;sup>4</sup> Ibid.

Rica/USA, Inc., interview by USITC staff, Apr. 17, 1992. <sup>6</sup> U.S. Department of State Telegram, June 1992, San Jose, message reference No. 162256Z. <sup>7</sup> Ibid.

### Guatemala

Guatemala's production of macadamias began in the 1970s. As in Kenya and Costa Rica, macadamias in Guatemala are often grown as shade trees for coffee. There are only about 60 macadamia growers in Guatemala, with approximately 2,023 hectares in production.<sup>8</sup> Kernel production was 272 metric tons in 1991 (table 1-1).

Guatemala has three macadamia-processing facilities, with the largest facility handling 90 to 95 percent of the country's production. There are an estimated 1,800 workers involved in macadamia production throughout the year.<sup>9</sup> However, these workers are not involved exclusively with macadamias, and they often work on other crops produced alongside macadamias. Guatemala exports nearly all of its production in raw form to the United States. Exporters, as well as producers and processors, do not receive any special Government assistance.

 <sup>8</sup> U.S. Department of State Telegram, Mar. 1992, Guatemala City, message reference No. 271947Z.
 <sup>9</sup> Ibid.

# **Major Foreign Markets**

### Japan

Japan is the second-largest importer of macadamia nut kernels and nut products in the world, behind the United States. The Japanese market for macadamia nut kernels is supplied entirely by imports, which grew by 12 percent during the 1987-91 period. These imports ranged from 846 metric tons in 1987 to 944 metric tons in 1991 (table 4-1 and figure 4-1). Kenya, the United States, and Australia, the principal import sources, accounted for 99 percent of Japanese imports in 1991. The Japanese macadamia nut market is relatively small, representing less than 1 percent of the total estimated edible tree nut market in Japan.

# Japanese imports of macadamia nuts and nut products

Macadamia nut kernels in Japan are mainly used by the food processing industry as ingredients for candies, cakes, and ice cream toppings. Kenya is the

#### Table 4-1

Total Japanese imports of macadamia kernels and kernel prod	lucts, by principal sources, 1987-91
---	--------------------------------------

Country	1987	1988	1989	1990	1991			
	1		Quantity (kilograr	ns)				
United States Kenya Australia South Africa All other	175,043 368,490 189,909 111,525 580	299,265 324,820 213,587 49,257 362	228,103 383,479 248,695 7,500 0	427,232 357,280 103,162 4,590 0	369,703 354,740 213,826 5,063 1,012			
Total	845,547	887,291	867,777	892,264	944,344			
	Value (1,000 yen) <sup>1</sup>							
United States Kenya Australia South Africa All other	394,865 359,677 328,326 155,174 1,080	610,033 310,832 369,653 77,865 635	533,167 449,495 478,119 11,081 0	951,326 417,578 175,557 5,782 0	700,923 398,244 328,961 5,852 1,317			
Total	1,239,122	1,369,018	1,471,862	1,550,243	1,435,297			
	Unit value (1,000 yen per kilogram)							
United States Kenya Australia South Africa All other	2.26 0.98 1.73 1.39 1.86	2.04 0.96 1.73 1.58 1.75	2.34 1.17 1.92 1.48 ( <sup>2</sup> )	2.23 1.17 1.70 1.26 ( <sup>2</sup> )	1.90 1.12 1.54 1.16 1.30			
Average	1.47	1.54	1.70	1.74	1.52			

<sup>1</sup> The following are the average exchange rates (¥/US\$) for 1987-91: 1987-144.6, 1988-128.1, 1989-138.0, 1990-144.8, and 1991-134.6 as reported by the Board of Governors of the Federal Reserve System. <sup>2</sup> Not applicable.

Note.-Data do not include bakery or confectionery products.

Sources: Government of Japan, *Japan Exports and Imports, Commodity by Country*, and Board of Governors of the Federal Reserve System for Exchange Rates.

Figure 4-1 Total Japanese macadamia kernel imports, by sources, 1987-91



Note .--- Data do not include bakery or confectionery products. Source: Government of Japan, Japan Exports and Imports, Commodity by Country.

leading supplier of Japan's fresh or dried macadamia kernels, accounting for 351 metric tons, or 56 percent, of the fresh or dried macadamia kernel imports in 1991 (table 4-2 and figure 4-2). Kenya's importance in the Japanese market is explained, in part, by the much lower price of all Kenyan kernels (table 4-1). Kenyan quality, according to industry sources, is lower than that available from the United States; thus, Kenyan processors are forced to supply nuts at a discount to Japanese buyers.<sup>10</sup> In addition, procurement of nuts in Japan is often handled by a trading company that shares the same parent firm as the user. The trading companies will often prefer to continue traditional relationships with Kenyan suppliers, even over the preferences of the confectionery user based on quality considerations.11

The United States is the main Japanese supplier of processed macadamia nuts, which are purchased for the retail and snack markets (table 4-3 and figure 4-3). Australia's shipments to Japan have traditionally consisted of fresh or dried macadamia kernels; however, Australia also supplies significant quantities of processed macadamia nuts.

The decline in Australia's shipments to Japan in 1990 and the concurrent increase in U.S. shipments may be the result of Australian macadamia nuts' being further processed and marketed by U.S. firms rather than a change in the actual source of the macadamia nuts.

Japanese distribution channels for imported nuts are quite complex, typically involving trading companies, nut roasters, food and confectionery manufacturers, food wholesalers, local secondary wholesalers, and a wide range of consumer outlets, such as confectionery stores, supermarket chains, department stores, restaurants, and hotels. Mauna Loa has sought to eliminate some of the intermediate marketing steps through agreements with some of the

<sup>&</sup>lt;sup>10</sup> McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts,"

rket Environment for Macadamia Nuts," p. 24. <sup>11</sup> Macadamia Plantations of Australia Pty. Ltd. states that the main reason why development of the Japanese market is slow is that low-priced nuts are being imported by a Japanese trading company whose subsidiary is involved in the growing and processing of macadamia nuts in Kenya. Macadamia Plantations of Australia Pty. Ltd., submission to the Commission, May 22, 1992, p. 3.

Country	1987	1988	1989	1990	1991			
			Quantity (kilogram	ns)				
Kenya Australia United States South Africa Guatemala	367,860 138,100 43,581 111,525 0	324,460 152,218 57,080 4,500 0	375,500 105,593 6,679 7,500 0	346,720 61,925 70,180 4,590 0	351,340 144,855 119,613 5,063 1,012			
Total	661,066	538,258	495,272	483,415	621,883			
			Value (1,000 yen)	p2				
Kenya Australia United States South Africa Guatemala	358,434 233,200 79,694 155,174 0	310,187 262,320 83,295 6,140 0	436,464 196,908 13,312 11,081 0	401,599 82,019 129,710 5,782 0	393,180 196,606 183,116 5,852 1,317			
Total	827,502	661,942	657,765	619,110	780,071			
	Unit value (1,000 yen per kilogram)							
Kenya Australia United States South Africa Guatemala	0.97 1.70 1.83 1.39 0	0.96 1.72 1.46 1.36 ( <sup>3</sup> )	1.16 1.86 1.99 1.48 ( <sup>3</sup> )	1.16 1.32 1.85 1.26 ( <sup>3</sup> )	1.12 1.36 1.53 1.16 1.30			
Average	1.25	1.23	1.33	1.28	1.25			

#### Table 4-2 Japanese imports: Macadamia nuts, fresh or dried.<sup>1</sup> by sources, 1987-91

<sup>1</sup> Japanese HTS 0802.90-200 from 1988 to 1991, 0805-430 for 1987.
 <sup>2</sup> The following are the average exchange rates (¥/US\$) for 1987-91: 1987-144.6, 1988-128.1, 1989-138.0, 1990-144.8, and 1991-134.6 as reported by the Board of Governors of the Federal Reserve System.
 <sup>3</sup> Not applicable.

Sources: Government of Japan, Japan Exports and Imports, Commodity by Country, and Board of Governors of the Federal Reserve System for Exchange Rates.

#### Figure 4-2

Japanese macadamia kernel imports, fresh or dried, by sources, 1987-91



Source: Government of Japan, Japan Exports and Imports, Commodity by Country.

### Table 4-3

 $\mathbf{h}_{i}$ tts.

Japanese Imports: Macadamia nuts, roasted and prepared or preserved, not containing added sugar, not elsewhere specified,<sup>1</sup> by sources, 1987-91

Country	1987	1988	1989	1990	1991		
••••••••••••••••••••••••••••••••••••••			Quantity (kilogram	s)			
United States Australia Kenya South Africa China	131,462 51,809 630 0 580	242,185 61,369 360 44,757 362	221,424 143,102 7,979 0 0	357,052 41,237 10,560 0 0	250,090 68,971 3,400 0 0		
Total	184,481	349,033	372,505	408,849	322,461		
			Value (1,000 yen)	2			
United States Australia Kenya South Africa China	315,171 94,126 1,243 0 1,080	526,738 107,333 645 71,725 635	519,855 281,211 13,031 0 0	821,616 93,538 15,979 0 0	517,807 132,355 5,064 0 0		
Total	411,620	707,076	814,097	931,133	655,226		
	Unit value (1,000 yen per kilogram)						
United States Australia Kenya South Africa China	2.40 1.82 1.97 ( <sup>3</sup> ) 1.86	2.17. 1.75 1.79 1.60 1.75	2.35 1.97 1.63 ( <sup>3</sup> ) ( <sup>3</sup> )	2.30 2.27 1.51 ( <sup>3</sup> ) ( <sup>3</sup> )	2.07 1.92 1.49 ( <sup>3</sup> ) ( <sup>3</sup> )		
Average	2.23	2.03	2.19	2.28	2.03		

<sup>1</sup> Japanese HTS 2008.19-221 and 2008.19-227 for 1988-91 and 2006.273 and 2006-274 for 1987. <sup>2</sup> The following are the average exchange rates (¥/US\$) for 1987-91: 1987-144.6, 1988-128.1, 1989-138.0, 1990-144.8, and 1991-134.6 as reported by the Board of Governors of the Federal Reserve System.

<sup>3</sup> Not applicable.

Sources: Government of Japan, Japan Exports and Imports, Commodity by Country, and Board of Governors of the Federal Reserve System for Exchange Rates.

#### Figure 4-3



Japanese macadamia kernel imports, roasted and prepared or preserved, by sources, 1987-91

Source: Government of Japan, Japan Exports and Imports, Commodity by Country.

larger trading companies, particularly 7-Eleven of Japan, thus enabling Mauna Loa to keep the final retail price lower and to expand volume.<sup>12</sup>

### **Tariff** treatment

Macadamia kernels from the United States, Australia, and South Africa enter Japan under the HTS numbers 0802.90-200 and 2008.19-221 at a duty rate of 5 percent ad valorem. The duty rate is reduced to 3 percent ad valorem for certain developing countries including Kenya, Costa Rica, and Guatemala. The duty is waived for other least developed countries, including Malawi. A minor tariff category— macadamia nuts, prepared or preserved, not roasted or containing added sugar-has a duty rate of 8 percent ad valorem, 6.4 percent ad valorem, and free, respectively, for the three categories of countries described above. No significant trade-distorting health or phytosanitary restrictions apply to the importation of macadamia nuts and nut products.

# **Other Foreign Markets**

The European Community (EC) and some Pacific Rim countries are believed to be potentially important markets for macadamia nuts and nut products. Although the quantity of exports to these countries from the United States is currently quite small, these markets offer considerable growth potential. Official information on the EC's macadamia nut products industry is not available. Consumption of macadamia nut products in the EC is considered negligible.<sup>13</sup> Producers from both the United States and Australia are trying to establish good relationships with nut brokers in the European Community. However, the reluctance by brokers to handle macadamia nuts is

<sup>12</sup> Mr. James Kendrick, executive vice president of operations, Mauna Loa Macadamia Nut Corp., transcript the hearing, Apr. 22, 1992, Kailua-Kona, HI. <sup>13</sup> McGregor, "A Review of the World Production and of

Market Environment for Macadamia Nuts," p. 7.

likely attributable to the high price of macadamia nuts relative to filberts and almonds, the most commonly used tree nuts in the EC.

Macadamia nut producers in Kenya, Malawi, and South Africa have been working to establish a market for macadamia nuts in the EC by selling at significantly lower prices than U.S. and Australian producers have traditionally demanded. U.S. marketers tend to focus on value-added services, such as the precision grading and sorting required by the EC's more heavily automated confectionery users, in order to penetrate the EC market. Macadamia Plantations of Australia and the Macadamia Processing Co. (Australia) indicated that they anticipate supplying major confectionery manufacturers in the EC who are introducing new products featuring macadamia nuts.<sup>14</sup> Most sales are through upscale department stores; the market is quite small and high retail prices are currently a major constraint to increasing volumes.

There are no specific breakouts for macadamia nut products under the Integrated Tariff of the European Communities (TARIC). For raw nuts, fresh or dried, whether or not shelled or peeled, classified under TARIC 08.02.90.90, the general duty rate is 2 percent ad valorem. Nuts from Kenya and Malawi may be imported free of duty under the Lome Convention. Prepared or preserved nuts, in packings of a net content exceeding 1 kilogram (TARIC 20.08.19.10) enter at a 14-percent ad valorem rate. Prepared or preserved nuts in immediate packings of a net content not exceeding 1 kilogram (TARIC 20.08.19.90) enter at a 16-percent ad valorem duty rate. The duty rates for TARIC 20.08.19.10 and 20.08.19.90 are reduced to 6 percent ad valorem for Guatemala and Costa Rica under the EC's Generalized System of Preferences, and the duties are waived for Kenya and Malawi under the Lome Convention.

<sup>&</sup>lt;sup>14</sup> Keith J. Ainsbury, consultant and former general manager, Macadamia Plantations of Australia, and John Wilkie, chairman of the board, Macadamia Processing Co., Ltd., transcript of the hearing, May 12, 1992, Washington, DC.

# CHAPTER 5 Competitive Conditions and Trade

During the 1980s the United States faced increased competition in domestic as well as foreign markets (particularly Japan) for macadamia nuts due to rising supplies from Australia, Costa Rica, Kenya, and other minor foreign suppliers. This chapter examines the competitive conditions affecting the U.S. macadamia nut industry at both the grower and the processor level. In the analysis of competitiveness, changes in U.S. and foreign countries' shares in major macadamia nut markets are considered, as well as the factors affecting cost structures and pricing strategies of major competitor countries. Additionally, factors affecting demand and long-term growth in the global macadamia industry, such as tourism, product quality, and market development efforts, are examined in the final section of this chapter.

# Market Shares in the U.S. and Japanese Markets

Changes in exporter market shares in two major macadamia nut markets, the United States and Japan, during 1987-91 are discussed below. The market share analyses indicate the increasing importance of imports in the U.S. market during 1987-91. At the same time, however, U.S. suppliers of macadamia nuts were able to increase their exports and market share in Japan.

## The U.S. market

U.S. macadamia nut processing industries lost market share in the domestic market to imported macadamia nuts over the period 1987/88 to 1990/91.<sup>1</sup> During this period U.S. imports from all sources increased from 24 percent of the U.S. market in 1987/88 to a high of 35 percent in 1990/91 (figure 5-1). In 1991/92 the share of the U.S. market supplied by imported macadamia nuts declined to 23 percent. This decline in market share in 1991/92 is attributable to several factors. First, U.S. importers (primarily brokers and domestic processors) held significant inventories at the beginning of 1991, which were made available to the U.S. market. Second, the sudden drop in the U.S. price structure in 1990 caused foreign suppliers to divert some product to markets in southeast Asia and Europe where prices were higher. Third, due to drought and the production response to lower prices in 1990 and 1991, there were smaller quantities available for export from Australia and other exporting countries.

From 1987/88 to 1990/91 Australia's share of the U.S. macadamia nut market increased from 13 percent to 22 percent. However, in 1991/92, imports of macadamia nuts from Australia supplied only 12 percent of the U.S. market, down significantly from Australia's peak share in 1990/91. The share of U.S. consumption held by other foreign suppliers also fell in 1991/92. Although these countries' U.S. market share increased from 11 percent in 1987/88 to 16 percent in 1989/90, their share fell to 11 percent in 1991/92.

### The Japanese Market

Japanese imports of macadamia nuts and nut products from all sources increased by 12 percent from 1987 to 1991. The distribution of export gains differed, however, as shown in figure 5-2. Whereas Australian and U.S. exports to the Japanese market gained in volume during the period, Kenya lost market share. Australia's market share<sup>2</sup> was the most variable, rising from 22 percent in 1987 to 29 percent in 1989 and then declining sharply to 12 percent in 1990. A rebound to 23 percent in 1991 resulted in a net market share gain of 1 percentage point over the period.

Kenya's share of the Japanese market was 44 percent in 1987, declining to 37 percent in 1988 and then rising back to 44 percent in 1989. Kenya's share returned to lower levels of 40 percent and 38 percent, respectively, in 1990 and 1991. Kenya's final loss for the period was 6 percentage points.

The United States achieved the strongest export gain in the Japanese macadamia nut market during 1987-91. After a 13-percentage point gain in market share, from 21 percent in 1987 to 34 percent in 1988, the U.S. market declined to 26 percent in 1989. A jump of 22 percentage points in 1990 resulted in U.S. exports' accounting for nearly one-half of the Japanese market. Even though the 1991 market share saw a decline to 39 percent, the net gain was 18 percentage points for the period.

<sup>&</sup>lt;sup>1</sup> Market share was calculated as U.S. imports for consumption divided by U.S. apparent consumption (production plus imports less exports).

<sup>&</sup>lt;sup>2</sup> Market shares for macadamia nuts in the Japanese market are defined as Japan's imports of macadamia nuts and nut products (on a volume basis) from the specific source country as a percentage of Japan's total imports of macadamia nuts and nut products from all sources.

#### Figure 5-1





Source: Compiled from official statistics of the U.S. Departments of Agriculture and Commerce.





Source: Government of Japan, Japan Exports and Imports, Commodity by Country.

The largest decline in exporter market share in the Japanese market was experienced by all other suppliers, and, in particular, South Africa. As a group, these countries' market share declined from 13 percent in 1987 to less than 1 percent in each of 1989, 1990, and 1991.

A better understanding of how the three major suppliers to the Japanese market—the United States, Australia, and Kenya-were able to maintain or increase their market shares during the 1987-91 period can be obtained by reviewing figures 4-2 and 4-3, which show Japanese import volumes broken down by product mix. Australia's shipments to Japan during 1987-91 were mixed between fresh or dried macadamia nuts, and further processed products such as roasted and prepared or preserved macadamia nuts, while Kenya's shipments to Japan consisted almost exclusively of fresh or dried macadamia nuts during the period. U.S. shipments to the Japanese market during the period consisted chiefly of roasted and prepared or preserved kernels. The development of market niches for retail macadamia nut products, among other factors, may explain the U.S. and Australian ability to maintain their market shares.

## **Price Comparisons**

Average sales prices for macadamia kernels sold in bulk industrial containers in the U.S. market, as reported by U.S. importers and U.S. processors in the Commission's questionnaires, are shown in table 5-1 and figure 5-3.<sup>3</sup> These data reflect the responses of eight importers and three processors.<sup>4</sup> The selling price is measured as a weighted-average of reported f.o.b. U.S. shipping point prices, net of all discounts, allowances, and broker's fees. A comparison of these prices indicates that, although there is considerable variability in the reported prices, bulk macadamia kernel prices at the processor and importer level trended upwards during 1987-89. The prices then fell significantly starting in early 1990, with further declines through 1991.

The average importer sales price peaked in the \$14.84 to \$16.87 per kilogram range during 1988 and in the first two quarters of 1989 before plummeting to a low of \$8.32 per kilogram in the third quarter of 1991 (figure 5-3). The processor sales price also appears to have followed the trend in the importer sales price. The average processor sales price peaked during the last quarter of 1988 through the last quarter of 1989 in the range of \$12.60 to \$13.51 per kilogram and then slipped to a low of \$10.03 per kilogram in the last quarter of 1991.

Importer sales prices reported by survey respondents remained above the prices reported by processors from the beginning of 1987 through the end of 1990. The average annual differential between the prices reported by processors and importers reached a high of -\$3.13 per kilogram in 1988. However, import prices fell below the prices reported by processors at the beginning of 1990, although the sales prices reported by the processors also declined. In 1991, the average annual price differential was \$1.63 per kilogram.

The relationships between average import prices for macadamia kernels in the Japanese market by export source during 1987-91 are shown in table 5-2. Import prices are measured from unit import values obtained from Japanese trade data. These data indicate that import prices into the Japanese market rose through 1989 and then fell during 1990 and 1991 (table 5-2).<sup>5</sup> The Australian prices, in yen per kilogram, were above the reported U.S. prices from late 1987 until the beginning of 1989, when they appeared to swing erratically and then declined through 1990 and 1991, except for the first quarter of 1991 when prices increased.<sup>6</sup> The Australian prices remained below the U.S. prices from early 1990 to late 1991 (figure 5-4). The U.S. price peaked at 2,197 yen per kilogram in the third quarter of 1989 and fell relatively steadily thereafter. Both U.S. and Australian prices were significantly above the Kenyan prices throughout the period examined. Kenyan prices averaged 39 percent below the U.S. and Australian prices from 1987-89 but were only 24 percent below the U.S. and Australian prices in 1990 and 1991.

## **Exchange Rates**

Exchange rates play an important role in determining the competitiveness of U.S. agricultural products. Because U.S. agriculture is a traditionally exporting sector, and one in which both imported and exported goods are typically invoiced in dollars, a weak U.S. dollar is considered to improve overall U.S. agricultural competitiveness, whereas a strong dollar is considered to detract from it.<sup>7</sup>

To reduce risks from exchange rate fluctuations, imports and exports of agricultural commodities, including macadamia nuts, are usually invoiced in

<sup>&</sup>lt;sup>3</sup> Data are for styles 1, 2, and 4 macadamia kernels.

<sup>&</sup>lt;sup>4</sup> Data on processors' sales of macadamia kernels may include imported kernels that have been blended with domestic kernels or it may include sales that were entirely of imported kernels.

<sup>&</sup>lt;sup>5</sup> Import prices are in yen per kilogram in order to avoid false pricing relationships resulting from exchange rate differences.

rate differences. <sup>6</sup> Data reported for Australia in the second quarter of 1989 and the first quarter of 1990 may reflect errors in the Japanese trade statistics.

the Japanese trade statistics. <sup>7</sup> G. Edward Schuh, "The Exchange Rate and U.S. Agriculture," American Journal of Agricultural Economics, No. 56 (Feb. 1974), pp. 1-13, and Dallas S. Batten and Michael Belongia, "The Recent Decline in Agricultural Exports: Is the Exchange Rate the Culprit?" Review, No. 66 (Oct. 1984), pp. 5-14.

Table 5-1	• • • I	
Macadamia nut bulk kernels:	Sales price, by processors and importers,	by guarters, 1987-91

Seller type and quarter	1987	1988	1989	1990	1991		
	Unit value (dollars per kilogram)						
Processor:	,				······································		
January-March	9.09	12.64	13.19	13.29	11.09		
April-June	11.38	12.15	12.60	12.91	10.53		
July-September	11.37	12.97	13.44	12.33	10.21		
October-December	12.13	13.51	13.47	11.88	10.03		
Importer:							
January-March	13.07	16.81	14.84	15.71	9.81		
April-June	13.52	15.04	16.87	13.45	8:67		
July-September	13.92	15.29	16.58	13.08	8.32		
October-December	16.29	16.68	15.13	12.32	8.52		
Weighted average:							
January-March	9.61	. 13.87	13.63	13.66	10.55		
April-June	11.96	12.54	13.35	13.05	9.71		
July-September	12.30	13.75	14.72	12.65	9.47		
October-December	12.88	14.15	14.15	12.02	9.29		
		-	Unit value price				
		differen	itial (dollars per ki	logram)			
Processor less importer:				·			
January-March	-3.98	-4.17	-1.29	-2.42	1.28		
April-June	-2.14	-2.89	-4.27	-0.54	1.86		
July-September	-1.92	-2.32	-3.43	-0.75	1.89		
October-December	-4.16	-3.17	-1.66	-0.44	1.51		

Source: Compiled from data submitted by three processors and eight importers in response to questionnaires of the U.S. International Trade Commission.

#### Figure 5-3

Macadamia nut bulk kernels: Sales price by processors and importers, by quarters, 1987-91



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

### Table 5-2

Japanese macadamia nut imports: Unit values for fresh or dried kernels, by countries, by quarters, 1987-91

	•	(in 1,000 yen per	kilogram	) <u>a</u> 1 a	• • •	
Origin and quarter	1987	1988		1989	1990	1991
Australia: January-March April-June July-September October-December	1.68 1.69 1.61 1.79	(1) (1) 1.64 1.97		1.68 .89 1.96 1.86	0.67 1.98 1.71 1.32	1.55 1.51 1.44 1.25
United States: January-March April-June July-September October-December	1.89 1.82 ( <sup>2</sup> ) 1.77	(1) (1) 1.45 1.68		1.78 1.92 2.20 2.08	1.99 1.99 1.93 1.52	1.59 1.57 1.45 1.40
Kenya: January-March April-June July-September October-December	.95 .94 1.00 .95	(1) (1) .96 .95		.98 1.20 1.18 1.15	1.11 1.30 1.23 1.09	1.11 1.18 1.13 1.07

<sup>1</sup> Not available.
 <sup>2</sup> Not applicable; there were no imports during this period.

Source: Government of Japan, Exports and Imports, Commodity by Country.

#### Figure 5-4 Macadamia nut bulk kernels: Japanese unit import values, by countries, by quarters, July 1988--December 1991



Source: Government of Japan, Japan Exports and Imports, Commodity by Country.

dollars.<sup>8</sup> Thus, changes in the value of the dollar relative to the currencies of other suppliers and importers may be reflected in the profits of producers or traders or in the dollar prices of imported or exported agricultural goods.<sup>9</sup> For example, in the U.S. market an increase in the value of the dollar may result in higher profits for foreign suppliers to the United-States when those suppliers exchange dollars received for export into local currency. However, rising profits may allow foreign exporters to lower their dollar prices in the United States in order to expand sales and capture market share.

Quarterly exchange rate data reported by the International Monetary Fund indicate that Australia's

<sup>8</sup> To reduce risk, contracts are made in dollars and dollar values may be hedged in foreign-exchange markets. In interviews by the Commission staff,

Mr. Rick Vidgen of MacFarms of Hawaii reported that all of MacFarms' exports, including those from Australia, are invoiced in dollars. Also, Dr. Herster Barres, vice president, Macadamias de Costa Rica, reported that Costa Rican exports are also invoiced in

dollars. <sup>9</sup> Cathy L. Jabara and Nancy E. Schwartz, "Exchange Rates and Commodity Prices: The Case of Japan," 5.22 American Journal of Agricultural Economics, vol. 69, No. 3 (Aug. 1987).

currency was generally higher in nominal value than the U.S. dollar at the end of 1991 than at the beginning of 1987 (table 5-3). The strong Australian dollar, relative to the U.S. dollar, suggests that exchange rate changes contributed to reduced Australian profits on macadamia nut sales to the United States and thus to a decrease in Australia's competitiveness in the U.S. · market.

The currencies of Costa Rica and Guatemala, however, were lower in nominal value at the end of 1991 than at the beginning of 1987. The dollar values of these currencies in 1991 were roughly one-half their 1987 values. Although the data suggest that exchange rate changes contributed to increased competitiveness for products from these countries in the U.S. macadamia nut market, the increase may not have been as significant as the exchange rate changes indicate. The rapid devaluations that occurred in these countries were accompanied by higher real interest rates and reduced capital availability. Thus opportunities for producers from these countries to expand sales into the U.S. market may have been more limited.<sup>10</sup>

<sup>10</sup> Dr. Herster Barres of Macadamia of Costa

Rica/USA, conversation with USITC staff, Aug. 20, 1992.

#### Table 5-3

Exchange rates:<sup>1</sup> Indexes of nominal exchange rates of selected currencies in specified countries, by guarters, 1987-91

Ś

January-March 1987 = 100							
Period	Aus- tralia	Costa Rica	Guate- mala	Japan			
1987: Martin and the second second second second	an an an an	e ngen og over	م با م مو				
January-March	100.0	100.0	100.0	100.0			
April-June	106.4	96.8	100.0	107.4			
July-September	106.4	93.7	100.0	104.3			
October-December	104.9	88.7	100.0	112.8			
1000		•		•			
	107.0	01.6	100.0	110.7			
	107.2	. 01.0	100.0	101.0			
April-June	110.0	/9.3	97.3	121.9			
	105.0	77.3 75 A	. 92.4	114.0			
Octobel-Decembel	,25.0	j <b>/3.4</b>	92.4	122.3			
1000							
1909. Japuani March	106.0	74 4		110.0			
April- lupo	115 0	; 72 <b>E</b>	. 92.0	119.2			
April-Ourie	112.5	73.0	92.0	1076			
	110.0 V	72.0	91.1	107.0			
	110.4	71.1	80.1	107.1			
1990:							
January-March	114.1	69.7	67.5	103.6			
April-June	114.5	67.4	58.5	98.7			
July-September	120.5	63.7	51.3	105.5			
October-December	116.6	59.6	49.0	117.1			
	:						
1991:							
January-March	116.0	54.2	50.5	114.4			
April-June	115.0	49.5	49.7	110.7			
July-September		46.7	49.2	111.7			
October-December	116.5	44.7	48.2	118.3			

<sup>1</sup> Exchange rates expressed in U.S. dollars per unit of foreign currency.

Source: International Monetary Fund, International Financial Statistics, Mar. 1990 and Aug. 1992.

On the export side, quarterly exchange rate data indicate that Japan's currency was higher in nominal value relative to the dollar at the end of 1991 than in early 1987. These data suggest that prices of all agricultural commodities that are invoiced in dollars and imported by Japan became more competitive in the Japanese market. However, because exports from different countries may be invoiced in dollars, the effect on U.S. competitiveness relative to other exporters is not clear. The dollar's fall against Australia's currency during the same period suggests that exchange rate changes increased U.S. competitiveness relative to Australia in the Japanese market.

# **Costs of Production**

### **Price-cost relationships**

Most studies of the cost of production for agricultural enterprises define cost of production to include total production expenses (cash operating expenses, taxes, interest, and capital consumption) divided by total physical production.<sup>11</sup> These studies do not include principal payments, income taxes, in-kind receipts, capital appreciation, changes in inventories, or the contribution of unpaid labor by the farm operator and family members, all of which are recognized in an accounting framework or financial. analysis. Two cost categories are involved in the production of macadamia nuts: the initial fixed investment costs and the variable cash costs involved in current production. Fixed investment costs, in any given production period, are costs that do not vary with the level of output, whereas variable costs are incurred only if production is carried on. Analysis of fixed costs is important for long-run competitiveness because the level of such costs affects the rate at which growers can expand capacity or leave the industry.

As in many tree crop industries, the high initial orchard investment and the relatively low maintenance cost thereafter keep many growers in business during price declines. Once an orchard is in place, the variable (maintenance) costs, such as labor, pesticides, and fertilizer, are the principal determinants for continued harvest; prices viewed by growers must cover these costs and provide some return on the initial macadamia investment to make harvest worthwhile over the long term. The nature of the industry dictates that there must be extended periods of poor returns before a substantial number of individual growers will exit, causing supply to decline and prices to rise again.

Average fixed and variable (maintenance) costs for macadamia nuts in the United States and Australia are presented in the following sections. However, any comparison of average costs of production is subject to a number of limitations.<sup>12</sup> For example, reported average industry costs do not take into account differences in production methods among growers or how growers would be expected to change their production methods and input mix in response to changes in output prices.<sup>13</sup> Whereas production costs for macadamias vary from grower to grower and from region to region, U.S. (Hawaiian) and Australian industry sources indicate that the current average costs of production for macadamia nuts are relatively similar in both of these countries.

### Fixed investment costs

Initial capital costs for a macadamia orchard include land, trees, and equipment, which may or may not include irrigation equipment. Land costs in Hawaii and Australia again vary from region to region but are similar and in the range of \$7,413 to \$29,652 per hectare for undeveloped land.<sup>14</sup> Two 1989 studies, one on Australian costs and returns in Queensland and one on costs and returns in Hawaii, provide a basis for additional comparisons of orchard establishment costs (table 5-4).<sup>15</sup> The latter study estimated orchard establishment costs per hectare to be \$6,378 for all sizes of macadamia farms. The costs included land clearing, layout, nursery stock, initial fertilizer, weed control, and miscellaneous expenses. Nursery stock was valued at \$8.00 per tree.

The Australian study, which broke down capital costs only to "trees," "establishments," and "sundry,"<sup>16</sup> estimated the cost of establishment per hectare for a 20-hectare farm at \$6,075, with nursery stock costs at \$10 per tree. Because Australian and U.S. macadamia nut yields on mature trees are approximately the same, investment costs for macadamia production on a per-unit quantity basis are also very similar.

<sup>13</sup> Agricultural industries in general are considered by economists to be increasing cost industries; that is, it costs more to produce the last unit of production than the average unit of production. Ibid.

average unit of production. Ibid. <sup>14</sup> Mr. Keith Ainsbury, consultant and former general manager, Macadamia Plantations of Australia, May 12, 1992. transcript of the hearing, p. 79:

1992, transcript of the hearing, p. 79; Mr. Rick Vidgen, president, MacFarms of Hawaii, May 12, 1992, transcript of the hearing, p. 132. Data have been changed from dollars per acre to dollars per hectare.

<sup>15</sup> Frank S. Scott, Jr., and others, "Economics of Macadamia Nut Production in Hawaii," College of Tropical Agriculture and Human Resources, University of Hawaii, Dec. 1989. Richard K. Thew, Gymple Vock, and Noel T. Vock, "Queensland Macadamia Nuts, Costs and Returns," Queensland Department of Primary Industries, Oct. 1989.

Oct. 1989. <sup>16</sup> Includes materials, machinery, and labor for the planting and fertilizing of windbreak trees, deep ripping, leveling, and the establishment and fertilization of a green manure crop.

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<sup>&</sup>lt;sup>11</sup> Cost of Production, Major Statistical Series of the U.S. Department of Agriculture, USDA-ERS Agricultural Handbook Number 671, vol. 12, rev. Mar. 1992, p. 4.

 <sup>&</sup>lt;sup>12</sup> Jerry A. Sharples, "Cost of Production and Productivity in Analyzing Trade and Competitiveness," *American Journal of Agricultural Economics*, vol. 72, No. 5 (Dec. 1990), pp. 1278-1282.

# Table 5-4 Macadamia nuts: Orchard establishment costs per hectare in Hawaii and Australia, 1989

Item	Hawaiian cost1	ltem	Australian cost
Land clearing, ripping		Trees \$	\$3,584
and leveling	\$4,077	Establishment (initial	
Preplanting, weed		site preparation,	•
control material:		planting, and	0.004
Glypnosate			2,091
	148	Sundry	400
	40		
Labor (tractor driver)	35		6,075
Layout & dig basins:			
Iractor (fuel & oil)	119		
Labor (tractor driver)	104		
Labor (layout & misc.)	25		
Planting:			
Nursery stock	988		
Truck (hauling material)	40		
Labor (truck driver)	35	,	
_ Labor (planting)	99		•
Fertilizer:	_		
Materials	7		
	25.		
Misc. materials	7		
Labor, indirect	49		
Management	580		
Total	6,378		

<sup>1</sup> Data were converted from dollars per acre to dollars per hectare.

<sup>2</sup> Australian dollars were converted to U.S. dollars using the 1989 exchange rate of .87052490 Australian to U.S. dollars.

Source: Frank S. Scott, Jr., and others, "Economics of Macadamia Nut Production in Hawaii," College of Tropical Agriculture and Human Resources, University of Hawaii, Dec. 1989. Richard K. Thew, Gymple Vock, and Noel T. Vock, "Queensland Macadamia Nuts, Costs and Returns," Queensland Department of Primary Industries, Oct. 1989.

Although the U.S. and Australian studies show the initial investment costs to be roughly equal, the interest rates at which the investments are financed represent a significant cost to the grower.<sup>17</sup> Real interest rates (market interest rates less the annual rate of inflation) in Australia and in the United States during 1977-91 are shown in figure 5-5. $^{18}$  As shown, Australian real interest rates were lower than real interest rates in the United States between 1979 and 1983; however, since 1984, U.S. rates have been lower than Australian rates. Low real interest rates would encourage the expansion of industries that require high initial investments, such as macadamia orchards, as there is little cost after inflation to borrowing money. In general the effects of low interest rates would influence production levels in the longer 6- to 8-year period, given the time needed for macadamia nut trees to mature. This effect can be seen in the rapid increases of Australian

production from 1983 to 1990, corresponding to the low or negative real interest rates between 1977-83.

### Variable production costs

The 1989 studies found annual production costs per hectare for an established macadamia orchard in Hawaii to be very close to the costs in Australia: \$3,788 and \$3,738, respectively (table 5-5).<sup>19</sup> The yields for established orchards in both countries were similar at 7,283 kilograms wet-in-shell (WIS) per hectare in Hawaii and 7,020 kilograms WIS in Australia.<sup>20</sup> The annual costs per kilogram of

yields. <sup>20</sup> Hawaiian WIS is generally calculated at 20-percent moisture, and Australian is calculated at 10-percent moisture. The Australian yields have been adjusted to 20-percent moisture to make comparison more meaningful.

<sup>&</sup>lt;sup>17</sup> Even if growers were to finance investments with their own funds, the funds invested in macadamia production would have an interest cost equal to the rate that could have been earned as an alternative investment.

<sup>&</sup>lt;sup>18</sup> Interest rate comparisons are based on lending rates as reported by the International Monetary Fund. Real interest rates are reported to account for differences in inflation that could cheapen the relative cost of loans over time.

<sup>&</sup>lt;sup>19</sup> While the studies were not directly comparable in all aspects, there were orchard costs common to both. These costs were used as the basis of the comparison. Furthermore, Hawaiian costs were estimated at a density of 124 trees per hectare and the Australian costs were calculated at 312 trees per hectare. While in the early years of production, the difference in tree density would make Australian yields higher, in a mature orchard the density difference would result in little difference in yields.



Figure 5-5 Real Interest rates in the United States and Australia, 1977-91

Note.—Real interest rates calculated on "Lending Rate" and "Consumer Prices" as reported by the International Monetary Fund (IMF).

Source: USITC calculations based on data from the International Monetary Fund, International Financial Statistics.

macadamia nuts WIS were \$0.52 for Hawaii and \$0.53 for Australia.

The Hawaiian costs included weed and pest control, fertilizer, leaf removal, hand harvesting, and husking, sorting, and drying for a mature 20-hectare farm. Labor accounted for the largest single part—65 percent—of annual expenses for Hawaii, with the major portion of the labor expenses consisting of hand harvesting. Weed and pest control and husking, sorting, and drying expenses were approximately 28 percent of the expenditures considered. Annual maintenance costs per hectare were found to decline in the study with an increase in farm size. The decline in costs can be attributed to economies of scale and the use of machine harvesting on the larger orchards.

Australian annual macadamia production cost for disease and insect control, weed control, fertilizer, mulching, machine harvesting, and postharvest handling for an average 10-year-old orchard was approximately \$3,738 per hectare.<sup>21</sup> Overall labor accounted for only 16 percent of yearly operational costs, largely because the relatively flat terrain of the Australian production areas allows for harvesting by machine. Expenses for disease and insect control were 38 percent of the production cost, while harvesting,

<sup>21</sup> Irrigation costs, which were not included in the Hawaiian study, may add up to \$300 per hectare, raising the annual production costs to \$4,038.

including labor, was only 13 percent of annual considered expenditures.

Mr. Rick Vidgen of MacFarms, which has growing operations in both Australia and Hawaii, indicated in testimony to the Commission that current production costs in Australia and Hawaii are approximately \$1.54 and \$1.48 per kilogram, respectively. Mr. Vidgen cites higher cultural care, irrigation, and husking costs in Australia but lower harvesting cost due to mechanized harvesting and lower tree depreciation costs in Australia than in Hawaii, as shown in the tabulation below (in dollars per kilogram):<sup>22</sup>

	Australia	Hawaii
Cultural care	0.22	0.15
Nutrition and pest		
control		26
Harvoet	40	
	.40	.43
irrigation	.09	(')
Husking	.13	.07
Fouriant depreciation		
and orchard overheads	•	
and orchaid overheads		~~
Including land tax		.22
Tree depreciation	11	18 .
General & administrative		
	44	44
expenses		.11
Total	1.54	1 40
	1.04	1/.40

<sup>1</sup> No allowance was made in these estimations for irrigation.

<sup>22</sup> The lower depreciation costs in Australia result from differing methods of depreciation.

#### Table 5-5

Macadamia nuts: Annual orchard production costs per hectare in Hawaii and Australia, 1989

ltem	Hawaiian <sup>1</sup> cost	ltem	Australian <sup>2</sup> cost
Weed control:		Disease and	
Glyphosate	\$278	insect control	\$1,400
Atrazine	18	Machinery	21
Paraquat	49	Labor	20
Tractor & spraver	59	Weed control	39
Labor. driver	52	Machinery	10
Labor, field	(3)	Labor	10
Rat control:	()· · ·	Fertilizer	580
Materials	37	Machinery	37
Labor	24	Labor	34
Fertilizina:	•	Mulching	394
16-16-16	623	Machinery	7
Tractor fuel & oil	40	Labor	7
l abor, driver	35	Harvesting (machine):	•
Labor, field	(3)	Machinery	402
Leaf removal:	an B. Astrony and	Labor	142
Tractor & leaf remover	79	Post harvest handling:	
Labor driver	69	Machinery	265
Labor field	(3)	Labor	369
Harvesting hand			
Pickup fuel & oil	138	Total	3 738
Labor driver	138	······································	0,700
Labor, field	1 606		
Husking & sorting:	.,		
Husker	62		
Labor	370		
Drying & sorting, labor	111		
Total	3,788		

<sup>1</sup> Data were converted from dollars per acre to dollars per hectare.

<sup>2</sup> Australian dollars were converted to U.S. dollars using the 1989 exchange rate of .87052490 Australian to U.S. dollars.

<sup>3</sup> Not available.

Source: Frank S. Scott, Jr., and others, "Economics of Macadamia Nut Production in Hawaii," College of Tropical Agriculture and Human Resources, University of Hawaii, Dec. 1989. Richard K. Thew, and Gymple Vock, and Noel T. Vock, "Queensland Macadamia Nuts, Costs and Returns," Queensland Department of Primary Industries, Oct. 1989.

# Production costs of other *exporters*

The U.S. Department of State in Costa Rica reports that production costs for macadamias in Costa Rica are considerably lower than those in Australia and Hawaii. Costs in the initial investment year are reported to be \$1,650 per hectare, approximately one-quarter of the startup costs in Australia or Hawaii, according to a 1992 U.S. Department of State report.<sup>23</sup> Yearly operational costs (by year 10) are estimated to be \$1,200, around one-third of the annual costs of Australian or Hawaiian operations. However, at 5,000 kilograms WIS per hectare, yields per hectare are reported to be lower than those of Australia or Hawaii.<sup>24</sup> Although specific data are not available, it is believed that the significant differences between Australian and Hawaiian startup costs and annual

operational costs and those in Costa Rica result from lower Costa Rican land values and wage rates.

A Brazilian study, "Macadamia," found the cost associated with nursery stock and installation of drip irrigation to be around \$2,500 per hectare.<sup>25</sup> Annual costs associated with the operation of a 2- to 5-year-old orchard in Brazil are reported to be \$2,222 per hectare. However, the study did not take into account the cost of land or equipment. Furthermore, the orchards considered were not mature producing orchards, and large-scale harvesting (labor), husking, and drying expenses were not included in the annual costs.

# **Demand Factors and Industry Growth**

A number of demand-related factors influence the ability of growers and firms in the macadamia nut

<sup>&</sup>lt;sup>23</sup> U.S. Department of State, June 1992, San Jose, message reference No. 162256Z. <sup>24</sup> Barres conversation.

<sup>&</sup>lt;sup>25</sup> Ezio Sena de Oliveira, Marcelo Ribeiro do Val. Patricia Camargo Neves, and Laerte F. Santos Filho, "Macadamia," submission to the U.S. International Trade Commission.

industry to expand sales and to increase their presence in international tree nut markets. Factors such as tourism, product quality, and market development are described below.

# Effects of Changes in Tourism

Tourist purchases of macadamia nut products are a major market outlet in both Hawaii and Australia. Many industry sources attribute price declines in late 1990 to early 1991 to a decline in overall tourism to Hawaii and decreased Japanese visits to Australia during the same period.<sup>26<sup>1</sup></sup> A representative from a major retailer of macadamia nuts in Hawaii noted that his sales declined in conjunction with the fall in tourism.<sup>27</sup> Table 5-6 shows the decline in tourism, compared with the previous year, for the period from December 1990-April 1991 in Hawaii, and the February-March 1991 decline of Japanese visitors to Australia. Although declines in the actual number of tourists occurred for a relatively short period, the growth rate of tourist visits in 1991 was slower than in 1990 for almost every month. Suppliers may have based production and sales projections of retail product demand on the historically higher growth rates for visitors. Sales below expectations may have led to a buildup of inventory at both the retail and supplier levels, which caused further downward pressures on prices.

## Quality Considerations

Hawaii has established standards for all in-shell and shelled macadamia nuts grown in Hawaii. In particular Hawaii has established a standard for Hawaii No. 1 shelled macadamia nut kernels that serves as the de facto world standard. To qualify as No. 1, macadamia kernels must be well developed, clean, and dry; must be free from loose extraneous material, mold, decay, insect infestation, or rodent injury; mustnot be off-odor or off-flavor by any cause, hollowcenter, or have been damaged by any other means. The average moisture content of the kernels cannot exceed 1.5 percent, by weight. The standard also provides for. eight styles of Hawaii No. 1 kernels. Styles refer to various size, classifications (i.e., wholes, halves, chips, fines, etc.) that are permitted as a percentage of a given lot.

Since there are no U.S. standards of identity for imported macadamia kernels, the Commission's staff contacted purchasers of imported macadamia kernels to ascertain if there are quality differences between domestically produced and imported macadamia kernels. In general respondents stated that there was little, if any, difference in the quality of Hawaiian and Australian macadamia kernels. Some respondents stated that they preferred the Australian product; others stated that they preferred the Hawaiian product. With respect to macadamia kernels from other sources. Costa Rican kernel was rated below that from Hawaii and Australia, however, there were numerous responses in which Costa Rican kernels were rated as having the same quality as Australian and Hawaiian kernels. Several respondents stated that the quality of Costa Rican kernels had improved over the last several years. The quality of kernels from Guatemala, Brazil, and Africa were usually noted by respondents as being inferior to the quality of macadamia kernels from Australia and Hawaii.

An industry representative stated that there are some manufacturers who prefer an Australian kernel because it has a slightly higher sugar content and therefore tastes a little sweeter. Also, the Australian kernel tends to be whiter.<sup>28</sup>

## Market Development

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Market development by the Hawaiian industry generally occurs on a company-by-company basis, as the only industry association, the Hawaiian Macadamia Nut Association (HMNA), does not have the financial resources at this time to engage in large-scale generic promotion of Hawaiian macadamia nuts.<sup>29,30</sup> U.S. companies have focused on eliminating some of the intermediate marketing steps in exporting to foreign markets and have focused on value-added services such as special styles, roasts, and specialty products (sliced and diced) in developing and expanding markets in export destinations such as Japan and the European Community.

The State of Hawaii has engaged in some macadamia promotion at national and international trade shows. These promotions have generally consisted of displays touting macadamias and their association with Hawaii, as well as informational brochures on macadamias.

<sup>&</sup>lt;sup>26</sup> Macadamia Plantations of Australia Pty. Ltd., May 6, 1992, p. 7; Macadamia Processing Co. Ltd., May 8, 1992, p. 19; Macadamia of Costa Rica/USA, Inc., May 28, 1991, p. 2; Suncoast Gold Macadamias, May 21, 1992, p. 3; submissions to the Commission. Mr. William L. Goulding III, Kona Gold Macadamia Nuts; Mr. James Kendrick, executive vice president of operations, Mauna Loa Macadamia Nut Corp.; transcript of the hearing, Kailua-Kona, HI, Apr. 22, 1992. Ainsbury testimony.

<sup>&</sup>lt;sup>27</sup> Mr. Jerry Imai, executive buyer of ABC Stores, interview by USITC staff, Honolulu, HI, Apr. 27, 1992.

<sup>&</sup>lt;sup>28</sup> Mr. Rick Vidgen, president in charge of marketing, MacFarms of Hawaii, transcript of the hearing, Keilus Kong, HI. Am. 22, 1992, p. 145

Kailua-Kona, HI, Apr. 22, 1992, p. 145.

<sup>&</sup>lt;sup>29</sup> The HMNA is studying the feasibility of a Federal marketing order with an assessment for promotional activities.

activities. <sup>30</sup> Mr. Mark Crawford, president, Hawaii Macadamia Nut Association, transcript of hearing, May 12, 1992, Washington, DC, p. 125.

### 5-12 Table 5-6 Total visit

### Total visitors to Hawali and Japanese visitors to Australia, 1989-91

	Total visitors to Hawaii				Japanese visitors to Australia					
Month	1989	1990	1991	Change from 1989 to 1990	Change from 1990 to 1991	1989	1990	1991	Change from 1989 to 1990	Change from 1990 to 1991
	1,000 visitors		percent		1,000 visitors			percent		
January February March April May June July September October November December	561 526 597 508 495 602 618 641 496 498 520 580	581 544 590 561 541 623 669 694 517 535 538 579	539 433 538 544 552 631 685 708 565 534 542 602	4 3 -1 11 9 3 8 8 4 8 3 0	-7 -20 -9 -3 2 1 2 2 9 0 1 4	30 32 30 25 24 29 31 28 28 29 31 28 29 35	38 40 42 35 34 38 44 42 43 37 40 48	47 37 38 38 39 50 45 46 49 47 58	29 23 29 25 37 60 50 34 54 40 38 36	22 -8 -12 9 12 3 14 7 7 30 16 21
Total	6,641	6,971	6,874	5	-1	349	478	529	37	10

Note .-- Totals and percentages may not add due to rounding.

Source: Hawaiian statistics from the Market Research Department of the Hawaii Visitors Bureau. Australian statistics from the Australian Bureau of Statistics.
Domestic Australian market promotions have occurred through the Australian Macadamia Society (AMS), a nonprofit organization founded in 1973 to promote the Australian macadamia industry.<sup>31</sup> The AMS promotes the Australian industry using a levy of A\$0.025 per kilogram on macadamias. The levy, which contributes to the funding of AMS research projects, also pays for promotions in the domestic market, such as cooking shows, and for the dissemination of recipes through national publications. Additionally, the AMS has funded research work on the relationship of macadamias to lower blood

<sup>31</sup> The AMS estimates that 85 percent of Australian macadamia growers, representing 96 percent of production, are members of the AMS.

cholesterol, information that may be used to expand the macadamia market into the health food market.

Foreign market development by the Australian industry has consisted of initiatives such as quality-assurance schemes and the subsequent development of an internationally recognized quality standard, both sponsored by the AMS. The AMS also sponsors foreign marketing development programs/seminars for the domestic industry. However, the majority of marketing initiatives are done on an individual basis by the exporting firms. Although most exporting firms develop specialty packs and products and participate in trade shows, more specific marketing development schemes are unique to each company and are kept confidential.

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### CHAPTER 6 Principal Findings

### An Industry in Transition

The U.S. macadamia nut industry is currently undergoing a rapid transformation due to changes in the supply, uses, and sources of macadamia nuts. The industry, which has traditionally been concentrated in Hawaii, is becoming much more global. The ability to adapt to a changing environment and to influence the direction of future changes will determine which firms are competitive in the industry. This section summarizes the changes that are occurring in the industry and the implications for competitiveness that arise as a result of market globalization.

### World Supplies

World macadamia production has nearly doubled in the last 10 years, climbing from 20,320 metric tons wet-in-shell (WIS) in 1982 to 39,133 metric tons in 1991. It is likely that WIS production will nearly double again in the next 10 years, even without significant new plantings, as existing trees mature and increase their output. Most of the increase in production in the last 10 years was accounted for by countries outside the United States. Moreover, over the last 5 years, plantings in South Africa, Costa Rica, Guatemala, and Brazil combined have significantly outpaced those of the United States and Australia (figure 1-4), suggesting that these African and Latin American countries will increase their share of world production considerably in the future. Even in spite of the recent price declines, macadamia nuts have outperformed the available crop alternatives of coffee and sugar over the last 15 years. For example Guatemala has doubled the plantings of macadamias in the past 2 years—a trend that indicates that growing macadamia nut trees remains more economically viable than the previous uses of the land. Therefore, the period of expansion may not be over yet in many of the African and Latin American countries. Regardless of future world plantings, Hawaii's share of the world market is likely to continue to decline because of producing existing plantings of and soon-to-be-producing trees in the rest of the world.

#### World Markets

Another result of increased production has been the globalization of the end-user markets. Traditionally the main market for macadamia nut products was in Hawaii (which was also the main producer). As growth in demand for macadamia nut products in Hawaii has slowed, possibly indicating that the local market for current macadamia products is saturated, producers of macadamia kernels and kernel-containing products have attempted to develop and expand new markets elsewhere in the world. These efforts have been most successful in the mainland of the United States and Pacific Rim countries, particularly Japan.

The high income elasticity estimated for macadamia nuts reflects the narrow niche market status that the macadamia nuts and nut products occupied when consumption was limited primarily to roasted snack nuts and chocolate-covered kernels.<sup>1</sup> Given the slowing of income growth in 1991 throughout the major markets in the world, the macadamia nut market did not expand at its traditional rate at existing price levels. Additionally, as macadamia nut prices fell significantly in 1990 and 1991, the macadamia nut market broadened considerably as producers found more users beyond the snack nut users in the United States and worldwide.

The current lower prices have allowed macadamia nuts to be more affordable to more users. It is also likely that demand is more elastic because lower macadamia nut prices make macadamias more easily substitutable for other nuts. Such substitutability makes demand more responsive to price changes. The market will expand in areas where the high cost of macadamia nuts contributes a small amount (relative to other food and nut ingredients) to the final product price. Examples where macadamia nuts are used as a component of larger products include nut mixes, baked goods, and confectionery and other food products. The ability to develop these markets will be the key to ensure the future expansion of the industry without more significant price declines.

<sup>&</sup>lt;sup>1</sup> Bambang Cahyono, "The Economic Feasibility of Import Barriers to Protect the Hawaii Macadamia Industry."

### Implications for Competitiveness

The near-doubling of world production of macadamia nuts and the rapid expansion of world markets have placed tremendous pressure on the industry. The entry of many new producers and end users of macadamia nuts has forced existing producers to become more competitive and innovative. Therefore, competitiveness in the macadamia nut industry ultimately depends on how firms and government policies adjust to change. Those industry players that prepare for a changing competitive environment by developing a range of products that meet the tastes of the individual markets will likely succeed; those who do not will be left behind.

Even though the share of world macadamia nut production being produced in Hawaii will decline, output in absolute quantity terms will continue to grow rapidly, as over one-half of the trees in Hawaii are under 14 years of age. Kernel yields per hectare in Hawaii are significantly higher than in Latin American and African countries, even when maturities are taken into account. These yield differentials help offset the lower costs of land and production per hectare in other supplying countries and may keep the cost per kilogram for raw kernels close enough for Hawaii to continue to be competitive for the foreseeable future.

As noted in table 2-2, farm production by the three major Hawaiian processors-Mauna Loa, MacFarms of Hawaii, and Hawaiian Host-will represent a declining share not only of world WIS production, but also a declining share of Hawaiian production. This decline implies that the major processors will shift their emphasis from growing operations to the processing and marketing of macadamia nut products. In addition, the increase in production in the rest of the world will mean that the Hawaiian processors will likely lose world market share. One way these firms have mitigated the loss of market share is through value-added processing and marketing of imported macadamia kernels to the mainland United States and the rest of the world. Producers will also need to continue the promotion of macadamia nuts and nut products to new end users and to assist in developing new product uses.

## APPENDIX A LETTER OF REQUEST FROM THE UNITED STATES SENATE COMMITTEE ON FINANCE

#### LLOVO BENTEEK, TEXAS, CHARMAN

DANEL FATER ADDITIONAL NEW YORK MAR GAUCUS, MONTANA MAR GAUCUS, MONTANA BIL GARDLEY, MEW JERSTY GEORGE J. MITCHEL MAND FRYOR, ARLANSAS DAND FRYOR, ARLANSAS DONALS W. NEGLE J. D., MICHEDAN JOHN D. ROCESTLLER W. WEST VROIMA FOM DASCHL SOUTH GAKOTA GUN BRACHL LOUSIANA BOB PACKWOOD, ORBHIN BOB DOLE, EAREAS WILLIAM Y, ROTH, AR, DELAWARE JOHN C, DAMPORTH, MISSOUR JOHN K, CHAFEL INDOE ISLAND DAYE DURABERERED. UMINEGOTA STEVE SYMMES, EDAHO CHARLES E, GAASSLEY, KIWA CHARLES E, GAASSLEY, KIWA

VANDA 8. MCMURTRY, STAFF DIRECTOR AND CHIEF COUNSEL EDMUND J. MINALEX, MINDRYY CHIEF OF STAFF Hnited States Senate

COMMITTEE ON FINANCE

November 20, 1991

The Honorable Anne Brunsdale Acting Chairman U.S. International Trade commission Washington, D.C. 20436

Dear Madam Chairman:

It has come to the attention of the Committee on Finance that the U.S. macadamia nut industry is concerned about the competitive factors affecting their industry, including competition from imports from Australia.

In order to assess more fully the nature and extent of these problems, more information is required concerning economic and competitive conditions in the macadamia nut industry. To provide this information, the Committee on Finance requests that the U.S. International Trade Commission conduct an investigation under section 332(g) of the Tariff Act of 1930, as amended (19 U.S.C. 1332(g)), and report on the economic and competitive conditions affecting the macadamia nut industry.

In its investigation, the Commission should, to the extent possible, develop information pertinent to the macadamia nut industry in the United States, including, but not limited to, the following factors:

- A description of the competitive factors affecting the domestic macadamia nut industry, including competition from imports of macadamia nuts;
- (2) A description of the extent to which trade practices and barriers to trade by other competing countries are impeding the marketing of domestically produced macadamia nuts; and
- (3) An analysis of current conditions of trade in macadamia nuts between the United States, Australia, and the rest of the world and any recent changes in such conditions, including information on prices, cost of production, and marketing practices.

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The Honorable Anne Brunsdale November 20, 1991 Page Two

The Committee requests that, in the course of its investigation, the Commission consider holding a public hearing, including consideration of a field hearing, so that industry representatives and other interested parties may present their views.

The Commission is requested to report the results of the investigation by November 13, 1992.

Thank you for your cooperation in this matter.

Sincer Hovd Bentsen Chairman

## APPENDIX B UNITED STATES INTERNATIONAL TRADE COMMISSION'S NOTICE OF INSTITUTION OF INVESTIGATION

#### UNITED STATES INTERNATIONAL TRADE CONDISSION WASHINGTON, DC

#### (Investigation No. 332-320) MACADAMIA NUTS: ECONOMIC AND COMPETITIVE FACTORS AFFECTING THE U.S. INDUSTRY

AGENCY: United States International Trade Commission

ACTION: Notice of institution of investigation and public hearing

EFFECTIVE DATE: December 30, 1991

SUPMARY: Following receipt on November 20, 1991, of a request from the Committee on Finance, United States Senate, the Commission instituted investigation No. 332-320, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) for the purpose of reporting on the economic and competitive conditions affecting the macadamia nut industry.

Hore specifically, as requested by the Committee, the Commission will, to the extent possible, develop information pertinent to the macadamia nut industry in the United States, including, but not limited to, the following factors:

- The competitive factors affecting the domestic macadamia nut growing and processing industry, including competition from imports of macadamia nuts;
- (2) The extent to which trade practices and barriers to trade by other competing countries are impeding the marketing of domestically produced macadamia nuts; and
- (3) Current conditions of trade in macadamia nuts between the United States, Australia, and the rest of the world and any recent changes in such conditions, including information on prices, cost of production, and marketing practices.

The Committee requested that the Commission submit its report not later than November 13, 1992.

FOR FURTHER INFORMATION CONTACT: Stephen Burket (202-205-3318) or David Ingersoll (202-205-3309), Agriculture Division, Office of Industries, or William Gearhart (202-205-3091), Office of the General Counsel, U.S. International Trade Commission. Hearing impaired persons can obtain information on this study by contacting the Commission's TDD terminal on (202)205-1810.

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**PUBLIC HEARING:** A public hearing in connection with this investigation will be held at the U.S. International Trade Commission Building, 500 E Street, SW., Washington, DC., at a time and date to be announced.

WRITTEN SUBMISSIONS: Interested persons may submit written statements concerning the investigation. To be assured of consideration, written statements (original plus 14 copies) must be received by the close of business (5:15 p.m.) May 29, 1992. Commercial or financial information that a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform to the requirements of section 201.6 of the Commission's <u>Rules of</u> <u>Practice and Procedure</u> (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by interested persons. All submissions should be addressed to the Secretary at the Commission's office in Washington, DC.

By order of the Commission.

Kenneth R. Mason Secretary

Issued: December 31, 1991

## APPENDIX C PRODUCTION PROCESSES FOR MACADAMIA NUTS



Source: MacFarms of Hawaii and Mauna Loa Macadamia Nut Corp.





Source: MacFarms of Hawaii and Mauna Loa Macadamia Nut Corp.

APPENDIX D WORLD MACADAMIA PRODUCTION ESTIMATES

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Source: Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," <u>31st Annual Maeting of</u> the Hawaii Macadamia Nut Association, May, 1991.

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## APPENDIX E SUMMARY OF STATE PREFERENTIAL TAX ASSESSMENT LAWS

			Preferential tax
			assessment with
	_	Preferential tax	restrictive
•	Preferential tax	assessment with	agreements and
State	assessment only	deferred taxation	<u>deferred taxation</u>
AL		X	
AK	-	X	
AZ	X .		
AR	X		
<u>CA</u>			X
CO	X		
CT		X	
DE		X	
FL	X	· .	
GA		<b>X</b> .	
HI			X
ID	X		
IL	X		
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KS	X		
KY		X	
LA	X		
ME	· •	X	
MD		X	
MA		X	
MI		· ·	X
MN		X	
MS	X		
MO	X		
MT	X		
NB		X	
NV		X	
NH		X	
NJ		X	
NM	X		
NY		X	
NC		X	
ND	X		
OH		<u> </u>	
OK	X		
OR		X	
PA		X	
RI		x	
<u>SC</u>		X	
SD	X		
TN		X	
TX		X	
UT		X	
<u>vr</u>		<u>X</u>	

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State	Preferential tax	Preferential tax assessment with deferred taxation	Preferential tax assessment with restrictive agreements and deferred taxation
VA		x	
WA		X	
WV	X		
WI			x
<u>WY</u>	X	· · · · · · · · · · · · · · · · · · ·	<u> </u>

Source: J. David Aiken, "State Farmland: Preferential Assessment Statutes," Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, in cooperation with the United States Department of Agriculture, 1989.

# APPENDIX F HAWAII COUNTY CODE PERTAINING TO LAND DEDICATION

#### Section 19-55. Dedicated lands.

(a) A special land reserve is established to enable the owner of any parcel of land within an agricultural district, a rural district, a conservation district, or any urban district to dedicate his land for a specific ranching or other agricultural use and to have his land assessed at its value in such use provided, that if the land is located within an urban district:

(1) A lessee of the land with a term of ten or more years remaining from the date of the petition shall also be deemed an owner of the land within these provisions;

(2) The land dedicated must be used for the cultivation of crops such as sugar cane, pineapple, truck crops, orchard crops, ornamental crops, or the like;

(3) The land dedicated must have been substantially and continuously used for the cultivation of crops such as sugar cane, pineapple, truck crops, orchard crops, ornamental crops, or the like for the five-year period immediately preceding the dedication request; provided further, that land situated within an agricultural district may be dedicated for a period of twenty years and shall be taxed at fifty percent of its assessed value in such use.

(b) If any owner desires to use his land for a specific ranching or other agricultural use and to have his land taxed at its assessed value in this use or fifty percent of its assessed value as the case may be, he shall so petition the director of finance and declare in his petition that his land can best be used for the purpose for which he requests permission to dedicate his land and that if his petition is approved he will use his land for this purpose.

(c) If the owner desires to change from one specific ranching or other agricultural use to another ranching or other agricultural use he shall so petition the director of finance and declare in his petition that:

(1) his land can best be used for a ranching or other agricultural purpose other than that for which he originally requested permission; and

(2) he will use his land for that new purpose if his petition is approved.

(d) Upon receipt of a petition as provided above in subsections (b) and (c), the director shall make a finding of fact as to whether the land in the petition area is reasonably well suited for the intended use. The finding shall include and be based upon the productivity ratings of the land in those uses for which it is best suited, a study of the ownership, size of operating unit, the present use of surrounding similar lands and other criteria as may be appropriate.

The director shall also make a finding of fact as to whether the intended use is in conflict with the overall development plan of the State. If both findings are favorable to the owner, the director shall approve the petition and declare that the owner's land is dedicated land; provided, that for lands in urban districts. the director shall make further findings respecting the economic feasibility of the intended use of the land. If all three findings are favorable, the director shall approve the petition and declare the land to be dedicated. In order to place prospective buyers on notice of the roll back liability, the petitioner shall within thirty days of notice of approval record the dedication in accordance with the procedures of the bureau of conveyances.

(e) The approval by the director of the petition to dedicate shall constitute a forfeiture on the part of the owner of any right to change the use of his land to a use other than agriculture for a minimum period of ten

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years or twenty years as the case may be, automatically renewable indefinitely, subject to cancellation as follows:

(1) In the case of a ten-year dedication, the owner may after the ninth year and years thereafter, give notice of cancellation by filing with the director, a written notice of cancellation, on or before December 31, to be effective as of July 1 of the following tax year:

(2) In the case of a twenty-year dedication, the owner may during the nineteenth year and years thereafter give notice of cancellation as provided by this subsection;

(3) In the case of a change in a major land use classification not as a result of a petition by any property owner or lessee such that the owner's land is placed within an urban district, the dedication may be cancelled within sixty days of the change by the owner. Upon any conveyance or any change in ownership during the period of dedication, the land shall continue to be subject to the terms and conditions of the dedication unless a release has been issued by the director.

Any other provision to the contrary notwithstanding an approved change in use as provided in subsection (c) and (d) shall not alter the original dedication period.

(f) Failure of the owner to observe the restrictions on the use of his land shall cancel the dedication and special tax assessment privilege retroactive to the date of the dedication, but in any event, shall not exceed the term of the original dedication, and all differences in the amount of taxes that were paid and those that would have been due from assessment in the higher use shall be payable with a ten percent a year penalty from the respective dates that these payments would have been due. The additional taxes and penalties, due and owning as a result of a breach of the dedication, shall be a paramount lien upon the property as provided for by this chapter.

(1) Failure to observe the restrictions on the use means failure for a period of twelve consecutive months to use the land in that manner requested in the petition or the overt act of changing the use for any period; provided that a change in land use classification upon petition by the owner of such dedicated lands, or the petition by the owner for a change in use as provided in subsection (c), and the owner's subsequent change in use of such dedicated lands, shall not be deemed to constitute a failure of the owner to observe the restrictions on the use.

(2) If an owner is permitted to change his use as provided in subsection (c) and (d), he shall be allowed up to thirty-six months from the date of the approval of his petition to convert to the new ranching or agricultural use. If the owner fails to make the conversion within the specified time limit he will be subject to the taxes and penalties provided above. For purposes of assessment of taxes and penalties, the conversion period shall be considered in addition to the specified dedication period, except, however, in the case of leased lands whose term expires prior to or in conjunction with the end of the dedication period, the conversion period shall be considered as a part of the dedication period. The petitioner shall submit progress reports of his efforts in converting from one agricultural use to another agricultural use to the director of finance by the anniversary date of the petition approval and yearly, thereafter, as long as such conversion period remains.

Any other provisions to the contrary notwithstanding, when a portion of the dedicated land is subsequently applied to a use other than the use set forth in the original petition, only such portion as is withdrawn from the dedicated use and applied to a use other than ranching or other agricultural use shall be taxed as provided by this subsection.

(g) The director shall prescribe the form of the petition. The petition shall be filed with the director of finance by September 1 of any calendar year and shall be approved or disapproved by December 15. If approved, the assessment based upon the use requested in the dedication shall be effective on January 1 of the next calendar year.

(h) The owner may appeal any disapproved petition as in the case of an appeal from an assessment.

(i) The term "owner" as used in this section includes lessees of real property whose lease term extends at least ten years from the date of the petition in the case of a ten-year dedication or lessees of real property whose lease term extends at least twenty years from the date of the petition in the case of a twenty-year dedication.

(j) The term "agricultural use" as used in this section shall include aquaculture.

(k) A special land reserve is established to enable the owner of any parcel of land within an urban district to dedicate his land for a specific livestock use such as feed lots, calf-raising and like operations in dairy, beef, swine, poultry and aquaculture, but excluding grazing or pasturing, and to have his land assessed at its value in such use; provided, that

(1) A lessee of the land with a term of ten or more years remaining from the date of the petition shall also be deemed an owner of the land within these provisions;

(2) The land dedicated must be used for livestock uses such

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payments would have been due: Failure to observe the restrictions on the use means failure for a period of over twelve consecutive months to use the land in that manner requested in the petition as a golf course by the overt act of changing the use for any period. Nothing in this paragraph shall preclude the County from pursuing any other remedy to enforce the covenant on the use of the land as a golf course.

(D) The director of finance shall prescribe the form of the petition. The petition shall be filed by September 1 of any calendar year and shall be approved or disapproved by December 15 of such year. If approved, the assessment based upon the use requested in the dedication shall be effective on January 1 of the next calendar year.

(E) The owner may appeal any disapproved petition as in the case of an appeal from an assessment.

(F). The term "owner" as used in this section includes lessees of real property whose lease term extends at least ten years effective from the date of the petition.

(G) The amount of additional taxes due and owing where the owner has failed to observe the restriction on the use shall attach to the property as a paramount lien in favor of the County as provided for by this chapter.

(2) Covenant not to engage in discrimination. The owner shall covenant in his petition with the director of finance that he will not discriminate against any individual in the use of the golf course facilities because of the individual's race, sex, religion, color or ancestry. (1981, Ord. No. 613, sec. 60.)

Section 19-58. Certain lands dedicated for residential use.

(a) The term "owner" as used in this section means a person who is the fee simple owner of real property, or who is the lessee of real property whose lease term extends at least ten years from the date of the petition. as feed lots, calf-raising and like operations in dairy, beef, swine, poultry and aquaculture but excluding grazing or pasturing;

(3) The land dedicated must have been substantially and continuously used in the livestock uses.enumerated in (2) hereinabove;

(4) And such livestock use must be compatible with the surrounding uses. (1981, Ord. No. 613, sec. 58; Am. 1984, Ord. No. 84-21, sec. 2.)

Section 19-56. Golf course assessment. Property operated and used as a golf course shall be assessed for property tax purposes on the following basis:

The value to be assessed by the director shall be on the basis of its actual use as a golf course rather than on the valuation based on the highest and best use of the land.

In determining the value of actual use, the factors to be considered shall include, among others, rental income, cost of development. sales price and the effect of the value of the golf course on the value of the surrounding lands. (1981, Ord. No. 613, sec. 59.)

Section 19-57. Conditions precedent to special assessment of land as golf course. In order to qualify in having land assessed in valuation as a golf course the owner of any parcel of land desiring or presently using his land for a golf course shall as a condition precedent qualify as follows:

(1) Dedication of land.

(A) The owner of any parcel of land for a golf course shall petition the director of finance and declare in his petition that he will dedicate his parcel of land for a golf course.

(B) The approval by the director of finance of the petition to dedicate the land shall constitute a forfeiture on the part of the owner of any right to change the use of the land for a minimum period of ten years. automatically renewable indefinitely. subject to cancellation by either the owner or the director of finance upon five years' notice at any time.

(C) The failure of the owner to observe the restrictions on the use of his land to that of a golf course shall cancel the special tax assessment privilege retroactive to the date of the dedication but not more than ten years prior to the tax year in which the exemption is disallowed; and all differences in the amount of taxes that were paid and those that would have been due from assessment in the higher use shall be payable with a six percent a year penalty from the respective dates that these . · ·