

Macadamia Nuts: Economic and Competitive Conditions Affecting the U.S. Industry

(Investigation No. 332-386)

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ABSTRACT

On October 23, 1997, at the request of the Committee on Finance, United States Senate,¹ the U.S. International Trade Commission instituted investigation No. 332-386, Macadamia Nuts: Economic and Competitive Conditions 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 a report on factors affecting trade between the United States and major world markets for macadamia nuts. As requested by the Committee, the Commission's report on the investigation includes the following information:

- A description of the competitive factors affecting the domestic macadamia nut industry, including competition from imports;
- A description of the prices U.S. consumers pay for macadamia nuts compared with the prices paid by consumers in other major markets, and a description of the degree to which quotas, tariffs, or other trade barriers affect such prices;
- A description of the extent to which trade practices and barriers by other competing countries are impeding the marketing of domestically produced macadamia nuts; and
- An analysis of current conditions of trade in macadamia nuts between the United States and macadamia-nut-exporting countries and between the exporting countries and the rest of the world.

The U.S. macadamia nut industry, centered in Hawaii, is the world's second largest producer behind Australia. Since 1992, U.S. production of macadamia kernels has grown significantly, by 21 percent in volume to 26,309 metric tons, valued at \$43.5 million, in 1997. However, the U.S. share of world production declined during the period from 50 to 36 percent. The U.S. production increase resulted mainly from the maturing of macadamia orchards planted in the 1980s and early 1990s, following a period of rising prices in U.S. and world markets. By 1997, U.S. and world supplies were expanding faster than demand and grower market conditions deteriorated: grower and processor prices fell, and unsold inventories accumulated as world production increased from recent record U.S. and Australian harvests. Further, near- and longer-term supplies will continue to grow as ever-expanding world orchard areas, particularly in Australia, Africa and Latin America, begin commercial production, and add to existing world supplies from mature orchards.

On the demand side, U.S. consumption depends largely on consumer incomes and spending. Foreign demand for U.S. macadamia products has been adversely affected by declining incomes in Asia caused by macroeconomic difficulties experienced during the past year: directly through decreased import demands for U.S. macadamia products by such countries as Japan and Hong Kong, and indirectly from diminished numbers of Hawaiian-bound Asian tourists.

¹ The request from the Senate Committee on Finance is reproduced in full in appendix A.

To boost demand and avert future price declines, the U.S. and Australian industries have, since the world price declines of the early 1990s, undertaken ambitious marketing programs in both traditional and new markets. Both industries are developing and promoting new products, such as macadamia cooking oil and new snack foods. The U.S. industry, dominated by a few firms with well-known brand names, is taking a brand-oriented marketing approach, whereas the Australian industry, with brands that are less well known abroad, is taking a generic marketing approach. The latter approach, by expanding consumer awareness of macadamias generally, may also help to boost future demand for U.S. products.

Public 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* (62 FR 5845) of October 30, 1997.² Public hearings on the investigation were held on March 25, 1998, in Kailua-Kona, HI, and on April 30, 1998, in Washington, DC.³ Nothing in this report should be construed to indicate how the Commission would find in an investigation conducted under statutory authority covering the same or similar subject matter.

² A copy of the Commission's notice of institution, is included in appendix B.

³ Lists of witnesses who testified at the hearings are included in appendix C.

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ABBREVIATIONS AND ACRONYMS

AHC	Australian Horticultural Council
AMS	Australian Macadamia Society
AVE	Ad Valorem Equivalent
CSIRO	Commonwealth Scientific and Industrial Research Organization (Australia)
CSR	Colonial Sugar Refiners (Australia)
EMDG	Export Market Development Grant (Australia)
FAO	Food and Agriculture Organization
HDOA	Hawaii Department of Agriculture
HMNA	Hawaiian Macadamia Nut Association
HRDC	Horticultural Research and Development Council (Australia)
HTS	Harmonized Tariff System
IMF	International Monetary Fund
ISO	International Organization of Standardization
KPFC	Kona Pacific Farmers Cooperative
MFN	Most Favored Nation
MPA	Macadamia Plantations of Australia Pty., Ltd.
MPC	Macadamia Processing Company Pty., Ltd.
MQD	Macadamia quick decline disease
MT	Metric tons
NIS	Nut-in-shell
NRS	National Residue Survey (Australia)
NSW	New South Wales, Australia
NTMs	Non Tariff Measures
UNCTAD	United Nations Council on Trade and Development
USDA, FAS	United States Department of Agriculture, Foreign Agricultural Service
USDOC	United States Department of Commerce
VAT	Value added tax

EXECUTIVE SUMMARY

The Commission instituted this investigation on October 23, 1997, following receipt of a request letter from the Committee on Finance, United States Senate. The Committee requested that the Commission conduct an investigation under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) to investigate the competitive factors affecting the industry, including competition from Australia, Brazil, South Africa, and the Central American countries, as well as trade practices and barriers of the competing countries impeding U.S. macadamia nut exports, and to provide a description of the prices U.S. consumers pay for macadamia nuts compared with prices paid for macadamia nuts by consumers in other major producing and consuming markets. The highlights of the Commission report are presented below:

- From 1992 to 1997, world production of macadamia nuts rose 67 percent to 72,914 metric tons of nut-in-shell (NIS). From 1992 to 1996, the United States was the world's largest producer, however, in 1997, Australia replaced the United States as the world's leading producer. During this period, the U.S. share of world production declined from 50 to 36 percent, while Australia's share rose from 27 to 38 percent.
- The United States was the world's largest consumer of macadamia nuts during 1992-97 and accounted for 51 percent of world macadamia consumption in 1996/97.⁴ Japan was the second-largest consuming country accounting for 15 percent of world consumption and Australia was third, accounting for 13 percent.
- For the purposes of this study the macadamia industry may be described as consisting of growers, grower/processors, and processors: (1) growers cultivate macadamia trees and harvest the nuts, (2) grower/processors cultivate and harvest macadamia nuts and crack the nuts into raw kernels, and (3) processors who purchase macadamia nuts and crack the nuts to produce raw kernels. Macadamia nuts that have been husked and dried until the internal moisture level of the nut has been reduced to about 3.5 percent are referred to as nut-in-shell. The nut meats that are obtained by cracking the hard nut shell are referred as raw kernels. Raw kernels are further dried to about 1 percent moisture to increase their storability. Roasted macadamia kernels are raw kernels that have been dry- or oil-roasted.

United States

Production and Employment

- In crop-year 1997/98, the United States produced 26,309 metric tons (in-shell basis) of macadamia nuts, with a farm value⁵ of \$43.5 million. Of U.S. commercial macadamia production, 99 percent is Hawaii-grown and the remainder is California-grown. According

⁴ Throughout, a "split" year refers to the U.S. and Australian crop or marketing year that begins July 1 and ends June 30 of the following year.

⁵ Net macadamia production multiplied by net farm price as reported by the Hawaii Agricultural Statistics Service.

to the U.S. Department of Agriculture (USDA) Hawaii had about 8,175 hectares planted is macadamia nuts in crop-year 1997/98 a decline of 1.5 percent from the 1992/93 crop-year.

- Despite declines in Hawaiian planted area, U.S. production increased during crop-years 1992-97, as previously planted hectares matured into peak-producing orchards, and favorable agronomic and climatic conditions increased yields from 3.1 metric tons per hectare to 3.4 metric tons.
- Hawaiian officials testified that the macadamia farming, processing, and manufacturing sectors provide 2,000 jobs and generate up to \$300 million annually for the Hawaiian economy. Until the early 1990s, the then-expanding macadamia industry provided an alternative for labor and farmland displaced by Hawaii's contracting sugarcane and pineapple industries. From 1992 to 1997, the area devoted to macadamia nut production declined by 1.5 percent. However, the total number of hours worked in the industry, as reported by respondents to Commission questionnaires, increased by 14 percent as a result of increasing production from the existing planted area.
- Responses to Commission questionnaires from growers and processors indicate that macadamia growing operations were an increasingly important Hawaiian employer during 1993-97, as the total number of hours worked in growing macadamia nuts increased by 14.5 percent. Labor requirements rose with higher production and consumer demand for macadamia products, particularly through 1996.
- Labor productivity in the U.S. macadamia processing industry may be lower than that in Australia. In 1996/97, average output per worker in the U.S. industry reached 6.7 metric tons, compared with 7.8 metric tons in Australia. Reasons for the difference include: (1) U.S. processors emphasize production of retail products while Australian processors focus on bulk products; and (2) producing retail products requires more labor than production of bulk products.

Business Conditions

- USDA data indicate that the average net U.S. farm price for NIS fell during 1997/98 to \$1.65 per kilogram from \$1.72 in 1996/97. Questionnaire responses show that incomes of Hawaiian macadamia growers have declined and are approaching production cost levels, and profits on Hawaiian macadamia processing operations also have declined. Recent reports suggest that the farm price is continuing to fall.
- Questionnaire responses by 70 independent U.S. growers indicate that aggregate net income or loss before income taxes for their macadamia growing operations rose from a loss of \$66,266 in 1995 to an aggregate net 1996 income of \$43,027, which then declined 10.5 percent to \$38,512 in 1997. During the period 1995-97, independent growers reported net incomes as high as \$74,000, while others reported losses of nearly \$102,000. Likewise, the aggregate net income or loss before income taxes for 9 growers affiliated Mauna Loa Macadamias increased from an aggregate net loss of \$1.1 million in 1995 to

an aggregate net income of \$2.2 million in 1996, then declined 45 percent in 1997 to \$1.2 million.

- U.S. macadamia processor questionnaires show that aggregate operating income rose 131 percent to \$6.1 million during 1995-97. In 1998, however, processor business conditions began deteriorating: domestic and export sales and prices began declining; Asian sales fell; and competition from foreign processors escalated in Asian markets.
- Tourists in Hawaii purchase a substantial volume of Hawaiian macadamia nuts. After several years of growth Hawaii-bound Asian tourism is declining as Asian macroeconomic problems continue. Hawaii's tourist data show that the number of Asian tourists prior to 1997 was growing between 10 and 13 percent on average per annum, but decline by nearly 1 percent in 1997. Preliminary data show further declines in 1998. Declining numbers of Asian tourists have a particularly adverse consequence for the Hawaiian economy since Asian tourists spend twice the daily amount spent by U.S. mainland tourists.
- Several other factors that may be contributing to the lower Hawaiian macadamia farm prices include: increasing world production, declining Asian import demands for macadamia products due to economic and financial problems, and a slowdown in European macadamia kernel purchasing.

Consumption and Trade

- During 1992/93-1996/97, U.S. apparent consumption of macadamia nuts increased 19 percent to 32,440 metric tons. Hawaii accounts for one-half of macadamia-related sales, and a substantial portion of these Hawaiian sales are to tourists ("suitcase exports").
- U.S. macadamia imports during 1992-97 increased 74 percent in volume, consisted primarily of shelled raw kernels, and were primarily from Australia, Costa Rica, Guatemala, South Africa, and Kenya.
- During 1992-97, U.S. macadamia nut and nut product exports consisted primarily of roasted kernels, rose by 39 percent in volume, and were primarily marketed in Japan, Hong Kong, Canada, and Taiwan.
- There are no quotas or other restrictive non-tariff barriers in the U.S. market for macadamia nuts other than a phytosanitary ban on most in-shell macadamia nut imports which is somewhat moot because most imports are kernels because of the cost of shipping bulky in-shell nuts and the potential for quality deterioration during transit. U.S. general rates of duty in 1997 ranged from 2.1 cents per kilogram (0.3 percent ad valorem equivalent) for fresh or dried macadamia kernels to 23 percent ad valorem for roasted or otherwise prepared or preserved macadamia kernels.

Australia

Production and Employment

- The Australian industry is younger than the Hawaiian industry. Since 1992/93, the USDA reports that Australia's production has increased by 129 percent to 27,500 metric tons in 1997/98. The Australian industry employs 1,600 persons--1,000 work on the growing side of the industry, and 600 work on the processor/marketing side.
- With 25 percent of Australia's orchards not yet bearing nuts, Australian production is expected to increase as the immature trees begin commercial production over the next 6-8 years. Yet Australian industry testimony suggested that expected increases in new orchard production may be tempered by a leveling-off of production from older orchards caused by reduced yield associated with orchard age.

Markets and Trade

- Australian processors and marketers focus on the bulk and industrial markets. Nonetheless, three Australian processors have developed and market retail macadamia products, and dedicate from 9 to 10 percent of revenues on sales, product, and market development activities.
- During crop-years 1992/93-1997/98, USDA sources reported that Australian exports to all markets rose by 98 percent to 16,000 metric tons (60 percent of production) and apparent consumption rose by 92 percent to 9,000 metric tons. Ending stocks, once consistently at near-zero levels, increased to 2,500 metric tons, equivalent to nearly 10 percent of production.
- Once dependent on the U.S. market, the Australian industry has diversified export markets. During crop-years 1992/93-1997/98, the U.S. share of Australian exports fell from 36 to 11 percent, while new export markets were established in Japan, China/Hong Kong, and Germany. The absolute level of exports to the United States, however, fell by a far lesser percent.
- Australian import duties range from free to 5 percent ad valorem. There are no quotas or other known nontariff barriers in the Australian market.

Major Foreign Producers Other Than Australia

- Three African countries (Kenya, South Africa, and Malawi) and three Latin American countries (Guatemala, Costa Rica, and Brazil) supply virtually all macadamia nuts produced outside the United States and Australia, and export 90 percent of their output to world markets, chiefly to the United States, Japan, the European Union (EU), and Hong Kong.
- Tariffs on imports of macadamia products into these major African and Latin American

countries range from free in South Africa, to 70 percent ad valorem on all types of macadamia nut products in Kenya, and to 110 percent ad valorem in Malawi on roasted nuts (tariff plus import surcharge levy). Tariffs range from 17 percent ad valorem in Guatemala on all forms of macadamia products, to a 19-percent ad valorem tariff in Costa Rica on raw nuts, and to 10 percent ad valorem on raw kernels in Brazil.

- Macadamia production in Africa increased rapidly during 1992-97, owing to increasing world demand and farm prices. Kenya nearly doubled output during the last 6 years, and accounted for 6,800 metric tons, or 9 percent of 1997 global output. South African macadamia output increased by nearly fourfold since 1992, and provided approximately 5,400 metric tons of 1997 global output. Output in the region is projected to increase further as recently planted trees enter the peak producing stage, and growers increase plantings.
- In 1997, Kenya exported 6,800 metric tons of NIS primarily to the United States and Japan, while South Africa exported 4,915 metric tons of NIS primarily to the United States, Europe, and Hong Kong. During 1992-97, Kenya more than doubled, and South Africa more than quadrupled, exports.
- Macadamia production in Latin America (Guatemala, Brazil, and Costa Rica) accounted for 9 percent of 1997 world production. During 1992-97, Guatemalan production (in-shell basis) rose 73 percent to 2,745 metric tons and Brazilian production expanded about fivefold to 1,600 metric tons, while Costa Rican output rose only slightly to 2,500 metric tons. Costa Rican production suffered from poor weather, ineffective management and horticultural practices, and acreage transfer to the production of higher-priced coffee.
- USDA data indicate that during 1992-97 Latin American macadamia exports rose 150 percent; domestic consumption was insignificant; and Guatemala was the region's primary exporter, followed by Costa Rica. Most of the region's 1997/98 exports were marketed in the United States.

Major Consumer Markets

- Major consumer markets outside of the United States and Australia are Japan, Hong Kong, and the EU. Together they account for approximately 27 percent of world consumption.
- During 1992-97, Japan's imports of macadamia kernels and kernel products expanded by an average 8.2 percent annually to 2,190 metric tons. Although the United States was Japan's leading supplier in value terms, Australia surpassed the United States as Japan's leading supplier in volume terms in 1993. The United States supplies chiefly processed products, while Australia and Kenya supply chiefly fresh or dried kernels to Japan.
- Japan's recession and declining income affected U.S. macadamia sales through lower direct imports and indirectly through lower numbers of Japanese tourists in Hawaii since 1996. Further, Japan's mix of macadamia imports has shifted away from roasted and

prepared or preserved product from the United States to fresh or dried macadamia kernels supplied by Australia and Kenya.

- China and Hong Kong have been a strong market for tree nuts for many years. Australia has supplied most of the imports of macadamia nuts to China, an area of particular marketing focus for the Australian industry.
- The EU, the world's second-leading tree nut market after the United States, is very price-sensitive with regard to consumption of nuts, and uses macadamias mainly in snacks. Germany is the leading EU consumer of tree nuts, including macadamias, although the United Kingdom and the Netherlands are also important markets. Australia has been the leading supplier of macadamia nuts to Germany. The Australian industry has developed the German market, which mainly consists of packaged, retail sales.
- Roasted macadamia kernel in retail glass jars recently sold for \$26 to \$40 per kilogram in the Washington, D.C. area, compared with a higher range of \$29 to \$47 per kilogram in Japan.

Comparative Analyses and Competitive Conditions

- Globally, the area planted with macadamias is expanding. Although the U.S. planted area remained almost unchanged, the macadamia planted area in key producing regions such as Australia, Guatemala, and Kenya has increased since 1992. As these new trees mature, world supplies of macadamia kernels will likely increase.
- According to USDA and Australian industry reports, there are 1.65 million trees, of which 8 percent are not yet bearing, in Hawaii, while Australia has 3.1 million trees, of which 25 percent are not yet bearing. Compared with Hawaii, Australia has almost double the trees on an orchard area about 50 percent larger, implying that growers in Australia plant at higher densities than those in Hawaii. Further, Australian orchards have far greater proportions of nonbearing trees than do Hawaiian orchards. Thus, Australia will likely realize greater production increases than Hawaii as nonbearing trees begin commercial production.
- World macadamia supplies currently exceed demand, and are depressing prices. Farm prices reported by the Hawaiian Agricultural Statistical Service fell by 5 percent from \$1.72 per kilogram in 1996 to \$1.65 per kilogram in 1997. Margins between wholesale and farm prices fell from 87 percent in 1995 to 84 percent in 1997, putting further downward pressure on farm prices.
- Asian macroeconomic troubles are contributing to lower macadamia nut prices. Asian tourism to Hawaii and Australia, a principal source of demand for macadamia nut products, is declining; as well, Asia's import demand for U.S. and Australian macadamia products is declining.
- Australian exporters had promoted macadamias as an ingredient in chicken dishes in Chinese-cuisine restaurants in Hong Kong and China. The Asian chicken flu in late 1997 and early 1998 caused a reduction in restaurant patronage, which depressed demand in this promising growth market. Lost sales have translated into lower kernel usage and increases

in Chinese/Hong Kong kernel inventories in 1998.

- Since the price declines in the early 1990s, Australian producers have taken a different marketing approach than U.S. producers. Australian exporters have launched a generic campaign to boost demand for macadamia nut products in export markets in Asia, Europe, and North America. In contrast, U.S. firms have focused their efforts on promoting products under their respective brand names or as “Hawaiian” products. U.S. and Australian interests disagree over the relative benefit of these different approaches as mechanisms for alleviating current and expected excess world supplies of macadamias.
- The Australian Federal Government has legislated a mandatory levy on macadamia growers’ NIS delivered to processors. The Australian Macadamia Society (AMS) annually determines the amount of the levy, which is collected for the AMS by the Department of Primary Industries and Energy (a Federal Australian agency). The AMS annually determines the levy amounts allocated to financing macadamia marketing and promotional programs and macadamia-related scientific and horticultural research.
- Relative costs of growing macadamias appear higher in the United States than in Australia. Breakeven NIS prices are those above which profits are generated, and below which losses are generated. In the United States, the break-even price ranges from \$1.21-\$2.03 per kilogram, compared with an Australian range of \$0.58-\$1.28. Possible explanations for the difference include the relatively younger ages of Australian orchards; the higher costs caused by Hawaii’s volcanic terrain; and yield-augmenting effects of horticultural research on macadamias in Australia funded through mandatory levy collections.
- Australian processors testified that they have difficulty in competing with U.S. processors for certain U.S. value-added sales because of the U.S. duty of 23 percent imposed on imports of roasted and prepared or preserved kernels. They also testified that U.S. processors have a unit cost advantage over Australian firms because Australian firms cannot achieve the economies of scale of larger U.S. processors.
- Inelastic supply of macadamia nuts contributes to short-run price fluctuations. Because macadamias are a tree crop, short-run supply is nearly fixed and depends on the number and ages of available trees. Therefore short-run changes in demand can cause wide swings in prices. Adding to price volatility is the “luxury” perception of macadamia products among consumers, which causes macadamia demand to be highly sensitive to changes in consumer incomes.

Exchange Rates

- During the period 1992 through the first quarter of 1998, movements in real exchange rates of macadamia producer and consumer currencies relative to the U.S. dollar have been mild and short-lived, while movements in nominal exchange rates have been more pronounced. Observed changes in macadamia-related prices, trade patterns, and market shares have likely not been induced by currency fluctuations because relevant real exchange rates have not changed significantly or for protracted periods.
- During the period 1992 through early 1998, reported declines in Australian kernel prices relative to U.S. prices may have arisen from declining Australian production costs, rather than real exchange rate movements. Changes in Asian imports and in the number of

Hawaii-bound Asian tourists during the 1990s may have arisen from changes in national economic activity and real income, rather than from exchange rate movements.

- Data are not available to determine whether declining 1998 Asian imports of U.S. macadamia products and numbers of Asian tourists to Hawaii are from movements in real exchange rates or from stagnating Asian incomes caused by the economic down turn.

Econometric and Statistical Analysis

- Macadamia tree plantings are influenced not only by current nut prices but also by past prices. Price trends that last for several years heavily influence growers' planting decisions. The nut-in-shell price prevailing in the current year has the greatest effect: statistical analysis suggests that a 1-cent increase (or decrease) in price would cause an increase (or decrease) in planted area of 6.3 hectares (or 0.08 percent of 1997/98 planted area). This current-year effect is followed by increasingly smaller effects in more distant years.

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. The United States, next to Australia, is the world's second-largest producer (accounting for 36 percent of world production in 1997) and the world's largest consumer of macadamia nuts.⁶ U.S. production of macadamia nuts is concentrated in Hawaii, which accounts for more than 99 percent of U.S. production. California accounts for the remainder.⁷ Macadamias are Hawaii's third-largest agricultural crop, following sugarcane and pineapples. According to industry sources, more than 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.

The demand for macadamia nuts and nut products rose sharply in both the United States and in foreign markets during the 1980s and 1990s.⁸ The increase in consumption of macadamia nuts was largely due to the increase in global incomes that occurred during this period as well as greater consumer awareness of macadamia nuts and nut products from perhaps Australian generic promotion efforts.

World production of macadamia nuts more than doubled during the 1980s and increased by 75 percent from 1990 to 1997. U.S. production also increased, but more slowly than that of foreign competitors, with production rising 36 percent in the 1980s, and then by another 16 percent during 1990-97.⁹ Following a decade of rising macadamia nut prices in the 1980's, 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 was due to increased competition in the world macadamia nut markets and an increase in inventory levels. Prices recovered gradually through the mid 1990s, before declining in late 1997 as the industry was faced again with high inventories.¹⁰ A number of causes for these reported recent adverse developments for U.S. growers and processors have been offered, and many are discussed later in the report. These causes have reportedly resulted in a situation where domestic and world demand and prices for kernel and kernel products have decreased and domestic and world kernel supplies have increased, and include: increasing macadamia acreage and production, primarily in Australia, Kenya, and South Africa; record U.S. and Australian macadamia crops in 1997; a slowdown in Hawaii-bound Asian tourists because of Asian macroeconomic problems; declining U.S. macadamia product exports; and a slowdown in European macadamia buying in 1997. This report will examine a variety of supply and demand factors, including competition from

⁶ Macadamia Situation and Outlook, found at <http://www.fas.usda.gov/http/circular/1998/98-03/9803macz.html>.

⁷ There were less than 20 acres of macadamia nut trees planted in Florida in the mid 1990s, but these trees have not reached bearing age.

⁸ Macadamia nuts are a luxury or premium nut with a relatively high income elasticity.

⁹ Hawaii Agricultural Statistics Service (HASS), *Hawaii Macadamia Nuts, Final Season Estimates*, July 7, 1998, p. 1.

¹⁰ Macadamia Situation and Outlook, found at <http://www.fas.usda.gov/http/circular/1998/98-03/9803macz.html>.

Australia, and how they have affected competitive conditions in the U.S. macadamia nut industry since 1991.

Purpose and Approach of the Report

This report, as requested by the Senate Committee on Finance, provides an analysis of (1) the factors affecting the competitiveness of the U.S. macadamia nut growing and processing industry, (2) the consumer prices paid for macadamia nuts and macadamia nut products in the United States and in other major consumer markets, and how tariffs and other trade measures influence such prices, (3) 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 (4) the current conditions of trade in macadamia nuts. The investigation was instituted on October 23, 1997, following receipt of the request on September 15, 1997, from the Committee on Finance, United States Senate.¹¹

The report analyzes supply and demand conditions in the United States, Australia, and other competitive countries. The report provides information on changes in market shares, the cost structures and pricing strategies of the United States and competitor countries, factors affecting industry growth and demand,¹² and a description and comparison of prices U.S. and non-U.S. consumers pay for macadamia nuts and nut products.

Information was obtained from domestic and foreign macadamia nut growers and processors, U.S. importers, researchers, and other government agencies. Early in the investigation the Commission sent questionnaires to 363 members of the U.S. macadamia nut industry, including 343 growers, 8 processors, and 12 importers.¹³ The Commission received questionnaire responses from 144 growers, 5 processors, and 8 importers. Information was also collected through public hearings held on March 25, 1998, in Kailua-Kona, Hawaii, and on April 30, 1998, in Washington, DC and through field work conducted in Florida, Hawaii, and Australia.

¹¹ The request from the Senate Committee on Finance is reproduced in app. A.

¹² 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.” E. Van Duren, L. Martin, and R. 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. McCorrison 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. S. McCorrison and I. Sheldon, “International Economics,” paper presented at the International Agricultural Trade Research Consortium, Annapolis, MD, Aug. 7-8, 1992.

¹³ The growers and 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 700 macadamia nut growers in Hawaii. The association’s processors’ list included all known processors as of September 30, 1997. 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.

Scope of the Report

Industry Defined

The segments of the macadamia nut and nut products industry examined in this report include (1) growers that cultivate macadamia trees and harvest the nuts, (2) processors that purchase macadamia nuts and crack the nuts to produce raw kernels, and (3) processors and importers that market raw kernels. This report examines processors that roast and salt macadamia kernels and manufacture macadamia confectionary and bakery products. However, the report does not examine the non-processor firms that are exclusively nut roasters, rebaggers, confectionery manufacturers, and bakery and miscellaneous food manufacturers, which are intermediate consumers of raw and roasted macadamia nut kernels.

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:

- B. 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 (hereafter nut-in-shell or NIS) that have been air-dried at the farm or at the processing plant until the internal moisture level of the nuts has been reduced to about 3.5 percent.
- 3. 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 storability; otherwise, the kernels will deteriorate. Raw kernels are an intermediate product that is usually further processed before being consumed, however, raw kernels may also be sold at health food stores and farmers market to consumers for direct consumption.
- 4. 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 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.

5. Bakery, candy, and confectionery products.) Macadamia kernels are used as ingredients in baked goods and in brittles and other candies, including chocolate-covered whole nuts, nut halves, nut clusters, and chocolate bars that include macadamia nuts as an ingredient.
6. Macadamia oil.—Macadamia shells containing fragments of kernels and kernels are pressed to produce food grade and pharmaceutical grade oils.

Production Relationships

The macadamia nut is produced from a subtropical 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 output and is preferred because of its higher oil content and superior roasting quality. The rough-shelled type has a higher sugar content and is therefore sweeter.¹⁴

Macadamia trees are perennials that generally can be harvested economically within 6 to 8 years of planting and may produce for 40 to 60 years or more with proper care.¹⁵ 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.¹⁶ Production generally occurs at altitudes below 760 meters, as trees above this elevation grow slower, produce fewer nuts, and produce nuts with thickened shells.¹⁷ 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 occurring 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 main harvesting season is from April through September. Macadamia trees primarily compete with crops such as sugarcane, coffee, and pineapples for use of available land.

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. 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.

¹⁴ Macadamia-the tree and its environment, found at <http://www.nor.com.au/agriculture/ams/oview.htm>, Oct. 20, 1997.

¹⁵ Jasper Guy Woodroof, *Tree Nuts: Production, Processing, Products*, 2d ed. (Westport, CT: Avi, 1979), p. 301.

¹⁶ Andrew McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts," *31st Annual Meeting of the Hawaii Macadamia Association*, May 1991, p. 4.

¹⁷ Woodroof, *Trees Nuts: Production, Processing, Products*, p. 304.

Due to their extremely hard shells, almost all macadamia nuts are cracked by commercial processors. Macadamia nuts have an average kernel recovery rate¹⁸ between 23 and 25 percent in Hawaii, depending on weather conditions, and 28 to 33 percent in Australia. Australia has an ongoing research program to develop higher yielding varieties. Several of these new varieties have kernel yields of approximately 35 percent.¹⁹ 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. Macadamia nut oil is a premium oil and is thought to be beneficial in lowering the risk of heart disease.²⁰ All of these products can also 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 processed into roasted kernels or other macadamia-nut-containing products. Macadamia kernels can be held in storage for a year or longer with no noticeable loss in quality.

The establishment of macadamia orchards requires a substantial initial investment, which is then followed by comparatively low maintenance costs during the productive life of the trees.²¹ The high initial startup costs relative to total annual costs and the production lags inherent in macadamia nut production make macadamia nut supply relatively price inelastic in the short run.²² Moreover, the same high startup costs and production constraints allow prices to vary widely in 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 in 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.

Study Timeframe

In most instances the period covered by the study is 1992 through 1997 as requested by the

¹⁸ The kernel recovery rate is determined by dividing the pounds of kernel production by pounds of net production (wet-in-shell).

¹⁹ Macadamia-the tree and its environment, found at <http://www.nor.com.au/agriculture/ams/oview.htm>, Oct. 20, 1997.

²⁰ Macadamia Commercial Links, found at <http://www.nor.com.au/agriculture/ams/commercial.htm>, Oct. 20, 1997.

²¹ 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 H. Askari and J. T. Cummings, *Agricultural Supply Response: A Survey of the Econometric Evidence* (New York: Praeger Publishers, 1976).

²² The short run refers 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. Askari and Cummings, *Agricultural Supply Response: A Survey of the Econometric Evidence* (New York: Praeger Publishers, 1976).

Committee on Finance. Based on the information collected in this investigation, 1997 was the healthiest year since 1989 for the domestic industry in terms of production volume, sales, and value. However, a number of U.S. grower and processor interests have reported a deterioration in business conditions during 1998. Data covering longer time periods are thus presented when available 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. Chapter 2 contains information on the U.S. industry and market, and chapter 3 examines the industry and market in Australia, the major U.S. competitor. Chapter 4 describes the other major foreign suppliers, including a number of developing countries whose commercially viable macadamia nut production dates only from the early 1980s. Chapter 5 describes the major foreign consumer markets, and chapter 6 analyzes the competitive position of the U.S. industry in both domestic and foreign markets.

Global Developments Since 1992/93 for Macadamia Cultivation

The United States has traditionally dominated both world production and consumption (table 1-1 and figure 1-1). However, in 1997, Australia displaced the United States as the world's largest producer; its production of 27,500 metric tons (NIS) exceeded U.S. production by 4.5 percent. USDA estimates suggest that the U.S. and Australian macadamia industries collectively accounted for nearly three-quarters of the world's 1997/98 macadamia production. Brazil, Costa Rica, Guatemala, Kenya, and South Africa have also emerged as major producers and competitors with the U.S. industry. The United States is the world's largest importer, as well as a major world exporter, of macadamia nuts and nut products.

Japan and Australia are the major consuming markets outside the United States, accounting for 15 percent and 13 percent, respectively, of world consumption in 1996/97. The European Union (EU) and Hong Kong/China are also important macadamia markets.

U.S. acreage planted to macadamia nuts has declined since 1992/93 while acreage planted in Australia burgeoned by more than 100 percent. The following discussion focuses on some of the factors responsible for these events.

Table 1-1
Macadamia nuts: World production, nut-in-shell (NIS) and kernel basis, and planted hectares, marketing years, 1992-97

Country and item	1992	1993	1994	1995	1996	1997
United States (Hawaii):						
Production (<i>metric tons</i>):						
NIS	21,773	21,999	23,814	23,133	25,628	26,309
Kernels	4,672	5,080	5,035	5,171	6,486	(¹)
Planted hectares	8,300	8,138	8,178	8,219	8,175	8,175
Australia:						
Production (<i>metric tons</i>):						
NIS	12,000	16,000	18,000	19,500	25,000	27,500
Kernels ²	3,480	4,640	5,220	5,655	7,250	7,975
Planted hectares	6,020	8,900	9,000	11,900	12,000	12,050
Brazil:						
Production (<i>metric tons</i>):						
NIS	360	600	930	950	1,300	1,600
Kernels	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Planted hectares	4,500	5,350	5,800	6,000	6,300	6,500
Costa Rica:						
Production (<i>metric tons</i>):						
NIS	2,700	3,000	2,300	2,300	2,500	2,500
Kernels ³	540	600	460	460	500	500
Planted hectares	6,500	6,500	6,600	6,000	4,250	5,000
Guatemala:						
Production (<i>metric tons</i>):						
NIS	1,588	1,943	2,130	2,272	2,507	2,745
Kernels ⁴	302	369	405	432	476	522
Planted hectares	2,800	2,800	3,080	3,200	3,300	3,400
Kenya:						
Production (<i>metric tons</i>):						
NIS	3,555	3,299	4,070	4,100	4,900	6,800
Kernels ⁵	(¹)	511	570	574	686	952
Planted hectares	5,314	5,414	5,600	5,750	6,050	6,150
South Africa:						
Production (<i>metric tons</i>):						
NIS	1,715	1,260	3,115	2,455	3,920	5,460
Kernels	(¹)	(¹)	(¹)	497	830	1,165
Planted hectares	3,497 ⁶	3,830	3,830	4,300	3,533	4,265
Total: ⁷						
Production (<i>metric tons</i>):						
NIS	43,691	48,101	54,359	54,710	65,755	72,914
Kernels	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Planted hectares	37,031	40,932	42,088	45,369	43,608	45,540

¹ Not available.

² Estimated from in-shell production at a recovery rate of 29 percent.

³ Estimated from in-shell production at a recovery rate of 20 percent.

⁴ Estimated from in-shell production at a recovery rate of 19 percent.

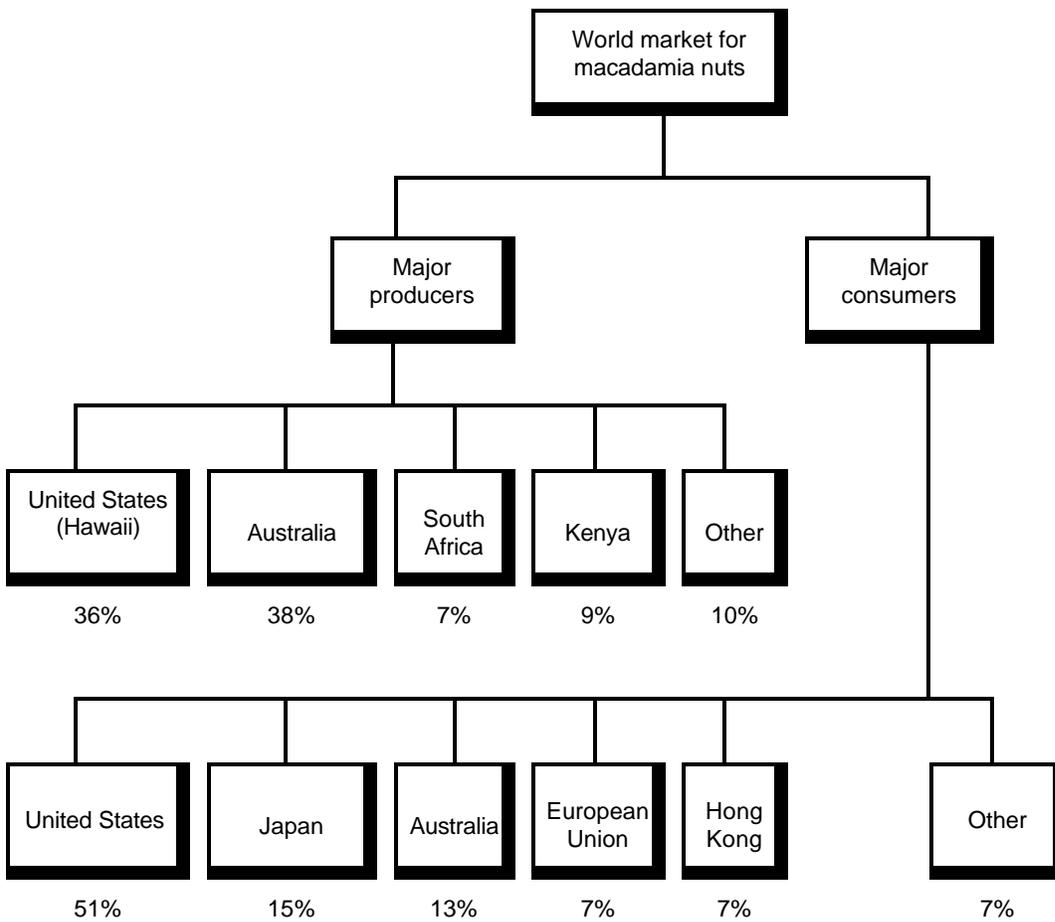
⁵ Estimated from in-shell production at a recovery rate of 14 percent.

⁶ Official data for 1992 are not available. Hence, data on planted hectares is estimated by taking the average of planted hectares in 1991 and 1993.

⁷ Data on other world producers are not available for 1992-97. 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.

Sources: The U.S. data were obtained from two Hawaii Agricultural Statistical Service reports: *Hawaii Macadamia Nuts, Preliminary Season Estimates*, Jan. 22, 1998; and *Hawaii Macadamia Nuts, Final Season Estimates*, July 11, 1997. The Australian data were obtained from two U.S. Department of Agriculture (USDA), FAS sources: "Tree Nuts--Macadamia Annual Report--Australia," telegram No. AGR AS8010, prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998; and *World Horticultural Trade and U.S. Export Opportunities*, May 1995, p. 46. Guatemalan data were obtained from the following USDA, FAS telegrams entitled "Tree Nuts--Macadamia Annual Report--Guatemala," and prepared by the U.S. Embassy staff in Guatemala City: telegram No. AGR GT8002, Jan. 12, 1998; and telegram No. AGR GT5003, Feb. 2, 1995. Costa Rican data were obtained from the following USDA, FAS telegrams entitled "Tree Nuts--Macadamia Annual Report--Costa Rica," and prepared by the U.S. Embassy staff in San Jose: telegram No. AGR CS8002, Jan. 29, 1998; and telegram No. AGR CS5001, Feb. 1, 1995. Kenyan data were obtained from the following USDA, FAS telegrams entitled "Tree Nuts--Macadamia Annual Report--Kenya," and prepared by the U.S. Embassy staff in Nairobi: telegram No. AGR KE8001, Feb. 1, 1998; telegram No. AGR KE7002, Feb. 1, 1997; telegram No. AGR KE6002, Jan. 29, 1996; telegram No. AGR KE5003, Mar. 1, 1995; and telegram No. AGR KE4003, Mar. 14, 1994. South African data were obtained from the following USDA, FAS telegrams entitled "Tree Nuts--Macadamia Annual Report--South African," prepared by the U.S. Embassy staff in Pretoria: telegram No. AGR SF8003, Jan. 29, 1998; telegram No. AGR SF7002, Jan. 31, 1997; telegram No. AGR SF6002, Jan. 23, 1996; and telegram No. AGR SF5005, Feb. 1, 1995.

Figure 1-1
World market for macadamia nut (nut-in-shell basis), 1997/98



Note.) Share of world production is calculated on a nut-in-shell basis. Share of world consumption is based on 1996/97.

Source: Hawaii Department of Agriculture, and U.S. Department of State agriculture attache reports.

The U.S. (Hawaiian) Growing Industry

U.S. acreage planted to macadamia nuts has declined 1.5 percent since 1992/93, while production has varied according to yields and other agronomic, entomological, and climatic influences.²³ The leveling-off of Hawaiian acreage may be explained by movements of macadamia prices relative to prices of other alternative crops, as well as by institutional and other market developments that may have generated incentives to plant Hawaiian acreage to crops other than macadamias.

Table 1-2 indicates that macadamia prices at the farmgate increased 8.7 percent during 1992/93-1997/98, an increase far below the nearly 125 percent rise in coffee prices. The more rapid increase in the coffee price relative to the macadamia price has provided an incentive for prospective farmers to plant Kona coffee rather than macadamias, and for current farmers with older orchards to replace macadamia trees with coffee.²⁴ Additionally, there are other alternative crops that have been competing with macadamia orchards for land: bananas, avocados, papayas, taro, sweet potatoes, certain tropical vegetables, eucalyptus, and hardwood trees.²⁵ For example, one lumber company has leased about 6,100 hectares (15,000 acres) of lands formerly planted with sugarcane in order to produce eucalyptus, which is used to produce pulpwood.²⁶

A second development that may have contributed to Hawaii's leveling-off and subsequent reduction in macadamia acreage since 1992/93 may have been a trend towards shorter leases on lands slated for agricultural uses.²⁷ Once written for periods as long as 45 years, agricultural land leases are currently written for terms of 19 years or less.²⁸ There are reports that such shorter leases may be increasing the uncertainty of the financial reward of a macadamia orchard investment, because even a lease of 19 years may be insufficient to fully realize potential pay backs of such an investment which typically requires 6-8 years to commercially produce, and up to a decade to break even.²⁹ Thus, uncertainty of a macadamia orchard's return on investment may be encouraging or prompting current and prospective farmers to plant other crops.

²³ These USITC staff assessments are based on information provided in two HASS sources and one USDA, FAS source: HASS, *Hawaiian Macadamia Nuts, Preliminary Season Estimates*, Jan. 22, 1998, and *Hawaiian Macadamia Nuts, Final Season Estimates*, July 11, 1997; and USDA, FAS, "Macadamia Situation and Outlook," Apr. 7, 1998, found at <http://www.fas.usda.gov/http/circular/1998/98-03/9803maca.html>, on July 15, 1998.

²⁴ USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

²⁵ Information was obtained in two USITC staff interviews: with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998; and with D. Martin, Hawaii State statistician, HASS, Honolulu, HI, Mar. 30, 1998.

²⁶ USITC staff interview with D. Martin, Hawaii State statistician, HASS, Honolulu, HI, Mar. 30, 1998.

²⁷ Information was obtained in two USITC staff interviews: with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998; and with D. Martin, Hawaii State statistician, HASS, Honolulu, HI, Mar. 30, 1998.

²⁸ USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

²⁹ Information was obtained in two USITC staff interviews: with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998; and with D. Martin, Hawaii state statistician, HASS, Honolulu, HI, Mar. 30, 1998.

Table 1-2
Annual and total changes in selected commodity and food prices, 1993/94-1997/98

Year	Macadamia ¹ price	World coffee ² price	U.S. sugar ³ price	World sugar ⁴ price	World food ⁵ price index
	<i>Percentage</i>				
1993/94	0.0	15.6	1.5	11.0	(2.0)
1994/95	1.3	118.2	1.9	20.3	6.1
1995/96	7.2	2.9	4.1	11.2	7.7
1996/97	5.5	(26.2)	(2.4)	(9.1)	12.5
1997/98	(5.2)	17.4	(2.0)	(1.5)	(11.1)
Total change since 1993/94	8.7	124.7	3.0	33.0	12.0

¹ Hawaiian Agricultural Statistical Service (HASS), Hawaiian Macadamia Nuts, Preliminary Season Estimates, Jan. 22, 1998 and *Hawaiian Macadamia Nuts, Final Season Estimates*, July 11, 1997.

² F.O. Lichts *International Coffee Yearbook 1997/98*, F.O. Licht GmbH, Kent, United Kingdom.

³ Contract No. 11 duty free paid New York. Average of nearest futures month for which an entire month of prices available, Coffee, Sugar Cocoa Exchange.

⁴ Contract No. 14 duty free paid New York. Average of nearest futures month for which an entire month of prices available Coffee, Sugar Cocoa Exchange.

⁵ Indices of Primary Commodity Prices 1983-1998 (in terms of U.S. dollars) International Monetary Fund, Washington, DC, found at <http://www.imf.or/external/np/res/commod/index.htm>, retrieved on July 13, 1998.

Notes.—Annual percentage changes are from year-previous levels. Changes in the price index of U.S. macadamia nuts are reported on a marketing year beginning July 1 and ending June 30 of the following year, such that the “split” year of 1997/98, for example, reflects July 1, 1997-June 30, 1998 marketing year. Data for the world food price index are reported on a calendar year basis, and denoted in the first of each “split” year’s dates, such that 1997/98 index value reflects the 1997 calendar year value.

Sources: USITC staff calculations from data provided by the following sources: Hawaiian Agricultural Statistics Service; the International Coffee Yearbook, 1997/98; and the International Monetary Fund.

And finally, the lack of established standards for nut-in-shell (NIS) buyers, who are usually units of larger corporations, is reportedly generating uncertainty for Hawaiian macadamia growers, especially those with smaller growing operations.³⁰ A set of standards (such as moisture content and damage) does not exist, and consequently a buyer’s quoted offer to a grower may conceivably vary at different times and may vary across buyers for the same consignment, such that growers do not know what levels of return to expect.³¹ This further contributes to farmers’ decisions to plant other crops.

³⁰ USITC staff interviews: with S. Agoot, general manager, Kona Pacific Farmers’ Cooperative, Captain Cook, HI, Mar. 24, 1998; with D. Martin, Hawaii State statistician, HASS, Honolulu, HI, Mar. 30, 1998; and with J. Rosenthal, a Hawaii grower, Kailua-Kona, HI, Mar. 27, 1998.

³¹ Information was obtained in three USITC staff interviews: with S. Agoot, general manager, Kona Pacific Farmers’ Cooperative, Captain Cook, HI, Mar. 24, 1998; with D. Martin, Hawaii state statistician, HASS, Honolulu, HI, Mar. 30, 1998; and with J. Rosenthal, a Hawaii grower, Kailua-Kona, HI, Mar. 27, 1998.

The Australian Growing Industry

Since 1992/93, Australian acreage planted to macadamias has increased by 100 percent, while production has risen by 129 percent.³² Australian industry officials cited three possible reasons for this expansion of growing activity (1) lack of other lucrative alternative crops; (2) increased availability of former dairy lands; and (3) the increasing effects on demand (and price) of market promotion activities funded by the Australian Macadamia Society (AMS).

Australian land dedicated to macadamia orchards in some instances is not suitable for growing other crops that are as lucrative as macadamia crops because of the hilly terrain.³³ Further, substantial areas of northern New South Wales and southern Queensland now planted to macadamia nuts were once dairy farms, which started to lose economic viability in the 1980s.³⁴ As this area's dairy farms ceased production, substantial acreage became available and was suited for macadamia cultivation. Consequently, the newly available acreage may have contributed to the increased Australian macadamia acreage, despite the sluggish increases in macadamia prices at the farmgate since 1992/93.

Finally, and as discussed in chapter 3, the AMS has established a mandatory macadamia grower levy, and has used levy collections to finance market promotion and scientific and horticultural research activities at increasing levels.³⁵ The AMS has also dramatically increased funds allotted to horticultural and other scientific research projects on breeding, variety selection trials, abscission, canopy management, and pest/disease control.³⁶ These market promotion and research activities may have enhanced domestic and foreign sales for Australian macadamias, and abated production costs, so as to augment the overall economic viability of the Australian macadamia industry.

Future Production Developments

World macadamia nut production is expected to increase dramatically during the first decade of the new millennium. Increasing raw kernel yields per hectare from the maturation of trees planted in the 1980s and early 1990s will result in world production reaching nearly 90,000 metric tons³⁷ on a NIS

³² Information was obtained from two USDA, FAS sources: *World Horticultural Trade and U.S. Export Opportunities*, May 1995, p. 46; and "Tree Nuts - Macadamia Annual Report - Australia," message reference No. AGR AS8010, prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

³³ USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, marketing director, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

³⁴ USITC staff interview with G. Hargreaves, an AMS director, Dunoon, New South Wales, Australia, Apr. 7, 1998.

³⁵ T. Davenport, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington DC, pp. 7-9; and a USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

³⁶ USITC staff interview with Dr. C. McConchie, research scientist, Commonwealth Scientific and Industrial Research Organisation (CSIRO) and University of Queensland's Division of Horticulture, and T. Davenport, an AMS director, at the University of Queensland campus, Brisbane, Queensland, Australia, Apr. 3, 1998.

³⁷ Calculation is based on a yield of 1.97 metric tons per hectare times the number of hectares planted in 1997. Yield was determined by dividing 1997 production by number of planted hectares in 1992. This assumes that any increase in planted hectares since 1992 contains trees that are not of bearing age.

basis. Data on macadamia nut production, planted hectares, and yield per hectare suggest that the U.S. share of world production will most likely continue to decline.

The U.S. share of world planted hectares decreased from 25 percent in 1992 to 18 percent in 1997. During this period, U.S. planted hectares declined by 125 hectares while other major world producers planted over 8,000 new hectares, equivalent to Hawaii's total 1997 planted area. Australia accounted for three-quarters of the new plantings; hectares planted with macadamias in Brazil, Guatemala, Kenya, and South Africa also increased. Since yields per hectare in major foreign producing countries are currently substantially below yields in Hawaii, reflecting the relative maturity of Hawaii's orchards, it is estimated that the U.S. share of world production will decline markedly from its present 36 percent share.

CHAPTER 2

U.S. INDUSTRY AND MARKET

The U.S. macadamia-nut-growing and -processing industry is in two States)) Hawaii and California--with Hawaii accounting for over 99 percent of the growing and processing.^{38,39} Hence this chapter focuses on the Hawaiian industry. The Hawaiian House of Representatives estimates that macadamia nuts generate 2,000 jobs in the farming, processing, and manufacturing sectors in Hawaii, along with gross revenues from \$250 million to \$300 million annually.⁴⁰ Since the early 1980s, Hawaii's macadamia farming, processing, and manufacturing activities have become increasingly important to Hawaii's economy as an alternative use for labor and land displaced by contraction of the State's sugarcane and pineapple industries.⁴¹ However, Hawaiian area planted to macadamias ceased growing in 1990/91, and acreage has declined by 1.5 percent since 1992/93.⁴²

The industry appears to have been relatively healthy from 1992 through 1997, after which a number of possibly adverse developments and trends for the industry appear to be taking place. After years of nearly continuous increases since 1992/93,⁴³ U.S. kernel prices at both the farm and wholesale levels began declining in 1997/98, while U.S. kernel exports fell and imports increased. Incomes from Hawaiian growing operations remained profitable, but began declining along with farm prices received in 1997. Further, there were reports that farm prices received by U.S. growers started falling below levels needed to meet production costs during late 1997 and during 1998.⁴⁴

³⁸ 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 with macadamia nuts in California, with an annual output of 136 metric tons, in-shell basis. Most of the 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.

³⁹ There are reportedly several hundred trees in Florida planted by hobbyist and backyard gardeners. However, there is no known commercial production of macadamia nuts in Florida. It has been reported that there has been one commercial planting within the last 5 years.

⁴⁰ Hawaii House of Representatives, testimony presented by M. Crawford, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 13-14.

⁴¹ D. Quitiquit, director, Hawaii County Research and Development Board, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 29-31.

⁴² This information based on acreage patterns was obtained from two sources from the USDA, Economic Research Service (ERS): *Sugar and Sweeteners, Situation and Outlook Report*, SSS-23 (May 1998), p. 32; and *Sugar, Background for 1995 Farm Legislation*, Agricultural Economic Report No. 711, personally prepared by R. Lord, Apr. 1995, pp. 43-47.

⁴³ U.S. data are reported on a marketing year beginning July 1 and ending June 30 of the following year, such that a split year such as 1992/93 refers to the marketing year July 1, 1992 through June 30, 1993.

⁴⁴ D. Rietow, HMNA president and president, Agro Resources, Inc., Kamuela, HI, transcript of the hearing, Apr. 30, 1998, Washington DC, pp. 74-75.

Although questionnaire data through 1997 suggest that generally U.S. processors have generated increasing profits, U.S. processors have reported that business conditions for macadamia-related operations began to deteriorate during 1998. A number of U.S. macadamia processors and retailers report that domestic and export sales have started declining;⁴⁵ prices for processed kernel, bulk products, and retail products have begun falling;⁴⁶ and competition facing U.S. processors for sales of kernel and finished macadamia products in U.S. and foreign markets, particularly in Europe and Asia, has escalated.⁴⁷ Such trends and patterns are generating U.S. processor concern over the ability to maintain current profitability of macadamia-related operations.

This chapter discusses the structure of the domestic macadamia nut growing and processing industry in Hawaii, including a profile of Hawaii's major macadamia processors. This chapter also examines factors affecting industry performance such as trends in production and hectares, employment, financial experience, investment, prices at the grower and processor level, markets, trade, and Federal and State Government and industry programs.

U.S. Macadamia Industry

Segments of the U.S. macadamia industry considered here include (1) growers, (2) processors that purchase macadamia nuts and crack the nuts to produce raw kernels, and (3) processors and importers that market raw kernels. Processors include both firms that are involved exclusively with processing macadamia nuts, as well as grower/processors that grow, as well as process, macadamia nuts. U.S. growers include independent farmers that own orchards and/or lease land and orchards from others, as well as absentee farmers who hire management companies that farm the orchards for them.

The U.S. macadamia industry is centered around its processors and grower/processors because these firms perform major shares of the industry's primary activities. U.S. processors either farm, or are owned by parent firms that farm, most of Hawaii's orchards. U.S. processors are the principal buyers of in-shell nuts from growers. These processors have developed bulk and/or retail lines of

⁴⁵ Reports of declining domestic and export sales orders for U.S.-produced macadamia products were reported in a number of USITC staff interviews: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; with M. Nakamura, president, Hawaiian Macadamia Co., Keaau, HI, Mar. 26, 1998; with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 26, 1998; with R. Kamigaki, owner, of Kamigaki Orchards and Kona Coast Nuts and Candy (hereafter Kamigaki enterprises), Kailua-Kona, HI, Mar. 27, 1998; and N. Arakaki, president, Hawaiian Candies and Nuts, Ltd., Honolulu, HI, Mar. 31, 1998.

⁴⁶ USITC staff interviews: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; with M. Nakamura, president, Hawaiian Macadamia Company, Keaau, HI, Mar. 26, 1998; with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 26, 1998; with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; and with N. Arakaki, president, Hawaiian Candies and Nuts, Ltd., Honolulu, HI, Mar. 31, 1998.

⁴⁷ One processor reported a general increase in the degree of competition for retail macadamia product sales in the U.S. and abroad, without reference to firm or country, in a USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998. There were a number of reports of an increase in competition facing U.S. processors in domestic and foreign markets, particularly from Australia, by R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI: transcript of the hearing, Apr. 30, 1998, Washington DC, pp. 56-67; and two facsimiles by R. Vidgen sent to USITC staff, June 16 and July 15, 1998.

macadamia products, and have developed domestic and export markets for such product lines. Additionally, U.S. processors provide both research and marketing investment to develop markets for existing products, and to develop new macadamia products and product markets.

Number and Location of Growers, and Grower Environment

There were 700 growers of macadamia nuts in Hawaii in crop year 1997/98, up from 650 growers in 1993/94 through 1995/96 (table 2-1). Although most growers in Hawaii are relatively small (i.e. less than 2.5 hectares), the distribution of acreage devoted to macadamia nut production is highly skewed. As shown in the following tabulation, based on the 1997 annual survey of the Hawaii Department of Agriculture, 7 percent of the macadamia farms had more than 7.7 hectares of madacamias planted:

Farm size	Percentage of farms	Percentage of planted acreage ¹
Over 7.7 hectares	7	90
2.5 - 7.7	22	5
Less than 2.5 hectares	71	5

¹ Estimated by the staff of the U.S. International Trade Commission.

**Table 2-1
Macadamia nuts in Hawaii: Number of farms, planted and bearing hectares, yield, production, and farm value of production, crop-years 1992/93 to 1997/98**

Crop year ¹	Farms <i>Number</i>	Planted <i>))))) Hectares))))</i>	Bearing <i>)))))</i>	Yield per hectare ² <i>))))) Metric tons)))))</i>	Production		Net farm ³	
					Gross	Net ³	Price <i>Dollars/ kilogram</i>	Value <i>Thousand dollars</i>
1992/93	660	8,300	7,085	3.07	24,041	21,773	1.50	32,690
1993/94	650	8,138	7,490	2.93	24,041	21,999	1.50	32,980
1994/95	650	8,178	7,490	3.17	26,309	23,814	1.52	36,225
1995/96	650	8,219	7,811	2.96	25,855	23,133	1.63	37,740
1996/97	680	8,175	7,770	3.29	28,577	25,628	1.72	44,070
1997/98	700	8,175	7,770	3.38	29,337	26,309	1.65	43,500

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

² Yield per hectare is calculated by dividing net production by bearing hectares.

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

Source: Hawaiian Agricultural Statistical Service (HASS), *Hawaiian Macadamia Nuts, Preliminary Season Estimates*, Jan. 22, 1998, *Hawaiian Macadamia Nuts, Final Season Estimates*, July 11, 1997 and *Hawaii Macadamia Nuts, Final Season Estimates*, July 7, 1998.

The average farm in 1997 was 11.65 hectares (29 acres). Hawaii Island is the center of Hawaii's macadamia-growing activity with more than 94 percent of the State commercial orchard area. The other commercial orchards are located on Maui.⁴⁸ Macadamia production on Hawaii Island occurs in two climatic environments--on the island's eastern "wet" side in areas surrounding Hilo, and on the island's "dry" west and southwestern areas near Kailua-Kona and Captain Cook.⁴⁹ Each area has its own set of conditions, advantages, and disadvantages. For example, while macadamia yields suffer more from the current drought on the dry Kona side of the island, orchard yields on the wet Hilo side of the island were harder hit by the macadamia quick decline (MQD) disease in the late 1980s and early 1990s.⁵⁰

MacFarms of Hawaii and C. Brewer: 65 percent of Hawaii's orchards

Two firms dominate Hawaii macadamia production through the ownership, leasing, and/or contract farming of 65 percent of the State's orchards: MacFarms of Hawaii and C. Brewer/Mauna Loa. Remaining orchards are far smaller operations.

MacFarms of Hawaii has about 1,600 hectares of macadamia orchards in production.⁵¹ MacFarms of Hawaii owns 225,000 trees, leases 7,200 trees, and farms 4,800 trees under contractual agreements.⁵² MacFarms of Hawaii owns most of the orchards it farms. However, the firm is increasingly both leasing orchards and farming orchards owned by others under contract. MacFarms of Hawaii's growing operations are chiefly situated on Hawaii Island's dry side near Captain Cook.

About 3,275 hectares, or 46 percent of Hawaii's macadamia orchards, are farmed by C. Brewer and its affiliates with the aim of supplying its subsidiary, Mauna Loa Macadamia Nut Corp. (hereafter Mauna Loa Macadamias) with kernel. Mauna Loa Macadamias, Hawaii's largest processor, does not own substantial orchard acreage although its corporate parent, C. Brewer, owns four farm management companies⁵³ that farm nearly one-half the State's macadamia orchard area through ownership, lease, and contract farming of orchards. Acreage farmed by the four C. Brewer farm management companies include orchards of Mauna Loa Macadamia Partners, LP (hereafter Mauna Loa Partners). C. Brewer's farming activities are situated on both the dry and wet sides of the Hawaii Island, as well as on Maui.

⁴⁸ USITC staff interview with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

⁴⁹ USITC staff interviews with R. Vidgen, president of MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with A. Yamaguchi, horticulturist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

⁵⁰ Ibid.

⁵¹ USITC staff interviews with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

⁵² Information was obtained by USITC staff in a facsimile from R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, June 2, 1998.

⁵³ These four C. Brewer Companies are Mauna Kea Agribusiness Company, Wailuku Agribusiness Company, Keaau Agribusiness Company, and Ka'u Agribusiness Company.

Leases, taxes, and alternative crops

Lease structures and taxes related to depreciation writeoffs have greatly influenced patterns of Hawaiian macadamia cultivation.⁵⁴ Land leases are common for both small and larger commercial operations. Leases are in force for both growers with a few hectares and for firms as large as Mauna Loa Partners.⁵⁵ Leases come in all sizes and forms: they can include or exclude a house; be customized by duration and area; and can vary by method of payment (fee simple rents per hectare and/or rents as percentages of generated revenues).⁵⁶ Changes in lease structures may decrease areas planted with macadamias under lease agreements, despite recent increases in land available for macadamia production from closing of Hawaiian sugarcane grower operations.⁵⁷ Lease lengths from such entities as the Bishop's Trust⁵⁸ are generally decreasing for lands in agricultural use to 19 years or less.⁵⁹ There are macadamia growers who are considering orchard expansion, as well as prospective macadamia farmers, who feel that leases of 19 years or less provide inadequate time spans to realize a secure return on macadamia orchard investments that often require from 6 to 8 years to realize the first commercially viable crop, and up to a decade after beginning production to break even.⁶⁰

Depreciation tax schedules have influenced Hawaiian macadamia production patterns, and these influences can be seen in the organization of Hawaii's two largest growers, C. Brewer/Mauna Loa and MacFarms of Hawaii. According to industry officials, current tax codes permit a 10-year depreciation write-off on macadamia trees, and hence provide incentives to sell orchards, while retaining farming/marketing rights to the macadamia output, so as to avoid taxes after the expiration of 10 years of depreciation write-offs.⁶¹

Orchard age profiles are increasingly approaching the 35-50 year age profile when certain growers claim that macadamia orchards begin to become commercially unviable.⁶² Although Hawaii's oldest commercial orchard was planted near Hilo in 1949, and is still farmed by C. Brewer,⁶³ lease and tax considerations and maturing orchard age profiles, along with other recent investment

⁵⁴ USITC staff interviews: with D. Martin, Hawaii state statistician, Honolulu, HI, Mar. 30, 1998.

⁵⁵ USITC staff interviews with D. Reitow, president of HMNA and of Agro-Resources, Kamuela, Hawaii, Mar. 24, 1998; with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998; with R. Kamagaki, owner, Kamigaki Orchards and Kona Coast Nuts and Candy, Kailua-Kona, HI, Mar. 27, 1998; and with R. Vidgen, president of MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

⁵⁶ USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

⁵⁷ Ibid.

⁵⁸ Bishop's Trust is a trust organization of large holdings of Royal Hawaiian lands, where the organization is entrusted to use rents and proceeds from the lands for the benefit of "Hawaii's children."

⁵⁹ USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

⁶⁰ Ibid.

⁶¹ USITC staff interview with R. Vidgen, president, of MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

⁶² The age at which macadamia orchards become commercially unviable is a source of debate, although two large Hawaiian growers suggested estimates which provide the 35-50 year age range. USITC staff interviews: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

⁶³ USITC staff interview with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

developments, place the continued long run commercial cultivation of these larger orchards in question. Possible long term options include the following: First, orchard-owning firms such as MacFarms of Hawaii could sell off the orchards to grower/investors and use the proceeds to develop new orchards on purchased or leased lands once planted to sugarcane.⁶⁴ Second, growers such as C. Brewer/Mauna Loa could rejuvenate the aging orchards and attempt to continue harvesting them past the 35-50 year age profile. Or third, orchard-owning firms could simply develop the land for residential housing and exit the macadamia-growing business.

Recent developments have generated conflicting signals over which option the larger Hawaiian growers will follow. Both Mauna Loa Macadamias and MacFarms of Hawaii have invested millions of dollars in processing and factory facilities to apparently expand their processing and retail-product-manufacturing capabilities well into the future.⁶⁵ C. Brewer Homes, Inc. and Mauna Loa Partners had proposed a merger that was disapproved by stockholders on June 26, 1998.⁶⁶ Because Mauna Loa Partners own substantial orchard area, such a merger could have indicated intentions to residentially develop orchards rather than replant or rejuvenate.

Grower/Processors and Processors

The processing industry in Hawaii was comprised of 8 firms at the end of 1997, down from 10 firms in 1991. Mauna Loa Macadamia Nut Corporation, MacFarms of Hawaii, and Hawaiian Host are the leading processors, accounting for more than 80 percent of Hawaii's processed macadamia nuts. The remainder of the industry consists of small firms that own orchards or 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. Information on six of these processors was obtained by Commission staff during fieldwork in Hawaii and is provided in table 2-2.⁶⁷

Of the six processors in table 2-2, the four largest are corporately-owned subsidiaries.⁶⁸ Of the remaining two, one is a cooperative and one is a family-owned firm. At peak season, these six

⁶⁴ USITC staff interview with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

⁶⁵ Information on such investment by MacFarms of Hawaii and Mauna Loa Macadamias was received by USITC staff in two facsimiles: from R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, June 2, 1998; and from D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 9, 1998.

⁶⁶ The PointCast Network, "Mauna Loa Macadamia Partners, LP Reports First Quarter 1998 Operating Results," May 16, 1998, 12:13 AM EDT, p. 1.

⁶⁷ The Commission did not obtain information for K. Oue Ltd. The Commission staff did interview representatives of Hamakua Sunrise Macadamia Nut Company in Kailua-Kona, HI, but they requested that their information be treated as business confidential.

⁶⁸ This figure includes the Hawaiian Macadamia Co., that no longer exists. As explained below, the firm was sold in 1998 to a Honolulu candy manufacturer that operates the facilities under its own name.

Table 2-2
Comparative attributes of major U.S. (Hawaiian) macadamia processors

	Mauna Loa Macadamias	MacFarms of Hawaii	Hawaiian Host	Hawaiian Macadamia Company	Kona Pacific Farmers' Cooperative	Kamigaki enterprises
Firm type	owned subsidiary	owned subsidiary	privately owned company	owned subsidiary	farmer-owned cooperative	family-owned company
General activities	grower/processor	grower/processor	processor	grower/processor	farm services provider, processor	grower/processor
1997 processings:						
NIS (<i>metric tons</i>)	19,225	about 6,000	(¹)	(¹)	(²)	454
Kernel (<i>metric tons</i>)	3,722	about 1,500	(¹)	(²)	113	136
Peak season employment	500	220-250	200	85	55	17
Marketing personnel	50	12	(¹)	1 person or less	None	2
Owned orchards (hectares)	none owned; C. Brewer farms 3,549 hectares of others	1,619	6.1	344	none owned by the cooperative	26.3-28.3
Own orchard output, NIS (<i>metric tons</i>)	none	(¹)	insignificant	(¹)	(²)	272-318
Break-even price estimate for NIS ³ (dollars/ kilogram)	(¹)	\$1.54 for Hawaii	(¹)	(²)	\$1.21-\$1.32	(²)
NIS purchases from other growers	varying amounts	40% of processings	100% of needs as not a grower	none	varying amounts	12.5-17% of processings
Major products	bulk kernel, retail	bulk kernel, retail	retail	bulk kernel	bulk kernel, roasted kernel in lb. bags	bulk kernel, retail line
Major export markets	Asia	South Korea Taiwan Europe	Asia	none	Asia, Far East	none
Percent of revenue to market-related activities	30	20`	(¹)	insignificant	insignificant	insignificant
Purchase of kernel imports	varying amounts	varying amounts	(¹)	none	none	none
State of business volume	declining	declining	(¹)	declining	strong, steady	declining

¹ This information was confidential business in nature and was not reported.

² Not available.

³ These breakeven price (or "cost") estimates are meant only as approximate indications of per-kilogram NIS production costs and should be examined and compared across U.S. and Australian industries with caution for a number of reasons. First, although the estimates were elicited by oral interview from U.S. and Australian macadamia processors, many of whom are growers or grower-associated, estimates were not elicited from independent and affiliated growers, who were too numerous to interview. Second, estimates were informally elicited orally, and although staff attempted to standardize the individual interviews as much as possible across processors, respondents may have had non-uniform conceptions of which production cost components to include in the breakeven price estimates. For example, some estimates may include, and some exclude, such cost components as interest charged on capital, all imputed management fees, and fixed costs not usually examined in day-to-day financing of production activities. At best, the estimates provide a general idea of NIS production costs for a major group of grower interests.

Notes.—NIS refers to macadamia nut in shell at 20 percent moisture content. US\$ refers to U.S. dollars. "Insignificant" means a value which is not significant enough to consider. "Marketing personnel" refers to workers with duties related to sales, product, and market development.

macadamia processors employ up to about 1,100 workers, of which the three largest processors employ from 920 to 950 people.

The processors in table 2-2 are either very large or very small, with size determined by volumes of 1997/98 kernel processings. In 1997/98, Mauna Loa Macadamias processed 3,700 metric tons, and MacFarms of Hawaii processed 1,500 metric tons, of kernels.⁶⁹ The two largest processors accounted for more than three fourths of the State's 1997/98 processings. Each of these three larger firms focused on allocating processed kernels to, and marketing, its own branded line(s) of retail products.⁷⁰ Aside from Kamigaki enterprises, which allocates one-tenth of its kernel processings to its own line of macadamia candies, the smaller processors in table 2-2 supply bulk kernel primarily to small- and mid-sized Hawaiian candy makers and confectioners, who have encountered problems in securing long-term supplies from larger Hawaiian processors.⁷¹

Investments in, and expenses related to, sales, marketing, and product development are generally substantial for the two largest Hawaiian processors shown in table 2-2. Mauna Loa Macadamias' and MacFarms of Hawaii allocate from 20 to 30 percent of their revenues to such activities. The three smaller firms service local markets and/or clients who participate in local and niche markets, so as to preclude the need to incur substantial marketing expenses. Personnel dedicated to such activities vary widely from none to as many as 50.

Most of the six Hawaiian processors reported noticeable declines in business volumes in 1998. Kona Pacific Farmers' Cooperative reported a steady business volume. The cooperative's business was attributed to a demand by small- and mid-sized candy manufacturers and confectioners that still outpaces the cooperative's supply.⁷²

Mauna Loa Macadamia Nut Corporation

Mauna Loa Macadamia Nut Corporation (Mauna Loa Macadamias), Hawaii's largest macadamia processor, cooperates with a number of grower and farm management firms to procure kernel for processing, but does not itself directly own orchards or grow macadamia nuts. The firm is owned by C. Brewer, which is in turn, owned by Buyco, Inc.⁷³ Mauna Loa Macadamias processed 19,255 metric tons NIS into 3,722 metric tons of kernel in 1997/98.⁷⁴ Mauna Loa purchases primarily

⁶⁹ Hawaiian Host elected not to report processing volume.

⁷⁰ Transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI: testimony of R. Vidgen, president, MacFarms of Hawaii, pp. 30-40; and testimony of T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, pp. 58-61. See also a facsimile sent to USITC staff from D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 22, 1998.

⁷¹ USITC staff interviews: with M. Nakamura, president, Hawaiian Macadamia Co., Keaau, HI, Mar. 26, 1998; with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; and with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

⁷² USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

⁷³ Information was obtained from two sources: Mauna Loa Macadamia Partners, LP, 10-K Report, filed with the Securities Exchange Commission, Mar. 23, 1998, p. 3; and a USITC staff interview with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 26, 1998.

⁷⁴ Information was received by USITC staff in two facsimiles from D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 9 and July 20, 1998.

domestic kernel, and expects to import less than 3 percent of its 1998 needs.⁷⁵

Mauna Loa Macadamias processes and markets macadamias as bulk products and in its established *Mauna Loa* line of retail products.⁷⁶ Mauna Loa Macadamias' bulk sales constituted from 5 to 6 percent of revenues since the early 1990s, and primarily are 25-pound and 50-pound vacuum-packed cartons of macadamias sold to various "ingredient nut" users. These bulk containers are generally kernel halves and pieces (style IV) and diced kernels; the firm does not sell retail wholes and half kernels (style II) in order to service their *Mauna Loa* line of retail products.

The *Mauna Loa* line of retail products includes, among other products, kernel of different flavors in variously sized jars and cans; bags, cans, and jars of macadamia kernel mixes; boxes of chocolate-enrobed macadamia kernels and other macadamia candies; macadamia cooking oil; and roasted kernel snack packs of differing sizes.⁷⁷ About 40 percent of the retail packaging of the *Mauna Loa* retail line is done at the firm's Hilo processing and factory facilities, with the remainder done on the U.S. mainland. The product packed in Hawaii is primarily sold in Hawaii and Asia. Most of the firm's 1997/98 export sales were made in Japan and various other Asian markets.

MacFarms of Hawaii

MacFarms of Hawaii, Inc. (MacFarms of Hawaii) is a totally owned subsidiary of Arnotts Ltd., which is in turn a totally owned subsidiary of Campbell Soup Company, USA.⁷⁸ In addition to marketing and sales offices in Sacramento, MacFarms of Hawaii has its corporate and grower operations centered in Kapu'a, near Captain Cook, Hawaii.⁷⁹ MacFarms of Hawaii is the second-largest processor, accounting for 20 to 25 percent of the nuts processed in Hawaii. The firm owns and operates 1,619 hectares of orchards in South Kona on Hawaii Island; owns 225,000 trees; leases 7,200 trees; and farms another 4,800 trees on a contract basis.⁸⁰ To supplement its own growing operations, the firm also purchases about 40 percent of its kernel requirements from 400 independent Hawaiian growers, often on 3-year contracts.⁸¹ At the height of cracking season (hereafter, peak season), MacFarms of Hawaii employs from 220 to 250 workers.⁸²

MacFarms of Hawaii's focus has been increasingly on marketing its own *MacFarms of Hawaii* and

⁷⁵ USITC staff interview with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 26, 1998; and a facsimile sent to USITC staff by D. Simonis, July 20, 1998.

⁷⁶ Information was received by USITC staff in a facsimile from D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 9, 1998.

⁷⁷ USITC staff interviews with D. Simonis, senior vice president and chief financial officer, and with M. Cromey, director of quality assurance/product development, of Mauna Loa Macadamias, at Mauna Loa Macadamias factory and offices, Hilo, HI, Mar. 26, 1998, and in two facsimiles from D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 9 and July 20, 1998.

⁷⁸ Information was received by USITC staff in a facsimile from R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, June 2, 1998.

⁷⁹ Captain Cook is the firm's mailing address and is used throughout.

⁸⁰ Information was received by USITC staff in a facsimile from R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, June 2, 1998. See also R. Vidgen, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, p. 38.

⁸¹ R. Vidgen, president, MacFarms of Hawaii, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, p. 38.

⁸² USITC staff interview with R. Vidgen, president of MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

other brands of retail products, and has evolved away from supplying bulk products.⁸³ By 1997, MacFarms of Hawaii had become into an increasingly retail-oriented processor with 45 percent of its processed kernel sold in branded retail products and 55 percent sold as bulk, as compared with the early 1990s, when the firm sold 85 percent of its processed kernel into the bulk markets and 15 percent as ingredients into its lines of retail products.⁸⁴ MacFarms of Hawaii's bulk or industrial product sales are distributed approximately evenly among sales of (style IV) kernel halves and pieces, variously sized grades of diced kernel, and variously sized grades of whole kernel.⁸⁵ The *MacFarms of Hawaii* line of retail products includes, among other products, roasted, roasted and salted, and natural kernels in variously sized cans and jars; boxes of chocolate-enrobed macadamias and macadamia candies; and variously sized snack packs of roasted kernels.⁸⁶ Export markets include Japan, South Korea, and Europe.⁸⁷

Hawaiian Host, Incorporated

Hawaiian Host, Incorporated (Hawaiian Host) differs from the other two grower/processors in two ways: (a) the firm is exclusively a processor/retail marketer, and hence purchases, but does not grow,⁸⁸ the macadamias it processes; and (b) the firm also markets almond-based products.⁸⁹ Hawaiian Host annually produces an undisclosed amount of processed kernel. Hawaiian Host prefers Hawaii-grown macadamias, and currently purchases an undisclosed amount of its input on Hawaiian spot markets for processing.

Hawaiian Host processes kernels for its two lines of retail products. The *Hawaiian Host* line primarily features macadamia products, along with some almond-based products, which are marketed in the Hawaiian and export (particularly Asian) markets.⁹⁰ The *California Host* line also

⁸³ R. Vidgen, president of MacFarms of Hawaii, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 44-50. In addition to the *MacFarms of Hawaii* line, the firm also markets such other lines as *Kona Select Harvest* products in chain stores on the U.S. mainland. This information on other brands was obtained from R. Vidgen: a facsimile received by USITC staff on July 23, 1998, and in a telephone conversation with USITC staff, July 24, 1998.

⁸⁴ Information on the sales proportions during the early 1990s was obtained in a USITC staff interview with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998. Information on current sales proportions was provided to USITC staff in a telephone communication with R. Vidgen, president, MacFarms of Hawaii, May 6, 1998. Also, see R. Vidgen, president of MacFarms of Hawaii, transcript of the hearing, Apr. 30, 1998, Washington, DC, p. 96.

⁸⁵ Information on MacFarms of Hawaii's major bulk products was received by USITC staff in two facsimiles from B. Loader, vice president of sales, MacFarms of Hawaii, Sacramento, CA, June 1 and 2, 1998.

⁸⁶ USITC staff interview with R. Vidgen, president of MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

⁸⁷ R. Vidgen, president, MacFarms of Hawaii, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 59-62, and 88.

⁸⁸ Hawaiian Host owns 15 acres of Hawaiian macadamia orchards, but the company does not consider such production as substantial. USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

⁸⁹ USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998; and Hawaiian Host, Inc., *Hawaiian Host, Hawaii's Gift to the World*, commercial promotional brochure (Honolulu, HI: Hawaiian Host, Inc., n.d.).

⁹⁰ Hawaiian Host, Inc., *Hawaiian Host, Hawaii's Gift to the World*, commercial promotional brochure (Honolulu, HI: Hawaiian Host, Inc., n.d.), pp. 7-22. That Hawaiian Host exports to Asia was implied by the cited brochure, which listed a Tokyo office as its only foreign office (p. 7). During fieldwork by

features macadamia- and almond-based products that are apparently marketed on the U.S. mainland. Both lines are also marketed in retail stores at airports.⁹¹ Products include chocolate-enrobed kernels, and primarily dry-roasted macadamia and almond kernels in varying package sizes and types.⁹² The lines also include boxes of candies combining macadamias, caramel, crisp rice, and different kinds of chocolate (milk, dark, and white chocolates); an array of different macadamia- and almond-based candy bars; and roasted kernels in cans (salted and unsalted).⁹³ Hawaiian Host does not co-pack products for other brands or for other entities such as hotels or Japanese travel/gift catalog companies.⁹⁴

For competitive reasons, Hawaiian Host elected not to discuss if current sales were increasing, steady, or declining.⁹⁵ The firm did note that it is encountering increased competition in both domestic and Asian markets.

Hawaiian Macadamia Co., Inc.

The Hawaiian Macadamia Co., Inc. (Hawaiian Macadamia Company or HMC) was once owned by the Mutual Life Insurance Co., and grew and processed macadamia nuts. The Hawaiian Macadamia Co. (HMC) no longer exists: it was sold in early 1998 to a Hawaiian candy manufacturer that continues to operate HMC facilities, but not as HMC.⁹⁶ With 344 hectares (850 acres) of orchards and an annual processing capacity of from 1,360 metric tons to 2,268 metric tons, the Hawaiian Macadamia Co. was Hawaii's fourth-largest grower/processor.⁹⁷ In 1997/98, the firm harvested and processed substantial amounts of kernels.⁹⁸ The firm processed only NIS crop from its own orchards, and does not use imported kernels, because of problems encountered with uncertain quality.⁹⁹

Hawaiian Macadamia Co. supplied primarily raw, and a lesser volume of roasted, kernels of various

USITC staff during Mar. 24-31, 1998, *California Host* products were observed only on the U.S. mainland, and not in Hawaii.

⁹¹ Staff observation during travel, Mar. 23 through Apr. 10, 1998.

⁹² Information was obtained by USITC staff from two sources: Hawaiian Host, Inc., *Hawaiian Host, Hawaii's Gift to the World*, commercial promotional brochure (Honolulu, HI: Hawaiian Host, Inc., n.d.), pp. 7-22. That Hawaiian Host exports focus on Asia was implied by the cited brochure, which listed a Tokyo office as its only foreign office (p. 7).

⁹³ Information was obtained by USITC staff from two sources: Hawaiian Host, Inc., *Hawaiian Host, Hawaii's Gift to the World*, commercial promotional brochure (Honolulu, HI: Hawaiian Host, Inc., n.d.), pp. 4-7; and a USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

⁹⁴ USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

⁹⁵ Facsimile sent to USITC staff from K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, July 1, 1998.

⁹⁶ USITC staff telephone communication with M. Nakamura, former president, the now-defunct HMC, Keaau, HI, July 16, 1998.

⁹⁷ USITC staff interview with M. Nakamura, president, Hawaiian Macadamia Company, Inc. (Hawaiian Macadamia Company), Keaau, HI, Mar. 26, 1998.

⁹⁸ The volumes harvested and processed is confidential business information.

⁹⁹ USITC staff interview with M. Nakamura, president, Hawaiian Macadamia Company, Keaau, HI, Mar. 26, 1998.

styles to Hawaiian candy makers and confectioners.¹⁰⁰ The firm supplied a different group of clients than the larger grower/processors: smaller kernel-using operations that have orders too low in volume or in kernel styles that larger processors reserve for their own retail brands.¹⁰¹ The Hawaiian Macadamia Co. nearly exclusively supplied the smaller Hawaiian candy makers and confectioners that, unable to compete on a unit cost basis with firms such as MacFarms of Hawaii or Mauna Loa Macadamias, have developed niche markets based on high quality and premium priced macadamia candy and confectionary products often produced under labor-intensive conditions.¹⁰² Due to the local nature of its market, Hawaiian Macadamia Co. did not make substantial investments in sales, product, or market development activities.

Kamigaki Orchards and Kona Coast Nuts and Candy

Kamigaki Orchards and Kona Coast Nuts and Candy (hereafter Kamigaki enterprises)¹⁰³ is a family-owned, integrated grower, processor, value-added manufacturer, and retailer of macadamia nuts and related products.¹⁰⁴ Centered in Hawaii Island's Kona district, Kamigaki enterprises includes from 26 to 28 hectares of macadamia orchards planted in the 1960s; a processing plant; and a chocolate candy factory and retail outlet specializing in macadamia retail products. Kamigaki enterprises annually processes 454 metric tons of NIS crop into 136 metric tons of kernel. From 12 to 17 percent of this NIS crop is produced in Kamigaki orchards, with the remainder purchased from independent growers.¹⁰⁵

Kamigaki enterprises markets both bulk kernels and retail macadamia products. Of Kamigaki enterprises' total processed kernels, 75 percent is sold as bulk raw kernels to other Hawaiian candy manufacturers (reportedly producers of high quality products for niche markets); 15 percent is sold as bulk kernels on the U.S. mainland; and 10 percent is processed into the firm's own line of retail macadamia products for sale in the firm's retail outlets.¹⁰⁶ With 75 percent of its bulk sales and all of its retail sales occurring locally in Hawaii, Kamigaki enterprises does not incur substantial expenses related to sales, product, and market development, aside from the salaries of two employees with sales-related duties.

Kona Pacific Farmers' Cooperative

Established in 1956, the Kona Pacific Farmers' Cooperative (KPFC) processes macadamia nuts and

¹⁰⁰ Ibid.

¹⁰¹ USITC staff interviews: with M. Nakamura, president, Hawaiian Macadamia Company, Keaau, HI, Mar. 26, 1998; and N. Arakaki, president, Hawaiian Candies and Nuts, Ltd., Honolulu, HI, Mar. 31, 1998.

¹⁰² Ibid.

¹⁰³ This term "Kamigaki enterprises" hereafter refers collectively to Kamigaki Orchards and Kona Coast Nuts and Candies, and does not refer to "Kamigaki Enterprise," another firm with no connection to the above-mentioned orchards or candy factory.

¹⁰⁴ USITC staff interview with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; and R. Kamigaki, owner, Kamigaki enterprises, posthearing brief, Apr. 4, 1998.

¹⁰⁵ Information was obtained in a facsimile to USITC staff from R. Kamigaki, Kamigaki enterprises, Kailua-Kona, HI, Aug. 19, 1998.

¹⁰⁶ USITC staff interview with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998.

Kona coffee produced by its 320 member/farmers.¹⁰⁷ The cooperative's membership represents a combined 324 hectares (800 acres) divided approximately evenly between macadamia nuts and Kona coffee, with the intercropping of macadamia nuts and Kona coffee common among members.¹⁰⁸ KPFC is Hawaii's sixth-largest macadamia processor (113 metric tons of kernels processed in 1997), and employs a peak season workforce of 55. The cooperative's gross revenue is estimated at about \$3 million annually from sales of processed macadamia nuts and Kona coffee.¹⁰⁹

KPFC offers harvesting, hauling, husking, and cracking services for its members.¹¹⁰ Additionally, the cooperative occasionally purchases NIS crop from nonmember growers when processing needs arise, and at the same prices paid to member growers. KPFC purchases member NIS (preferably unhusked) with an agreement to pay at least 70 percent within 90 days of delivery, and the remainder by year's end.¹¹¹

KPFC processes NIS crop into raw and roasted kernels for sale to three principal types of clients: small- to medium-sized candy maker and confectioner operations; Hawaiian wholesalers and store chains; and Asian and Far Eastern "co-packing clients" that package KPFC products to market under their own company names.¹¹² These candy making and confectionary operations are willing to pay premium prices for steadiness of supply and small quantities.

KPFC supplies processed and packaged kernels and kernel products (such as one-pound bags of roasted and salted kernels) to Hawaiian wholesalers and store chains. On occasion, KPFC has marketed processed kernel on the U.S. mainland. The cooperative also supplies retail macadamia products to Far Eastern co-packers in certain Asian and Far Eastern markets. The cooperative

¹⁰⁷ USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative (KPFC), Captain Cook, HI, Mar. 24, 1998.

¹⁰⁸ *Ibid.*

¹⁰⁹ Information was provided to USITC staff in a phone conversation with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, June 2, 1998.

¹¹⁰ USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

¹¹¹ Often, the remainder is paid before year's end. Information was obtained in a USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

¹¹² Information was obtained in a USITC staff interview with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998, and in a USITC telephone conversation with S. Agoot, June 2, 1998.

avoids sales, product, and marketing development costs because the onus to advertise and develop markets is undertaken by these clients on behalf of their own brands.

Trends in Production

Hawaii's production of NIS increased almost steadily from 21,773 metric tons (NIS) in 1992/93 to 26,309 metric tons in 1997/98 (table 2-1). The increases in NIS output during 1992/93-1997/98 were attributable to increases in bearing acreage and in yield per hectare. The farm value of production rose steadily from \$32.7 million in 1992/93 to \$44.1 million in 1996/97, reflecting an increased volume of macadamia nuts and higher prices. However, the value of production declined to \$43.5 million in 1997/98 as increased production was offset by lower prices.

Bearing hectares in Hawaii increased from 7,085 hectares in 1992/93 to a peak of 7,811 hectares in 1995/96, before declining slightly to 7,770 hectares in 1996/97 and 1997/98 (table 2-1). According to officials of the Hawaii Department of Agriculture, there were some new plantings of macadamia trees during 1992-97, but most were relatively small. Replanting and renovation of existing orchards were much more common. Hence, the bearing acreage may contain a substantial number of trees that are not of bearing age. MacFarms of Hawaii and C. Brewer (Mauna Loa) have not recently undertaken substantial new plantings to expand acreage. C. Brewer's last planting was a 186-hectare orchard in 1995.¹¹³ MacFarms of Hawaii recently replanted about 41 hectares to replace older orchards, and is considering leasing land formerly planted to sugar and/or lands within the Bishop Trust.¹¹⁴

Factors that affect macadamia nut yields include maturity of trees, grower prices, the volume and distribution of rainfall, night temperatures, diseases, pests, and horticultural practices.¹¹⁵ As orchards mature, yields drop as canopies form between trees.¹¹⁶ These canopies provide havens for pests, vermin, and insects, and can retard new wood growth, and hence future yield increases.^{117, 118} According to industry officials, these relationships contributed to the variation in yields during 1992/93-1997/98 (table 2-1).¹¹⁹

¹¹³ USITC staff interview with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

¹¹⁴ USITC staff interview with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

¹¹⁵ USITC staff interviews: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

¹¹⁶ USITC staff interview with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

¹¹⁷ Ibid.

¹¹⁸ Macadamia buds are produced on wood that is at least 2 years old. Anything that reduces the development of new wood or damages old wood will reduce the volume of wood available for new fruiting buds to form on and produce nuts.

¹¹⁹ USITC staff interview with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

It is anticipated that macadamia nut yields and production in Hawaii will rise only modestly in the future because planted area has not increased. Production in 1998/99 may actually decline as a result of drought on the Kona side of Hawaii Island. In 1997, 59 percent of the trees were 14 years and older, meaning they were near or at their optimum bearing-age (table 2-3).¹²⁰ Twenty-two percent of the trees were between the ages of 8 and 13 years, and 19 percent of the trees were 7 years and younger. The grouping of trees that are 8-13 years old includes the last of the major new plantings of macadamia trees in Hawaii and includes the largest ever annual planting in 1985/86 totaling 1,376 hectares. In 1997, 96 percent of the trees 13 years and younger were owned or farmed by processors or under long-term supply contracts to processors, as were 93 percent of the trees 14 years and older. According to data of the Hawaii Agricultural Statistical Service, there were 1.6 million macadamia trees in Hawaii during the 1997/98 season, of which 92 percent were 6 years or older.¹²¹

Processors' Recovery of Kernels

Macadamia nut processors' recovery of raw kernels¹²² from in-shell nuts increased almost steadily from 4,672 metric tons in 1992/93 to 7,031 metric tons in 1997/98 (table 2-4). The recovery rate is affected by losses detected at the processor's plant, but not at the farm. Such losses include nuts that were not of acceptable quality because they were moldy, rotten, immature, germinating, or damaged in other ways (such as insect damage).

During 1992/93-1997/98, the equivalent wholesale value of bulk macadamia kernel production at the processor level increased steadily from \$47.0 million to a record high of \$76.4 million (table 2-4). Increased kernel recovery and an increase in the average wholesale price in 1997/98 contributed to the record wholesale value.

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

In-shell macadamia nuts

U.S. processors can procure in-shell nuts for further processing from three sources: (1) orchards that are owned, leased, rented, or farmed under contract by the processor, (2) independent growers, or (3) imports. However, for all practical purposes, there are no imports of in-shell macadamia nuts because of U.S. phytosanitary regulations. (See discussion in the section on "Import Restrictions" for more detail).

¹²⁰ Compiled from data submitted by growers and grower/processors in response to questionnaires of the U.S. International Trade Commission.

¹²¹ Hawaii Agricultural Statistics Service, *Hawaii Macadamia Nuts, Final Season Estimates*, July 7, 1998, p. 2.

¹²² Recovery rate is equal to kilograms of kernel recovered divided by kilograms of net production (wet-in-shell).

Table 2-3
Hawaiian macadamia trees: Age distribution of trees devoted to macadamia nut production,
by ownership types, 1992-97

Ownership type and age	1992	1993	1994	1995	1996	1997
	<i>Quantity (1,000 trees)</i>					
Independent grower holdings:						
7 years and younger	13	17	13	12	11	11
8-13 years	12	30	31	31	29	31
14 years and older	16	21	29	31	38	44
Total	41	68	73	74	78	86
Processor holdings: ¹						
7 years and younger	321	193	184	195	205	192
8-13 years	257	368	299	258	203	203
14 years and older	429	415	475	515	564	588
Total	1,007	976	958	968	972	983
Total holdings:						
7 years and younger	334	210	197	207	216	203
8-13 years	269	398	330	289	232	234
14 years and older	445	436	504	546	602	632
Grand total	1,048	1,044	1,031	1,042	1,050	1,069
	<i>Percentage of total trees</i>					
Independent grower holdings:						
7 years and younger	31	25	18	17	14	13
8-13 years	30	45	42	42	37	36
14 years and older	39	30	40	41	49	51
Total	100	100	100	100	100	100
Processor holdings:						
7 years and younger	32	20	19	20	21	20
8-13 years	26	37	31	28	21	21
14 years and older	42	43	50	52	58	59
Total	100	100	100	100	100	100
Total holdings:						
7 years and younger	32	20	19	20	21	19
8-13 years	26	38	32	28	22	22
14 years and older	42	42	49	52	57	59
Grand total	100	100	100	100	100	100

¹ Includes data for orchards that are under long term supply contracts with processors.

Source: Compiled from data submitted by 77 growers and 4 U.S. processors in response to questionnaires of the U.S. International Trade Commission. These growers and processors accounted for 69 percent of the macadamia trees planted in Hawaii in 1997.

Table 2-4

Macadamia nuts: Kernel recovery by processors, average wholesale prices, and wholesale values, crop years 1992/93 to 1997/98

Crop year ¹	Kernel recovered <i>)) Metric tons))</i>	Recovery rate <i>Percentage</i>	Kernel (bulk shelled)	
			Average wholesale price <i>Dollars/ kilogram</i>	Equivalent wholesale value ² <i>))) Million dollars —</i>
1992/93	4,672	21.5	10.05	47.0
1993/94	5,080	23.1	10.14	51.5
1994/95	5,035	21.6	10.60	53.4
1995/96	5,171	22.8	10.86	56.2
1996/97	6,486	25.3	10.75	69.7
1997/98	7,031	26.7	10.86	76.4

¹ Crop year beginning July 1 and ending June 30 of the following year.

² 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.

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

Hawaiian processors frequently purchase NIS from independent Hawaiian growers and supplement needs with imported kernel. Processor purchases of NIS from independent growers increased from 12 percent of total procurement in 1992 to 15 percent in 1994, decreased in 1995 to 13 percent before rising sharply in 1996 to 26 percent (table 2-5). The ratio edged downward in 1997 to 20 percent. The rise in the share of NIS purchased by processors from independent growers is believed to be the result of the continued consolidation of the Hawaiian processing industry. Also, the number of independent growers of macadamias increased over the 1992-97 period. Five of the six major Hawaiian macadamia processors purchase NIS crop grown by independent farmers (table 2-5).

In addition to Mauna Loa Partners, C. Brewer-owned farm management companies farm and harvest the NIS crop of 16 entities in order to supply kernel to Mauna Loa Macadamias. MacFarms of Hawaii has, since 1997, relied increasingly on independent growers for supplemental NIS supplies, and currently purchases 40 percent of its needs from 400 Hawaiian growers, often on 3-year contracts.¹²³ Not being a significant grower, Hawaiian Host purchases virtually all of its NIS and kernel needs.¹²⁴ Kona Pacific Farmers' Cooperative occasionally purchases NIS crop from nonmember growers at member prices, while Kamigaki purchases from 30 to 40 percent of its NIS needs from independent local growers.¹²⁵

¹²³ R. Vidgen, president, MacFarms of Hawaii, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, p. 38.

¹²⁴ Hawaiian Host considers percentages of kernel needs purchased from Hawaiian sources as business confidential. USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

¹²⁵ USITC staff interviews: with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998; and with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998.

Table 2-5
In-shell macadamia nuts: Processors' procurement from owned, leased, or rented orchards¹
and from independent growers, 1992-97

Procurement method	1992	1993	1994	1995	1996	1997
	Quantity (<i>metric tons</i>)					
Orchards owned, leased, or rented	19,823	17,412	18,876	20,297	18,319	21,355
Independent growers	2,722	2,849	3,337	3,053	6,452	5,474
Total	22,545	20,261	22,213	23,350	24,771	26,829
	Percentage of total volume of nuts					
Orchards owned, leased, or rented	88	86	85	87	74	80
Independent growers	12	14	15	13	26	20
Total	100	100	100	100	100	100

¹ Data include processors' procurement of in-shell macadamias under long term contracts from growers.

Source: Compiled from data submitted by 5 U.S. processors in response to questionnaires of the U.S. International Trade Commission. These 5 U.S. processors accounted for approximately 90 percent of the macadamia nut production processed in Hawaii in 1997.

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 believed to be negligible. However, purchases of raw kernels from foreign sources are substantial. During 1992-97, domestic processors' purchases of raw kernels from foreign sources ranged from a low of 523 metric tons in 1992 to a high of 1,046 metric tons in 1995 (table 2-6). Purchases of imported kernels then declined to 659 metric tons in 1997. It is believed that the principal reason for this decline was the severing of the relationship between MacFarms of Hawaii and MacFarms of Australia, as MacFarms of Hawaii had been marketing a portion of MacFarms of Australia's production on the U.S. mainland.¹²⁶ As a share of processors' total kernel supply, purchases from foreign sources increased irregularly from 10 percent in 1992 to a peak of 19 percent in 1995. The share then declined to 13 percent in 1997.

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

Growing Operations

Employment in macadamia nut growing operations varies and depends largely on the size of the operation. Orchards under six hectares are usually operated by the owner and family members, and hired employment, if any, is used during the harvesting season.

¹²⁶ The Peninsular Group/Australian MacFarms, prehearing brief, Apr. 3, 1998.

**Table 2-6
Macadamia kernels: Production of raw kernels from domestic macadamia nuts and purchases of imported kernels by domestic processors, 1992-97**

Item	1992	1993	1994	1995	1996	1997
	Quantity (1,000 metric tons)					
Raw kernels produced from domestic nuts	4,748	4,155	4,262	4,461	4,545	4,590
Procurement of imported raw kernels	523	872	677	1,046	855	659
Total supply of kernels	5,271	5,027	4,939	5,507	5,400	5,249
	Percentage of total kernels					
Raw kernels produced from domestic nuts	90	83	85	81	84	87
Procurement of imported raw kernels	10	17	15	19	16	13
Total supply of kernels	100	100	100	100	100	100

Source: Compiled from data submitted by 5 U.S. processors in response to questionnaires of the U.S. International Trade Commission. These 5 U.S. processors accounted for approximately 90 percent of the macadamia nut production processed in Hawaii in 1997.

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 2-7. Total hours worked, including unpaid hours worked by owners/family, rose irregularly from 803,504 hours in 1993 to 919,680 hours in 1997. Total hours worked in 1997 were 14 percent higher than those in 1993.

Total hours for independent growers increased steadily and by 49 percent over the 1993-97 period, from 89,772 hours to 133,847 hours (table 2-7). The steady growth in hours worked by independent growers reflects the growth in output of macadamia nuts by these growers. Employment in growing operations of processors, including growers with long-term supply contracts with processors, increased irregularly during 1993-97 from 713,732 hours to 785,833 hours. The trend in man-hours worked in the growing operations of processors reflects the changes (increases) in NIS production by these firms' orchards over the period, with the exception of 1994 when hours worked declined and production increased.

Processing Operations

The average number of workers, hours worked, and wages paid by domestic macadamia nut processors during 1992-97, as reported in the Commission's questionnaire, are presented in table 2-8. A significant portion of the number of workers, hours worked, and wages paid by processors may involve the further manufacturing of kernels into retail products by these firms. The average number of production and related workers engaged in the processing of macadamia kernels and kernel products fluctuated over the period from a low of 549 workers in 1996 to a high of 611 workers in 1997. Total wages paid and hours worked by these workers showed no discernible trend over the period. However, the average wage rate paid to production and related workers increased steadily from \$7.92 per hour in 1992 to \$9.21 per hour in 1997.

Table 2-7

Macadamia nut growing operations: Number of hours worked by full-time production and related workers, number of hours worked by seasonal employees, and number of unpaid hours worked by owners/family in growing macadamia nuts, 1992-97

Item	(Hours)					
	1992 ¹	1993	1994	1995	1996	1997
Independent growers:						
Full-time paid		23,047	24,338	29,081	30,557	36,587
Seasonal paid		29,768	32,464	36,674	43,781	47,268
Unpaid man-hours by owners/family		36,957	39,902	40,275	48,162	49,992
Total		<u>89,772</u>	<u>96,704</u>	<u>106,030</u>	<u>122,500</u>	<u>133,847</u>
Processors' growing operations: ²						
Full-time paid		296,516	265,739	294,497	282,387	330,374
Seasonal paid		417,216	419,310	449,767	444,795	455,459
Unpaid man-hours by owners/family		0	0	0	0	0
Total		<u>713,732</u>	<u>685,049</u>	<u>744,264</u>	<u>727,182</u>	<u>785,833</u>
Total:						
Full-time paid		319,563	290,077	323,578	312,944	366,961
Seasonal paid		446,984	451,774	486,441	488,576	502,727
Unpaid man-hours by owners/family		36,957	39,902	40,275	48,162	49,992
Grand total		<u>803,504</u>	<u>781,753</u>	<u>850,294</u>	<u>849,682</u>	<u>919,680</u>

¹ Data for 1992 not reported because a substantial number of firms no longer had employment records for that year.

² Data include growing operations that produce macadamia nuts under long-term supply contracts to processors.

Source: Compiled from data submitted by 77 growers and 5 U.S. processors in response to questionnaires of the U.S. International Trade Commission.

Table 2-8

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 nut processing operations, and wages paid, 1992-97

Item	1992	1993	1994	1995	1996	1997
Average number employed in the reporting establishment in which macadamia nuts were processed:						
All persons (number)	1,102	1,075	1,068	1,096	1,055	1,080
Production and related workers:						
All operations (number)	886	845	851	875	853	877
Macadamia nuts (number)	600	556	573	570	549	611
Hours worked by production and related workers producing:						
All products (1,000 hours)	1,673	1,584	1,650	1,633	1,582	1,628
Macadamia nuts (1,000 hours)	1,376	1,262	1,298	1,245	1,172	1,247
Wages paid to production and related workers producing:						
All products (1,000 dollars)	16,829	15,632	16,324	16,213	16,452	17,497
Macadamia nuts (1,000 dollars)	10,896	10,096	10,925	10,632	10,610	11,492
Average wage rate paid to production and related workers producing:						
All products (dollars)	10.06	9.87	9.89	9.93	10.40	10.75
Macadamia nuts (dollars)	7.92	8.00	8.42	8.54	9.05	9.22

Source: Compiled from data submitted by 5 U.S. processors in response to questionnaires of the U.S. International Trade Commission. These 5 U.S. processors accounted for approximately 90 percent of the macadamia nut production processed in Hawaii in 1997.

U.S. Prices

Farm Prices

Price determination

There are two methods of farm price formation for in-shell nuts in the Hawaiian market--long-term contracts and the spot market.¹²⁷ Long-term contracts (set annually at the start of the season) govern the sales of up to two-thirds of Hawaiian macadamia nut production. In the spot market, major Hawaiian processor interests purchase in-shell nuts by publishing NIS price offers at various times throughout the season.¹²⁸ The spot market covers about 20 to 25 percent of all macadamia nuts sold at the farm level. The remainder of the production is not priced but is transferred from a firms' captive growing operation to its processing operation.

The most important contract price is that paid by Mauna Loa Macadamias to its growers, such as Mauna Loa Partners. This price is important not only because Mauna Loa Macadamias purchases nearly one-half of the nuts grown in Hawaii, but because its price is a major factor in the average annual price reported by the USDA, which in turn is used as a guide for prices paid by other processors.¹²⁹ The USDA price also affects the price paid by Mauna Loa Macadamias in succeeding years, because of the way Mauna Loa Macadamias' contract prices are determined. The contract price is based 50 percent on the current year processing and marketing returns of Mauna Loa Macadamias and 50 percent on the average U.S. farm price for macadamia nuts as reported by the U.S. Department of Agriculture for the preceding two years.¹³⁰ The USDA-reported price in turn is heavily influenced by Mauna Loa Macadamias' previous years' prices because of the firm's large share of the total market.¹³¹ Therefore, if Mauna Loa Macadamias' processing and marketing results improve in any single year, that improvement will be reflected in a higher price paid to Mauna Loa Partners in that year, which will raise the price reported by USDA for that year, which will automatically raise the price paid by Mauna Loa Macadamias in the following 2 years. In-shell prices paid for U.S.-grown nuts by other large U.S. processors are also generally determined through the provisions of long-term contracts.¹³²

Although imports can influence farm prices through the spot market, most of the direct influence of imports at the farm level is limited mainly to the ability of processors to use the availability of low-cost raw kernel imports as a means to negotiate lower prices with growers. Although the obligation of processors to purchase the entire crop of their contracted growers precludes their ability to turn away such growers, the price they pay for those growers' supply is subject to

¹²⁷ USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

¹²⁸ *Ibid.*

¹²⁹ USITC staff interview with D. Martin, Hawaii state statistician, HASS, Honolulu, HI, Mar. 30, 1998.

¹³⁰ See Mauna Loa Macadamia Partners, LP, 10-K report filed with the Securities Exchange Commission, Mar. 23, 1998, pp. 19-21.

¹³¹ USITC staff interview with D. Martin, Hawaii state statistician, HASS, Honolulu, HI, Mar. 30, 1998.

¹³² R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 38-39; and USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

negotiation, at least at the start of the season.¹³³ NIS buyers may seek to negotiate a reduction in next season's in-shell prices by arguing that their competition with rivals who use cheaper imported kernels is growing. Or, as alleged by some growers in interviews with Commission staff, NIS buyers may downgrade a larger share of a grower's shipment of nuts on the basis of quality, thereby effectively reducing the overall average price paid for a delivery of nuts.¹³⁴

Price levels and trends

U.S. farm prices for macadamia nuts have increased irregularly from a low point in 1992-93. Two series on recent trends in farm prices received by growers are reported in the following tabulation, with both being annual average unit values of delivered nuts to processors, net of nuts rejected because of low quality:

Year	Series A ¹	Series B ²
	<i>Dollars per kilogram</i>	
1992	1.39	1.50
1993	1.32	1.50
1994	1.43	1.52
1995	1.41	1.63
1996	1.48	1.72
1997	1.57	1.63

¹ Source: Responses to processor questionnaires submitted to the U.S. International Trade Commission.

² Source: Hawaiian Agricultural Statistical Service (HASS), *Hawaiian Macadamia Nuts, Preliminary Season Estimates*, Jan. 22, 1998.

Prices in series A, which are average unit values of nut purchases by grower-processors, rose from a low of \$1.32 per kilogram in 1993 to a high of \$1.57 per kilogram in 1997, an increase of 19 percent over the four-year period, or an average of four percent per year. Series B prices, which are average unit values calculated by dividing the net farm value of the Hawaiian crop by its quantity, as reported for the Hawaii industry by the Hawaiian Agricultural Statistics Service, rose from a low of \$1.50 per kilogram in 1992-93 to a high of \$1.72 per kilogram in 1996-97, an increase of 15 percent over the period, before declining by 5 percent to \$1.63 per kilogram in 1997/98. According to an industry representative, the recent decline in price was in large part the result of macadamia nuts being delivered with a higher moisture content. Other industry representatives suggested that the decline may be partially explained by growing world production

¹³³ During the season, the actual price paid by the processor can also diverge from the agreed contract price. Processors may adjust the net price to growers to account for nuts rejected because of rot, high moisture content, and other quality factors.

¹³⁴ An objective, standardized system of quality evaluation and control would help remedy this problem, according to the grower. USITC staff interviews: with J. Rosenthal, Hawaii macadamia nursery operator and grower, Kailua-Kona, HI, Mar. 27, 1998; and with S. Agoot, general manager, Kona Pacific Farmers' Cooperative, Captain Cook, HI, Mar. 24, 1998.

as newer orchards in Australia and elsewhere began bearing nuts, coupled with stagnating or declining demand in parts of Asia and Europe¹³⁵

Wholesale prices

Price Determination

Wholesale prices are paid to processors by distributors, retailers, institutions (e.g., hotels, restaurants), and other firms in the various market channels between the processor and the final consumer. Such prices vary by product form (e.g., whole kernels versus macadamia-filled cookies), container size (typically the larger the container the lower the unit price), marketing channel, and the brand under which the product is marketed.

The wholesale pricing of macadamia nuts and nut products is tied to prices at both the farm and retail/institutional levels. Wholesale nut prices are influenced by fluctuating supplies of nuts from farms that are subject to varying weather conditions, and on the demand side by the vagaries of consumer demand for a luxury product marketed primarily to tourists and other visitors to Hawaii. In addition, wholesale price determination is affected by the influence of a few firms with well-established brand names sustained by extensive advertising efforts.

Wholesale prices for products marketed through retail outlets are published in processors' list prices, which are then adjusted for other marketing activities such as promotional allowances, to arrive at a net price. Such list prices are adjusted frequently according to prevailing local market conditions. Long-term contracts at the wholesale level are rarely, if ever, used. In the institutional trade, prices often are set by individual negotiations between the processors and the distributors, because in some cases the product (or at least its packaging) is customized for the buyer. In such cases, standardized list prices are not feasible, although contracts of varying lengths are.

Price Levels and Trends

U.S. wholesale prices of raw macadamia kernels for further processing also generally rose during the 1992-96 period, before declining in 1997. Average wholesale unit values of kernels procured by processors for further processing are presented in the following tabulation of data compiled from USITC industry questionnaires:

¹³⁵ USITC staff interviews: with B. Wright and J. Wagaman, both of Blue Diamond, at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 12, 1998; and with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

Year	Quantity 1,000 kilograms	Value 1,000 dollars	Average unit value		Marketing margin ¹ Percentage
			Wholesale	Farm	
			—Dollars/kilogram—		
1992	538.6	5,296.3	9.83	1.38	86.0
1993	516.1	5,145.4	9.96	1.32	86.7
1994	577.2	5,957.5	10.31	1.43	86.1
1995	546.4	5,987.8	10.95	1.41	87.1
1996	512.4	5,731.6	11.17	1.48	86.8
1997	614.6	6,018.9	9.78	1.57	84.0

¹ Marketing margin=(Wholesale unit value - Farm unit value)/Wholesale unit value x 100.

Wholesale prices of kernels for processing rose steadily from a low of \$9.83 per kilogram in 1992 to a peak of \$11.17 per kilogram in 1996, an increase of 14 percent during the 5-year period. However, the subsequent decline in 1996-97, to \$9.78 per kilogram, more than erased the previous 5-year gain. The marketing margin rose during 1992-95, as wholesale price increases outpaced gains in farm-level nut prices.¹³⁶ However, during the recent decline, the fall in wholesale prices has exceeded the decline in farm-level prices, squeezing the processors' margin from a high of 87.1 percent in 1995 to 84 percent in 1997. This lag between changes in wholesale prices and changes in farm prices is due to the fact that, as described above, farm prices are in many cases set by long-term contracts that take into account previous years' prices, whereas wholesale prices are more commonly set according to current market conditions.

Wholesale prices of processed products generally increased during 1992-97 (table 2-9). For example, the average price of 4.5 to 5-ounce roasted kernels rose steadily from \$13.95 per kilogram in 1992 to \$23.43 per kilogram in 1997, an average annual increase of 11 percent during the 5-year period. Among chocolate kernel products, the wholesale price of 8-ounce containers rose from \$37.94 per kilogram in 1992 to \$56.45 per kilogram in 1997, an average annual increase of 8 percent during the period. Bulk products also increased in wholesale price: the average price of bulk "style 4" kernels, increased from \$9.10 per kilogram to \$10.25 per kilogram between 1992 and 1997, an average increase of 2.4 percent per year.

Relationship Between Farm Prices and Production

Commission staff provide estimations and analytical results from an econometric model relating area planted with macadamias to current and past NIS prices received by farmers (see chapter 6 and appendix D). Statistically significant results suggest that acreage planted has historically responded to farm prices, with both area planted and farm prices moving in the same direction.

¹³⁶ The marketing margin does not take into account processors' rejection or downgrading of shipments because of quality factors such as rot or moisture content, as these factors are reflected in the farm price.

Table 2-9
Macadamia nut products: U.S. wholesale prices, 1992-97

Year	Roasted kernels		Chocolate covered kernels 8 ounce or less	Chocolate bars containing macadamia nuts 2.5 ounce or less	Bulk products ^{1,2}		
	3.5-oz.	4.5 to 5-oz.			Style I	Style II	Style IV
	<i>Dollars per kilogram</i>						
1992	23.80	13.95	37.94	15.89	11.17	9.56	9.10
1993	22.94	19.46	49.89	24.25	12.86	9.83	9.25
1994	22.97	19.59	57.49	24.29	13.99	10.03	9.54
1995	23.23	19.62	54.67	27.73	12.52	11.02	9.63
1996	23.34	22.00	52.93	26.89	11.11	11.23	10.16
1997	23.72	23.43	56.45	26.45	11.00	11.50	10.25

¹ Bulk products: 25-pound containers, Grade 1.

² Style I is minimum 90 percent whole kernels, style II is 50 percent whole kernels and 50 percent halves, and style IV is minimum 50 percent halves.

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

Results also suggest that on average, a 1-cent rise in the NIS farm price per kilogram leads to an initial increase of 6.3 hectares in Hawaiian area planted with macadamias (an 0.08 percent increase in 1997 area) in the first year of the price change. The current effect is followed by a number of successive annual effects of decaying strength.

Financial Experience of U.S. Growers and Processors

Growers

Financial data were provided by 70 growers who responded to the Commission's questionnaires, representing about 7 percent of the area harvested in 1997 (table 2-10). The responding independent growers reported: aggregate net losses on macadamia nut farm operations in 1995 of \$66,266, or 4 percent of net sales; aggregate net profits in 1996 of \$43,027, or 2 percent of net sales; and aggregate net profits in 1997 of \$38,512, or 2 percent of net sales. Total farm operations were profitable in all years during 1995-97, thus indicating that some independent growers may have been able to offset some of their macadamia nut operation losses with income earned on their total farm operations (table 2-11). In 1997, macadamia nuts represented nearly 70 percent of the total.

Table 2-12 shows major expenses incurred by independent growers on their macadamia nut operations and net income as a percent of macadamia nut net sales. The major expense reported was labor expense. As a percent of macadamia nut net sales, labor expense increased from 26 percent to 30 percent during the period 1995-97 (table 2-12). Materials and supplies were the next major expense, ranging from 15 percent to 17 percent of macadamia nut net sales.

Table 2-10
Income and loss experience of 70 U.S. independent growers on their macadamia nut farm
operations, 1995-97

Item	1995	1996	1997
	Quantity (kilograms)		
Net sales of macadamia nuts	2,118,176	2,440,808	2,743,392
	Value (dollars)		
Net sales of macadamia nuts:			
Sales to processing outlets	1,576,148	1,908,658	2,068,463
Sales to other outlets	0	0	0
Total sales	1,576,148	1,908,658	2,068,463
Growing and operating expenses:			
Materials and supplies:			
Fertilizer	127,241	156,487	148,629
Pesticides	45,350	49,780	44,918
All other materials and supplies	86,032	116,535	119,998
Labor	415,458	513,632	625,628
Partners' or officers' salaries	31,567	42,922	37,432
Depreciation	203,896	202,240	198,088
Interest expenses	91,357	88,131	91,755
Repairs and maintenance	66,284	80,581	103,353
Land rent	109,085	123,339	155,133
Taxes and insurance:			
Land taxes	43,008	46,228	48,939
All other taxes and insurance	115,222	121,408	121,546
Other expenses	307,914	324,348	334,532
Total expenses	1,642,414	1,865,631	2,029,951
Net income or (loss) before income taxes	(66,266)	43,027	38,512

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission. These growers accounted for 7.8 percent of in-shell macadamia nut production in 1997.

Table 2-11
Income and loss experience of 70 U.S. independent growers¹ on their total farm operations,
1995-97

(Dollars)

Item	1995	1996	1997
Net sales:			
Macadamia nuts	1,576,148	1,908,658	2,068,463
Other farm products	1,076,348	831,963	902,794
Total sales	2,652,496	2,740,621	2,971,257
Other income	408,200	343,775	518,805
Total net sales and other income	3,060,696	3,084,396	3,490,062
Growing and operating expenses:			
Materials and supplies:			
Fertilizer	185,724	266,095	236,127
Pesticides	43,939	49,056	44,147
All other materials and supplies	214,030	216,834	230,515
Labor	700,155	773,106	901,686
Partners' or officers' salaries	51,532	64,649	55,862
Depreciation	270,421	259,746	253,231
Interest expenses	124,720	108,948	116,253
Repairs and maintenance	82,493	94,233	119,666
Land rent	122,761	160,571	180,923
Taxes and insurance:			
Land taxes	55,771	58,135	60,214
All other taxes and insurance	211,111	228,512	209,956
Other expenses	712,030	606,304	560,978
Total expenses	2,774,687	2,886,189	2,969,558
Net income before income taxes	286,009	198,207	520,504

¹ 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.

Table 2-12
Expenses and net income expressed as a percentage of macadamia nut net sales by 70 U.S. independent macadamia nut growers, 1995-97

<i>(Percentage)</i>			
Item	1995	1996	1997
Growing and operating expenses:			
Materials and supplies:			
Fertilizer	8	8	7
Pesticides	3	3	2
All other materials and supplies	5	6	6
Labor	26	27	30
Partners' or officers' salaries	2	2	2
Depreciation	13	11	10
Interest expenses ¹	6	5	4
Repairs and maintenance	4	4	5
Land rent	7	6	7
Taxes and insurance:			
Land taxes	3	2	2
All other taxes and insurance	7	6	6
Other expenses	20	17	16
Total expenses	<u>104</u>	<u>98</u>	<u>98</u>
Net income or (loss) before income taxes	<u>-4</u>	<u>2</u>	<u>2</u>

¹ 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.

Depreciation was also a major expense over the period. Depreciation expenses declined steadily over the period, from 13 percent to 10 percent of increasing macadamia nut net sales.

Affiliated Growers

Financial data applicable to macadamia nut operations for 1995-97 were provided by 9 firms that had long-term supply contracts with a single processor (table 2-13). These firms accounted for 27 percent of the acreage planted with macadamias in 1997. Total net sales of macadamia nuts increased from \$16.3 million in 1995 to \$21.4 million in 1996, before declining to \$19.6 million in 1997. Net income before taxes for these firms over the period followed the same trend, increasing from a loss of \$1.1 million in 1995 to a gain of \$2.2 million in 1996, and then declining to a net income of \$1.2 million in 1997.

Table 2-13
Income and loss experience of 9 U.S. affiliated growers on their macadamia nut farm operations, 1995-97

(Thousands of dollars)

Item	1995	1996	1997
Net sales of macadamia nuts	16,265	21,432	19,555
Growing and operating expenses:			
Direct growing expense ¹	11,323	12,461	11,821
Interest expense	1,812	1,964	1,661
Repairs and maintenance	12	29	0
Land rent	183	669	926
Taxes and insurance	320	336	² 331
Other expenses	3,727	3,798	3,635
Total expenses	<u>17,377</u>	<u>19,257</u>	<u>18,374</u>
Net income or (loss) before taxes	-1,122	2,175	1,181

¹ The reporting firms were not able to provide detailed breakdowns for direct growing costs. These costs are incurred by the farming company that manages the day-to-day operations of the orchards for the affiliated growers.

² Does not include a one-time deferred income tax credit for one firm.

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

U.S. Processors

Income and loss data reported on macadamia nut product operations show a steady increase in operating income from \$2.6 million in 1995 to \$6.1 million in 1997 (table 2-14). Contributing to the increased profitability was the significant increase in net sales from \$94.6 million in 1995 to \$149.4 million in 1997, an increase of 63 percent. Over the same period, cost of goods sold and selling, general and administrative expenses increased from \$92.0 million to \$143.3 million, or by 56 percent.

Although questionnaire data through 1997 show steady increases in operating income for U.S. processors' macadamia product operations, a number of U.S. processors reported adverse trends in the business during 1998. A number of U.S. processors noted a decline in volumes of domestic and export sales of both bulk and retail macadamia products.¹³⁷ U.S. processors also noted decreased margins on U.S. macadamia products sold in the U.S. and foreign markets.

¹³⁷ USITC staff interviews: with M. Nakamura, president, Hawaiian Macadamia Company, Keaau, HI, Mar. 26, 1998; R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 26, 1998.

Table 2-14
Income and loss experience of 4 U.S. processors on their macadamia nut products
operations,¹ 1995-97

(Dollars)

Item	1995	1996	1997
Net sales plus intra-company transfers	94,632,569	151,260,302	149,401,281
Cost of goods sold:			
Raw materials	26,885,310	38,291,518	39,902,486
Direct labor	9,993,294	13,110,587	13,571,554
Other factory costs	24,398,959	47,526,290	40,960,946
Total cost of goods sold	<u>61,277,563</u>	<u>98,928,395</u>	<u>94,434,986</u>
Gross profit	33,355,006	52,331,907	54,966,295
Selling, general and administrative expenses	<u>30,708,455</u>	<u>48,594,323</u>	<u>48,852,565</u>
Operating income	<u>2,646,551</u>	<u>3,737,584</u>	<u>6,113,730</u>

¹ The processors and their respective fiscal year ends are Mauna Loa Macadamia Nut Corp.; Hawaiian Host, Inc.; and Hawaiian Macadamia, Co. - - June 30 and MacFarms of Hawaii - - July 31.

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

Recent Investment of U.S. Processors

The major U.S. processors have made a number of investments in improving physical plant facilities, and in sales, product, and market development. C. Brewer/Mauna Loa has invested some \$400 million since the 1980s to develop orchards; build processing and factory facilities; and create, promote, and perpetuate the *Mauna Loa* retail line.¹³⁸ Mauna Loa Macadamias' more recent capital investments have focused on basic nut drying, storage, and processing (cracking, inspection, and roasting).¹³⁹ The firm has spent well over \$5 million in recent years for additional capacity, improved quality, and automation of selected processes.¹⁴⁰ Additionally, the firm has invested in developing a streamlined distribution system for *Mauna Loa* retail products to sell at lower prices in Japan.¹⁴¹ On average, Mauna Loa Macadamias invests \$30 million or 30 percent of its annual revenues in sales, product, and market development activities that include trade promotion, consumer advertising, and marketing.¹⁴²

¹³⁸ T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, p. 59.

¹³⁹ Information was received by USITC staff in a facsimile from D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 9, 1998.

¹⁴⁰ *Ibid.*

¹⁴¹ T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, transcript of the hearing, Mar. 25, 1998, Washington DC, pp. 80-81.

¹⁴² *Ibid.*, p. 59.

In 1998, MacFarms of Hawaii expects to spend \$5 million, or 20 percent of its revenues, on sales, product, and market development.¹⁴³ Such costs and investments are wide and varied, and can total up to \$250,000 before a single unit of a newly-developed product is sold. Included among these costs are salaries, product and package design expenses; costs associated with the design, manufacture, and distribution of samples; and travel expenses involved in multiple trips to clients and product co-producers.¹⁴⁴

MacFarms of Hawaii has also made a major investment (\$850,000) to expand the capacity of its processing facility from about 4,500 metric tons in 1991 to over 7,000 metric tons currently.¹⁴⁵ In recent years, Hawaiian Host has expanded its Honolulu corporate offices and factory facilities from 25,000 to 67,000 square feet, and created a research and development department.¹⁴⁶

U.S. Market

U.S. apparent consumption of macadamia nuts increased steadily from 27,243 metric tons in 1992/93 to 30,888 metric tons in 1994/95 (table 2-15). Apparent consumption declined in 1995/96 to 29,823 metric tons before rebounding to a record 32,440 metric tons in 1996/97, (table 2-15)¹⁴⁷ the last full crop-year for which data are available. Apparent consumption for the first eleven months of 1997/98 was a record 36,809 metric tons. The rise in apparent consumption over the period was a result of increasing domestic supplies along with rising import volume accompanied by declining export sales. The State of Hawaii accounts for about one-half of U.S. retail sales of macadamia nuts and nut products in any year.¹⁴⁸ However, a substantial portion of these sales are to tourists, who buy gift-packed macadamias either to mail home or to carry home in their suitcases.¹⁴⁹

The U.S. Department of Agriculture estimates that U.S. per capita consumption of macadamia nuts in 1996/97 was 0.03 kilograms-significantly less than the U.S. per capita consumption of other major tree nuts except hazel nuts (table 2-16). Almonds are the closest consumer

¹⁴³ R. Vidgen, president, MacFarms of Hawaii, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, p. 47 and 49.

¹⁴⁴ USITC staff interviews: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with B. Loader, vice president of sales, and T. Pogson, industrial sales, of MacFarms of Hawaii, at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 12, 1998. Also see R. Vidgen, president of MacFarms of Hawaii, transcript of the hearings: March 25, 1995, Kailua-Kona, HI, pp. 75-76, and Apr. 30, 1998, Washington DC, p. 88.

¹⁴⁵ This information was obtained from two sources: a facsimile to USITC staff from R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, June 2, 1998; and a USITC staff interview with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

¹⁴⁶ Hawaiian Host, Inc., *Hawaiian Host, Hawaii's Gift to the World*, a commercial promotional brochure (Honolulu, HI: Hawaiian Host, Inc., n.d.), pp. 4-5.

¹⁴⁷ Apparent consumption = U.S. production + imports - exports.

¹⁴⁸ McGregor, "A Review of the World Production and Market Environment for Macadamia Nuts."

¹⁴⁹ USITC staff interviews: with K. Sakamoto, senior vice president for marketing, finance and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998; with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; and with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

Table 2-15
Macadamia kernels: U.S. production, exports, imports for consumption, and apparent consumption, crop years 1992/93 to 1997/98

Crop year ¹	Production	Exports ²	Imports ³	Apparent consumption	Ratio of	
					Imports to apparent consumption	Exports to production
<i>(Metric tons, in-shell basis)</i>						
					<i>Percentage</i>	
1992/93	21,773	4,428	9,898	27,243	36.3	20.3
1993/94	21,999	2,841	8,617	27,775	31.0	12.9
1994/95	23,814	3,728	10,802	30,888	35.0	15.7
1995/96	23,133	4,858	11,548	29,823	38.7	21.0
1996/97	25,628	4,593	11,405	32,440	35.2	17.9
1997/98	26,309	⁴ 3,195	⁴ 13,695	⁴ 36,809	37.2	12.1

¹ Crop year begins July 1 and ends June 30 the following year.

² Export data include only prepared or preserved macadamia nuts.

³ Imports of in-shell macadamia nuts are believed to consist almost entirely of shelled macadamia nuts that were misclassified. Reported imports of in-shell macadamia nuts were converted as if they were imports of kernel.

⁴ Data are through May 1998.

Note.—U.S. exports and imports of kernel were converted using the following shelling ratios 1992/93-0.215, 1993/94-0.231, 1994/95-.216, 1995/96-.228, 1996/97-.228, and 1997/98-.23.

Source: Production data from official statistics Hawaii Department of Agriculture, *Macadamia Nuts, Final Season Estimates*, various issues; export and import data compiled from official statistics of the U.S. Department of Commerce.

Table 2-16
Tree nuts: U.S. per capita consumption (kernel weight basis), crop-years 1992/93 to 1996/97

Crop year ¹	<i>(Kilograms)</i>							Total
	Almonds	Hazelnuts	Mac-adamias	Pecans	Pistachios	Walnuts	Other	
1992/93	0.27	0.03	0.02	0.16	0.05	0.21	0.26	1.00
1993/94 .....	.22	.05	.02	.24	.06	.17	.25	1.01
1994/95 .....	.25	.03	.03	.22	.06	.20	.23	1.02
1995/96 .....	.22	.04	.03	.18	.05	.18	.20	.90
1996/97 ² .....	.22	.02	.03	.23	.05	.16	.24	.95

¹ The crop year begins July 1 and continues through June 30 of the following year.

² Preliminary estimate.

Note.—Totals may not add because of rounding.

Source: U.S. Department of Agriculture, Economic Research Service, Commodity Economics Division.

substitute to macadamias, thus providing an indicator of future consumption for macadamia nuts. Although the per capita consumption of macadamia nuts increased over the last 6 years, almond consumption is over 7 times that for macadamias. Other substitutes for macadamias are cashew nuts and pistachios.

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. In responses to Commission questionnaires, U.S. growers reported that the quantity of unsold in-shell nuts on hand, or nuts for which they could not find a buyer, ranged from a high of 5 metric tons in 1991 to less than 2 metric tons in 1994 and totaled over 4 metric tons in 1997. However, the majority of the growers had no inventory at the end of 1997.

Processors

Several U.S. processors of macadamia kernels maintain substantial end-of-year inventories so they can produce retail products on a year-round basis. U.S. processors' end-of-year inventories of macadamia kernels and kernel products¹⁵⁰ declined irregularly from a high of 2,942 metric tons in 1992 to a low of 2,056 metric tons in 1997, a decline of 30 percent (table 2-17). Inventories of raw and bulk industrial kernels accounted for all of the decline over the period, falling from 2,357 metric tons in 1992 to 1,469 metric tons in 1997. Inventories of retail macadamia-containing products decreased from 585 metric tons in 1992 to 392 metric tons in 1994, before rising irregularly to 587 metric tons in 1997. As a proportion of kernel production for the responding firms, inventories decreased irregularly from a high of 61 percent in 1993 to a low of 41 percent in 1997.

Table 2-17
Macadamia kernels: U.S. processors' inventories of macadamia kernels and kernel products, 1992-97

Type	1992	1993	1994	1995	1996	1997
	<i>Quantity (metric tons)</i>					
Raw and bulk industrial kernels	2,357	2,157	1,766	1,760	1,898	1,469
Retail products ¹	585	410	392	564	501	587
Total	2,942	2,567	2,158	2,324	2,399	2,056
	<i>Ratio of inventories to production² (percentage)</i>					
Total	60	61	50	51	51	41

¹ Includes roasted kernels, chocolate covered kernels, and other retail size packs.

² Inventory to production ratio is based on data for those firms responding to the grower/processor questionnaire.

Source: Compiled from data submitted by 5 processors in response to questionnaires of the U.S. International Trade Commission.

¹⁵⁰ U.S. processors end-of-year inventories of raw and bulk industrial kernels include domestically-produced and imported kernels.

Importers

U.S. importers reported that end-of-year inventories¹⁵¹ of macadamia kernels and kernel products ranged from a low of 212 metric tons in 1992 to a high of 348 metric tons in 1994, and totaled 329 metric tons at the end of 1997 (table 2-18). Some U.S. importers, such as Macadamia Processing Company (MPC) and Pacific Plantations, maintain warehouses in the United States.¹⁵² For example, MPC maintains seven warehouses in the United States: two in California; one in Hawaii; and one in New Jersey, Oregon, Illinois, and Georgia.¹⁵³

Table 2-18
Macadamia kernels: U.S. importers' end-of-year inventories by types, 1992-97

Type	1992	1993	1994	1995	1996	1997
	Quantity (<i>metric tons</i>)					
Raw kernels	0	0	7	9	85	15
Bulk industrial kernels	212	214	341	289	188	314
Total	212	214	348	298	273	329
	Ratio of inventories to imports ¹ (<i>percentage</i>)					
Total	52	29	36	29	26	22

¹ Inventory/import ratio is based on data from those firms responding to the importer questionnaire. It does not include data on any inventories of imported kernel or kernel products held by processors.

Note.—U.S. importers reported that they had no end-of-year inventories of retail size packs of macadamia nuts during 1992-97.

Source: Compiled from data submitted by 8 U.S. importers in response to questionnaires of the U.S. International Trade Commission.

Marketing Channels

Macadamia nut processors have a wide array of marketing channels for their various products. The majority of processed macadamia nuts are sold, 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

¹⁵¹ Imported macadamia kernels and kernel products held by processors are included in inventory data reported by those firms.

¹⁵² USITC staff interview with D. Macrae, managing director, Pacific Plantations, Bangalow, New South Wales, Australia, Apr., 7, 1998. Also, see a facsimile sent to USITC staff by B. Raphael, general manager, MPC, Alphadale, New South Wales, Australia, May 22, 1998.

¹⁵³ Information was provided in a facsimile sent to USITC staff by B. Raphael, general manager, MPC, Alphadale, New South Wales, Australia, May 22, 1998.

roasters and salters, confectionery manufacturers, and to specialty ingredient users such as ice cream manufacturers and bakeries.¹⁵⁴

Over the last two or three decades, Hawaii's two largest processors, Mauna Loa Macadamias and MacFarms of Hawaii, evolved away from bulk product marketing and have increasingly focused on the marketing of their own branded lines of macadamia products. Since the 1970's, Mauna Loa Macadamias has invested \$400 million in order to establish, manufacture, and promote its *Mauna Loa* retail line such that since the early 1990's, only from 5 to 6 percent of revenues were generated by bulk product sales.¹⁵⁵

MacFarms has put less emphasis on its bulk sales, such that 55 percent of 1997 sales were bulk generated, compared with 85 percent in the early 1990's.¹⁵⁶

Trade in Macadamia Nuts

The U.S. macadamia nut industry is both 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 reportedly often insufficient to meet demand.¹⁵⁷ 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.¹⁵⁸ Concurrently, there was generally increased tourism to Hawaii from Japan and other Pacific Rim countries from the early 1990's through 1996, and this opened new markets for processed macadamia nuts and nut products.

U.S. Imports of Macadamia Nuts and Nut Products

U.S. imports of macadamia nuts totaled 3,227 metric tons, valued at \$31.8 million, in 1997 (table 2-19 and 2-20), an increase of 74 percent in volume and 132 percent in value over imports in 1992. Australia was the leading source of U.S. imports over the period 1992-97. Imports from Australia increased from 992 metric tons, valued at \$8.0 million, in 1992 to 1,274 metric tons, valued at \$13.8 million, in 1997 and accounted for 39 percent of the volume and 44 percent

¹⁵⁴ Information was obtained from two facsimiles sent to USITC staff by D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 9 and 22, 1998.

¹⁵⁵ T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, Hilo, HI, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 58-61. Also, see a facsimile sent to USITC staff by D. Simonis, senior vice president, Mauna Loa Macadamias, Hilo, HI, June 22, 1998.

¹⁵⁶ R. Vidgen, president, MacFarms of Hawaii, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 96. Information on current sales was provided to USITC staff in a telephone communication with R. Vidgen, May 6, 1998.

¹⁵⁷ R. Vidgen, president, MacFarms of Hawaii, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 95-96.

¹⁵⁸ USITC interviews: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 24, 1998.

Table 2-19
Fresh or dried macadamia nut kernels¹: U.S. imports for consumption, by principal sources,
1992-97

Source	1992	1993	1994	1995	1996	1997
	<i>Quantity (1,000 kilograms)</i>					
Australia	988	1,159	794	1,097	1,026	1,270
Costa Rica	178	202	123	223	184	435
Kenya	0	49	97	250	280	361
South Africa	314	220	204	334	279	297
Guatemala	263	195	363	362	376	202
Brazil	5	38	67	110	109	151
Malawi	21	103	72	135	163	123
China	0	20	7	20	25	26
All other	7	22	32	70	39	32
Total	1,776	2,009	1,760	2,602	2,481	2,898
	<i>Value (1,000 dollars)</i>					
Australia	7,971	9,701	7,307	10,021	10,281	13,826
Costa Rica	1,307	1,671	1,044	1,905	1,850	4,296
Kenya	0	344	638	1,933	2,415	3,077
South Africa	1,911	1,155	1,541	2,571	2,312	2,443
Guatemala	1,818	1,361	2,942	3,386	3,437	2,134
Brazil	36	294	514	825	817	1,200
Malawi	123	685	491	1,112	1,306	1,050
China	0	139	46	150	211	236
All other	50	144	222	573	334	269
Total	13,217	15,494	14,774	22,474	22,962	28,531
	<i>Unit value (per kilogram)</i>					
Australia	\$8.07	\$8.37	\$9.20	\$9.13	\$10.02	\$10.89
Costa Rica	7.36	8.27	8.48	8.54	10.08	9.87
Kenya	(²)	7.01	6.59	7.72	8.63	8.52
South Africa	6.09	5.24	7.54	7.69	8.28	8.23
Guatemala	6.90	6.98	8.10	9.35	9.15	10.55
Brazil	6.69	7.83	7.67	7.51	7.50	7.97
Malawi	5.91	6.64	6.80	8.21	7.99	8.52
China	(²)	7.08	6.64	7.55	8.32	9.06
All other	7.04	6.45	6.93	8.22	8.61	8.42
Total	7.44	7.71	8.38	8.64	9.26	9.85

¹ Data includes imports covered by HTS subheadings 0802.90.80.10 and 0802.90.98.10.

² Not applicable.

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

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

Table 2-20
Prepared or preserved macadamia nuts, not elsewhere specified or included¹: U.S. imports
for consumption, by principal sources, 1992-97

Source	1992	1993	1994	1995	1996	1997
<i>Quantity (1,000 kilograms)</i>						
Australia	0	0	0	25	33	0
Costa Rica	27	5	50	33	21	26
Guatemala	20	18	9	9	10	12
El Salvador	0	0	0	3	5	15
Indonesia	3	4	1	1	1	(²)
France	0	0	0	0	(²)	0
All other	0	56	31	1	0	10
Total	50	83	91	70	70	63
<i>Value (1,000 dollars)</i>						
Australia	0	0	0	172	243	0
Costa Rica	210	48	452	316	185	256
Guatemala	76	129	59	71	86	95
El Salvador	0	0	0	27	24	150
Indonesia	8	7	5	3	3	2
France	0	0	0	0	5	0
All other	0	406	250	0	0	94
Total	294	590	767	588	547	598
<i>Unit value (per kilogram)³</i>						
Australia	(⁴)	(⁴)	(⁴)	\$6.89	\$7.41	(⁴)
Costa Rica	\$7.69	\$9.10	\$9.12	9.69	9.02	\$9.83
Guatemala	3.88	7.11	6.99	7.93	8.30	8.26
El Salvador	0.00	0.00	0.00	9.58	4.55	10.08
Indonesia	2.85	1.65	4.51	3.76	3.93	4.59
France	(⁴)	(⁴)	(⁴)	(⁴)	15.43	(⁴)
All other	(⁴)	7.31	7.78	(⁴)	(²)	9.29
Total	5.90	7.10	8.39	8.39	7.83	9.48

¹ Data includes imports covered by HTS subheading 2008.19.90.10.

² Less than 500 kilograms.

³ Calculated from unrounded figures.

⁴ Not applicable.

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

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

of the value of imports in 1997. Costa Rica, Guatemala, Kenya, and South Africa were also important suppliers accounting for 15 percent, 12 percent, 11 percent, and 10 percent, respectively, of the volume of U.S. imports in 1997.

Fresh or dried macadamia nut kernels (primarily raw macadamia kernels) constitute the majority of macadamia nut and nut product imports into the United States (table 2-19). During 1992-97, U.S. imports irregularly trended upward from 1,776 metric tons, valued at \$13.2 million, in 1992 to a high of 2,898 metric tons, valued at \$28.5 million, in 1997. Over the 6-year period,

Australia was the major import source, in terms of value and volume, of fresh or dried shelled macadamia nuts.

Imports of prepared or preserved macadamia nuts (primarily roasted macadamia kernels) increased from 50 metric tons, valued at \$294,000, in 1992 to 91 metric tons, valued at \$767,000, in 1994, before declining to 63 metric tons, valued at \$598,000, in 1997 (table 2-20). In most years, most imports of prepared or preserved macadamia nuts are primarily from developing countries, which are eligible for preferential rates of duty. The high general rate of duty (21.3 percent ad valorem) in 1998 on prepared or preserved macadamia nuts from developed countries, such as Australia, effectively precludes imports of such products into the United States.¹⁵⁹ Official import data are not separately available on U.S. imports of chocolate-covered macadamia kernels, chocolate bars containing macadamias, or on cookies containing macadamias, but it is believed that such imports are relatively small.

Brokers and representatives of the U.S. and Australian industries reported that occasionally insufficient Hawaiian production, the priority placed on kernel usage by major U.S. processors for their own branded product lines, and the duties imposed on U.S. imports of finished macadamia products, have provided an opportunity for foreign producers to participate in the U.S. macadamia market by providing manufacturers primarily food processors, with industrial or bulk macadamia products.¹⁶⁰ These brokers and representatives reported that U.S. mainland food processors and macadamia users have difficulty in procuring steady, 12-month supplies from Hawaiian processors.¹⁶¹ U.S. industry representatives conceded that Hawaiian kernel supplies are sometimes insufficient to cover prioritized needs for their branded product lines, as well as mainland demands for the bulk and industrial macadamia markets.¹⁶²

U.S. Exports of Macadamia Nuts and Nut Products

U.S. exports of macadamia nuts and nut products totaled 1,313 metric tons, valued at \$12.7 million, in 1997 (table 2-21 and 2-22). Most of these exports consist of otherwise prepared or preserved macadamia nuts (table 2-21). Exports of otherwise prepared or preserved macadamias declined from 945 metric tons, valued at \$9.6 million, in 1992 to 618 metric tons, valued at \$6.7 million, in 1994. Exports rose in 1995 to 1,083 metric tons, valued at \$10.8 million, then declined slightly in 1996, before rising again in 1997 to 1,053 metric tons, valued at \$12 million. Japan was the largest single market for U.S. macadamia products, accounting for \$7.4 million,

¹⁵⁹ See The Peninsular Group/Australian MacFarms, prehearing brief, Apr. 3, 1998; and G. Hargreaves, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 14-15.

¹⁶⁰ These opinions, were expressed in a number of sources. See transcript of the hearing, Apr. 30, 1998: testimony of R. Vidgen, MacFarms of Hawaii, Captain Cook HI, pp. 95-96; and testimony of B. Raphael, general manager, MPC, Alphadale, New South Wales, Australia, pp. 14-15. These opinions were also expressed in USITC staff interviews: with R. O'Connor, export manager, Jorgenson Waring Foods, Sydney, New South Wales, Australia, Apr. 8, 1998; and with D. Macrae, managing director, Pacific Plantations, Bangalow, New South Wales, Australia, Apr. 7, 1998.

¹⁶¹ Ibid.

¹⁶² R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 95-96.

Table 2-21
Prepared or preserved macadamia nuts¹: U.S. exports of domestic merchandise, by principal markets, 1992-97

Markets	1992	1993	1994	1995	1996	1997
	<i>Quantity (1,000 kilograms)</i>					
Japan	559	444	377	625	569	561
Hong Kong	119	127	62	111	181	170
Canada	56	39	36	121	54	86
Korea	94	34	21	63	37	74
Taiwan	28	49	36	61	73	58
France	0	0	0	0	0	47
Switzerland	(²)	5	7	24	6	28
Netherlands	12	12	9	3	17	7
Lebanon	1	1	3	0	0	6
All other	76	54	66	75	73	15
Total	945	766	618	1,083	1,010	1,053
	<i>Value (1,000 dollars)</i>					
Japan	5,830	5,349	4,147	6,704	7,188	7,361
Hong Kong	1,256	1,455	756	1,120	1,591	1,591
Canada	286	167	143	566	221	485
Korea	892	448	274	837	532	1,059
Taiwan	300	504	348	448	709	666
France	0	0	0	0	0	282
Switzerland	3	65	81	315	76	204
Netherlands	154	161	105	27	205	91
Lebanon	13	7	41	0	0	45
All other	887	667	788	821	837	208
Total	9,622	8,823	6,683	10,838	11,360	11,993
	<i>Unit value (per kilogram)³</i>					
Japan	\$10.43	\$12.04	\$11.01	\$10.73	\$12.62	\$13.13
Hong Kong	10.53	11.42	12.16	10.05	8.78	9.34
Canada	5.13	4.27	3.93	4.68	4.10	5.61
Korea	9.72	13.05	12.76	13.24	14.36	14.29
Taiwan	10.56	10.23	9.72	7.38	9.70	11.41
France	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)	6.02
Switzerland	8.38	13.37	10.86	13.35	12.13	7.18
Netherlands	12.30	13.33	12.22	9.45	12.44	13.83
Lebanon	11.65	12.32	12.47	(⁴)	(⁴)	7.98
All other	11.60	12.24	11.87	10.94	11.54	13.63
Total	10.18	11.52	10.81	10.01	11.25	11.39

¹ HS subheading 2008.19.9010.

² Less than 500 kilograms.

³ Calculated from unrounded figures.

⁴ Not applicable.

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

Source: Compiled by the staff of the U.S. International Trade Commission from official statistics of the U.S. Department of Commerce.

Table 2-22
Shelled fresh or dried macadamia nuts¹: U.S. exports of domestic merchandise, by markets, 1992-97

Markets	1992	1993	1994	1995	1996	1997
<i>Quantity (metric tons)</i>						
Japan	-	-	-	-	-	247
Netherlands	-	-	-	-	-	13
Korea	2	-	-	-	-	-
Hong Kong	-	-	6	11	4	-
Total	2	-	6	11	4	260
<i>Value (1,000 dollars)</i>						
Japan	-	-	-	-	-	653
Netherlands	-	-	-	-	-	35
Korea	14	-	-	-	-	-
Hong Kong	-	-	16	28	18	-
Total	14	-	16	28	18	689

¹ U.S. exports of shelled fresh or dried macadamia nuts were derived from the Schedule B subheading 0802.90.95 (Nuts, n.e.s.o.i., fresh or dried, shelled). In order to calculate what part of subheading 0802.90.95 was 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.

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

or 61 percent, of prepared or preserved macadamia exports in 1997. Hong Kong was the next most important market, accounting for 13 percent of exports in 1997. Most of the exports are believed to have been roasted kernels in retail-size containers or bulk industrial kernels.

U.S. exports of shelled, fresh or dried macadamia kernels are relatively minor, and industry sources indicate such exports are probably raw kernels (table 2-22). Exports of in-shell macadamia nuts are almost nonexistent, with 3 metric tons, valued at \$9,000, going to France in 1994.¹⁶³ The only other shipment was to Korea in 1995, consisting of 1 metric ton, valued at \$6,000.

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 in this study indicate that such exports are substantially larger than those of roasted macadamia kernels. Japan is the major market for U.S. exports of both roasted macadamia kernels and confectionery products containing macadamia nuts.

U.S. processors, in response to Commission questionnaires, reported that exports of macadamia nuts and nut products during 1992-97 increased from 829 metric tons, valued at \$28.9 million, in 1992 to 1,539 metric tons, valued at \$44.9 million, in 1994 (table 2-23).¹⁶⁴ Exports then declined steadily to 1,134 metric tons, valued at \$30.1 million, in 1997. Japan was by far the

¹⁶³ Data were obtained from official statistics of the U.S. Department of Commerce for the U.S. Customs District of Honolulu, HI. It was assumed that all exports from the U.S. Customs District of Honolulu were macadamia nuts.

¹⁶⁴ Export data include roasted kernels, in retail size containers; chocolate covered kernels; all other retail size packs; and bulk industrial containers.

Table 2-23
Macadamia kernels: Exports of chocolate-covered kernels and other kernel and kernel products by U.S. processors, by type, and by major markets, 1992-97

Markets	1992	1993	1994	1995	1996	1997
	<i>Quantity (metric tons)¹</i>					
Chocolate-covered kernels:						
Japan	158	166	225	156	108	98
All other	182	148	223	155	132	130
Total	340	314	448	311	240	228
All other retail size and bulk industrial kernels: ²						
Japan	281	627	591	665	598	588
All other	208	279	500	557	454	318
Total	489	906	1,091	1,222	1,052	906
Grand total	829	1,220	1,539	1,533	1,292	1,134
	<i>Value (1,000 dollars)</i>					
Chocolate-covered kernels:						
Japan	9,038	9,806	12,436	9,895	6,962	6,087
All other	10,178	8,464	15,031	8,963	8,022	7,305
Total	19,216	18,270	27,467	18,858	14,984	13,392
All other retail size and bulk industrial kernels:						
Japan	5,545	10,033	8,239	10,866	10,270	10,547
All other	4,117	4,868	9,237	8,330	8,073	6,128
Total	9,662	14,901	17,476	19,196	18,343	16,675
Grand total	28,878	33,171	44,943	38,054	33,327	30,067

¹ Kernel weight basis.

² Data include exports by processors of bulk industrial containers of kernels and retail sized containers of roasted macadamia kernels, and other retail size containers except chocolate covered kernels.

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

most important market, accounting for 60 percent of reported exports. Hong Kong and South Korea were also important destinations. Processors' exports of chocolate-covered kernels declined from 340 metric tons (kernel weight basis), valued at \$19.2 million, in 1992 to 228 metric tons, valued at \$13.4 million, in 1997. Japan was the principal U.S. market for chocolate-covered kernels during the period. U.S. shipments to Japan declined from a peak of 225 metric tons in 1994 to a low of 98 metric tons in 1997, a decline of 56 percent. Exports to other markets also declined but not as sharply as those to Japan. Exports of "other retail sizes and bulk industrial kernels" increased steadily from 489 metric tons in 1992 to a peak of 1,222 metric tons in 1995, before declining to 906 metric tons in 1997. Japan was the principal destination for U.S. exports of "other retail sizes and bulk industrial kernels," accounting for 65 percent of the volume and 63 percent of the value of such shipments in 1997.

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. Not included are purchases (suitcase exports) in Hawaii by Japanese and other tourists and exports by Hawaiian candy and cookie manufacturers that were not covered by the Commission's questionnaires.

Import Restrictions

Tariff Treatment

U.S. imports of macadamia nuts and macadamia nut products (HTS subheadings 0802.90.80, 0802.90.98, and 2008.19.90) have different general and column 2 rates of duty. For HTS subheading 0802.90.80--macadamia nuts, fresh or dried, in shell--the general rate of duty is 1.8 cents per kilogram and the column 2 rate of duty is 5.5 cents per kilogram.¹⁶⁵ Fresh or dried shelled macadamia nuts enter under HTS subheading 0802.90.90 and have a general rate of duty of 7 cents per kilogram 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 21.3 percent ad valorem and a column 2 rate of duty of 35 percent ad valorem.

Under the Caribbean Basin Economic Recovery Act, the United States-Israel Free-Trade Area Implementation Act, the Andean Trade Preference Act, and the North American Free-Trade Agreement, 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. 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 1806.90.90 and have a general rate of duty of 6.3 percent ad valorem and a column 2 rate of duty of 40 percent ad valorem. These chocolate macadamia products enter the United States free of duty under the Generalized System of Preferences, the Caribbean Basin Economic Recovery Act, the United States-Israel Free Trade Area Implementation Act, the Andean Trade Preference Act, and the North American Free Trade Agreement.

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. 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.

¹⁶⁵ Imports are subject to phytosanitary regulations of the U.S. Department of Agriculture. See the discussion of phytosanitary regulations that follows.

Hawaiian Labeling Law

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

Government Programs

No known Government programs were identified 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.¹⁶⁶ These statutes provide tax incentives for placing or keeping land in agriculture. However, some of the benefits derived from placing land in agriculture in Hawaii are mitigated by restrictive agreements, such as prior usage and land dedication,¹⁶⁷ attached to the preferential tax assessment. (See appendix E, “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—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.¹⁶⁸ This agricultural assessment is generally lower than other assessments. However, all buildings and other real property on the land are separately valued and assessed.

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 parcel
Macadamias	3,707	1,853
Coffee, good	6,178	3,089
Coffee, poor	3,089	1,544

The tax assessment program in Hawaii discourages changes in land use from agricultural to nonagricultural activities, and as well, discourages the subdivision of land into smaller parcels. In the event of a change in land-use classification 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,

¹⁶⁶ Applicable State Statutes: Hawaii Rev. Stat. 205-2, -5, 246-10, -12 (1985 & Supp. 1988).

¹⁶⁷ 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.

¹⁶⁸ To qualify for this program, land located within an urban district must have been substantially and continuously used for agriculture during the 5-year period immediately preceding the dedication request.

with respect to a change in land use classification, all taxes are due by the end of the year, with a 10-percent per annum penalty for the preceding years. With respect to subdivision of the land, all taxes are due within 60 days of such conversion, with a 10-percent per annum penalty for the preceding years. 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 assessment program with its restrictions and penalties, dedicated land that otherwise would have left the industry in response to unfavorable market conditions may remain in macadamia or other agricultural production. However, it is not known to what extent the tax assessment program has encouraged the continued production of macadamias or has discouraged the establishment of new orchards.

Trends in Hawaii-Bound Tourists and Demand for Retail Macadamia Products

Tourism patterns constitute important competitive conditions for the U.S. macadamia industry.¹⁶⁹ Increasing tourism implies increased macadamia product demand because tourist purchases of retail macadamia nut products have long constituted a strong source of demand in Hawaii.¹⁷⁰ Tourism is positively correlated with a growing economy and national income level in the tourist's home country, and in the short-term, with stable exchange rates of foreign currency relative to the U.S. dollar.¹⁷¹

Since 1993, Hawaii's growth in tourism has slowed noticeably (table 2-24). Since 1993, the growth in Hawaii-bound tourists fell from annual increases of 5 percent for 1993-1994, to 2.9 percent for 1995-1996, after which the rate of increase fell markedly to 0.8 percent for 1996-1997. Hawaiian officials fear a further slowdown in tourist growth, or even a decline, as the numbers of Hawaii-bound Asian tourists, who account for over one-third of Hawaii's tourists, fall because of the severe economic and financial problems facing Japan and other Asian countries.¹⁷²

The number of Asian tourists traveling to Hawaii actually dropped in 1997. After growing by 9.8 percent during 1993-94, and 11.3 percent during 1994-95, the growth in Hawaii-bound Asian

¹⁶⁹ USITC staff interviews: with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998; with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; and with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

¹⁷⁰ Ibid.

¹⁷¹ W. Claiborne, "Hawaii: Paradise at a Loss," *Washington Post*, June 23, 1998, p. A.3.

¹⁷² Ibid.

Table 2-24
Numbers, changes, and selected shares of tourists¹ in Hawaii by residence nation, 1993-97

Item	1993	1994	1995	1996	1997
	Number of tourists				
All visitors	6,124,230	6,430,300	6,629,180	6,823,130	6,877,470
Asia	1,875,320	2,059,060	2,291,370	2,416,530	2,397,470
Japan	1,591,920	1,756,100	1,998,860	2,089,760	2,092,480
Korea	92,990	112,450	104,550	121,920	116,740
Hong Kong	23,220	22,820	23,190	23,960	19,430
Indonesia	12,560	16,280	19,220	19,090	20,410
China	20,760	19,380	21,200	27,070	31,320
Taiwan	75,780	73,960	62,760	77,320	60,880
	Tourist (percentage shares)				
Asian tourists, share of total	31.0	32.0	35.0	35.0	35.0
Japanese tourists, share of Asian	84.9	85.3	87.2	86.5	87.0
Japanese tourists, share of total	26.0	27.3	30.2	30.6	30.4
	Annual (percentage change)				
	1993-94	1994-95	1995-96		1996-97
Change, all tourists		5	3.1	2.9	0.8
Change, Asian tourists		9.8	11.3	5.5	(0.8)
Change, Japanese tourists		10.3	13.8	4.5	0.1

¹ Tourists are those visitors staying in Hawaii for at least a night.

Source: The 1995 and 1996 tourist data are from the Hawaii Department of Business, Economic Development, and Tourism (HDBEDT), *1997 Hawaii Data Book* (Honolulu, HI: HDBEDT, 1997). The 1993, 1994, and preliminary 1997 tourist data were obtained by USITC staff in a facsimile from HDBEDT, June 26, 1998. Shares and percentage changes were calculated by USITC staff using HDBEDT tourist count data.

tourists fell by more than one-half, to 5.5 percent during 1995-96, and then turned negative (-0.8 percent) during 1996-97. The number of Japanese tourist traveling to Hawaii, once growing 10-14 percent annually, grew only one-tenth of a percent during 1996-97.

Such declines in Asian tourist numbers particularly worry Hawaiian officials. More than eighty-five percent of Hawaii's Asian tourists are Japanese, and a decline in their numbers will cause a sharp drop in tourism revenue.¹⁷³ Hawaiian officials estimate that Japanese tourists spend an average of \$286 per day, compared to only \$137 per day for U.S. mainland tourists.¹⁷⁴ Further, recent estimates indicate that Japanese tourists are spending less, with 1997 expenditures by Japanese tourists in Hawaii having declined 8 percent from previous year levels.¹⁷⁵

As economic conditions in Japan and other Asian countries worsen, there will likely be further declines in Asian tourists to Hawaii. The sharp fall in the value of Asian currencies relative to the

¹⁷³ Ibid.

¹⁷⁴ Ibid.

¹⁷⁵ Hawaii Visitors and Convention Bureau, *Hawaii Visitors and Convention Bureau, Preliminary June 1998 Highlights*, p. 83. Portions of this report were sent to USITC staff by facsimile on Aug. 4, 1998.

dollar may also cause a drop in spending by these tourists. Sales of macadamia products to this important market will suffer.

The Hawaiian Macadamia Nut Association: Interchange among Growers, Processors, Consumers, and Governments

The Hawaiian Macadamia Nut Association (HMNA) was organized with the specific goals of educating the public, government officials and staff, and individuals involved directly and indirectly in growing, processing, and marketing of macadamia nuts. Such education is accomplished by the dissemination and exchange of information, knowledge, and techniques relating to growing, processing, and marketing of macadamia nuts.¹⁷⁶ Such information dissemination and education is done through HMNA mailings; an annual HMNA conference held in either the Hilo or Kailua-Kona areas; and through a number of publications. More specifically, members receive the following publications:

- *Hawaii Grown Tree Crops Journal*: a quarterly source of important events such as proposed legislative and horticultural developments in crop production, research findings, and farm-related events.
- *Hawaii MacFacts*: the HMNA newsletter, published quarterly.
- *HMNA Annual Conference Proceedings*: provide written presentations, research reports, and industry updates that occur at or emerge from the annual conference.

The HMNA is governed by an annually elected, 19-member Board of Directors. Board membership is determined by location and size of the grower/member's operation, and for nongrowers, by the type of entity.

Memberships and Partnerships

The HMNA represents the macadamia-related interests of growers, processors, consumers, governments, and foreign organizations. Of the 225 HMNA members, most (85 percent) are regular members, while 15 percent are associate members. There are also an undisclosed number of honorary members, as well as a number of HMNA "partnerships".

- *Regular members*: regular memberships, currently numbering over

¹⁷⁶ The Hawaii Macadamia Nut Association directly provided USITC staff with information in 2 facsimiles on July 3 and June 9, 1998, and in an email communication on July 10, 1998.

110, are open to individuals, cooperatives, corporations, and/or organizations who reside, are located, or own a business in Hawaii, and are actively engaged in growing, processing, and manufacturing of macadamia nuts and/or related products.

- *Associate members:* associate members are nonvoting, may reside in or outside of Hawaii, and are typically associated with the macadamia industry through government service, educational and research institutions, and/or service as a supplier of macadamia-related services or inputs. There are about 35 associate members.
- *Honorary members:* annually, the HMNA Board appoints a Nominating Committee to nominate honorary members. Honorary members are often selected because of contributions made to benefit the industry and achievements that go beyond personal reward.
- *HMNA Partnership activities:* the HMNA also works on cooperative arrangements with various federal, state, and county governments in activities of mutual benefit to both. These cooperative government bodies include: such organizations as the USDA's Agricultural Research Service, Hawaii Department of Agriculture, Hawaii's State Legislature, and the University of Hawaii's College of Tropical Agriculture and Human Resources. The HMNA also cooperates with business and agricultural associations for various projects and activities such as the International Nut Council, and the Hawaii Agricultural Research Center.

For the fiscal year ending June 30, 1999 (1998/99), the Hawaiian Macadamia Nut Association (HMNA) projects a total income (total receipts) of \$160,000. The sources of this income include, among others, the following in order of fiscal importance: voluntary assessment on growers; a Hawaii Department of Agriculture (HDOA) research matching grant; a HDOA promotional matching grant; conference revenue and donations; and membership dues.

Budgeted HMNA Activities

The activities of the association can be best viewed through examination of its expense categories which total \$156,000 for 1998/99. The single most important activity is for macadamia-related research, which is budgeted at \$92,000 in 1998/99.¹⁷⁷ Research projects include, in order of budgetary importance, a study on long term macadamia variety trials; research studies on two macadamia pest problems (stink bug and the tropical nut bore); and development of a pest handbook for Hawaiian macadamia growers.

The research project is the primary research project funded through the HMNA. Sponsored by the HMNA through the University of Hawaii, the research project on variety trials focuses on the long run goal of orchard rejuvenation and a long term breeding program. The project entails a review of

¹⁷⁷ Information was received by USITC staff in a facsimile received from HMNA, Kealahou, HI, June 9, 1998.

yield and quality data collected through the University of Hawaii; determination of the most commercially promising selections; development of an orchard rejuvenation program using the commercially promising selections; and propagation of the replications at the University of Hawaii Experiment Stations and cooperating farms. After the propagation of replications is complete, the long-term breeding program will be developed and implemented.

Education and promotion activities account for just over 13 percent of 1998/99 HMNA expenses. Such activities include promoting public awareness of the macadamia nut's nutritional value; development and maintenance of an HMNA website; and development of macadamia-related display material. Finally, activities associated with government affairs comprise just over two percent of 1998/99 HMNA expenses.

Voluntary Assessment Program

As of January 1, 1996, the HMNA instituted a voluntary assessment on NIS delivered and processed. The assessment has two tiers: farmers pay a quarter of a cent on each pound of NIS delivered, and processors pay a quarter of a cent on each pound of NIS processed. Processors, under voluntary written agreement with each supplier/grower, deduct the growers' assessment, and pay the half-cent per-pound assessment to the HMNA. Assessment funds are stated to obtain available government matching funds for research; to develop action plans to promote concerns and interests of the Hawaiian macadamia industry; to promote macadamia-related education, commercial promotions, relationships with government entities; and to finance HMNA operations. All research findings and results are provided annually through the HMNA Annual Conference Proceedings.

CHAPTER 3

AUSTRALIAN INDUSTRY AND MARKET

Australia is the world's largest producer of macadamia nuts, accounting for 36 percent of production in 1997. Over the last two decades, Australian farmers increased plantings, and these plantings will make Australia's share of the world market substantially greater by the beginning of the 21st century.¹⁷⁸ During the 1993-1997 period alone, Australian hectares planted with macadamias doubled to 12,050 hectares, an area about 50 percent greater than U.S. planted hectares, while production expanded by 129 percent. Although domestic consumption has been increasing in recent years, the Australian macadamia nut industry is highly export-oriented, exporting about 60 percent of its production, while the U.S. industry exports less than 20 percent of its production.

Australian Industry

Segments of the Australian macadamia industry considered here include (1) growers, (2) processors that purchase macadamia nuts and crack the nuts to produce raw kernels, and (3) processors and exporters that market raw and processed kernels. As with the U.S. industry, processors include both firms that are exclusively involved with macadamia processing, as well as grower/processors that are involved in commercial growing and processing of macadamia nuts. Australian growers include independent farmers who own and operate their orchards, as well as farm management companies that farm macadamia orchards owned by others.

The Australian industry centers around the processors because these firms perform major shares of the industry's primary activities. Most Australian processors either own substantial growing facilities or are firms owned and operated by grower/shareholders. Australian processors are also the primary buyers of independent farmers' nut-in-shell (NIS) crop. Further, Australian processors have developed bulk and/or retail product lines; have developed and currently service markets for these bulk and retail lines; and are currently developing new products and markets for macadamia nuts. Thus processors play a similar role in the Australian market as U.S. processors do in the U.S. market.

The macadamia nut is indigenous to Australia, and has long been known as the "Australian Bush Nut." Macadamias naturally occur within 15 miles of the Australian coast from lower Beechmont to Mt. Bauple.¹⁷⁹ Australian commercial production is centered in northern New South Wales and southeastern Queensland, which provide the rich soils and large amounts of annual rainfall needed to promote maximum growth. These areas account for approximately 90 percent of Australia's

¹⁷⁸ K. Ainsbury, "Macadamia Industry in Australia: AMS and the Market," *Hawaiian Macadamia Nut Association, 31st Annual Conference, Proceedings, May 1991* (Kailua-Kona, HI: Hawaii Macadamia Nut Association, May 1991).

¹⁷⁹ USDA, FAS, telegram No. AGR AS8010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

production, with the remainder of the production on the mid-north New South Wales coast and in central and northern Queensland. There is a small amount of production in the State of Western Australia.

Although the macadamia is native to Australia, a significant share of the commercial acreage is planted to varieties that were selected and grown in Hawaii and reintroduced to Australia. Many of these varieties are not particularly well adapted to Australian conditions. Since the variety reintroductions, Australia is developing new hybrids that are better suited to local soils and climate.¹⁸⁰ Most new orchards (planted in the last 10 years) contain native Australian varieties. Commercial development of the macadamia industry in Australia began only about 25 years ago with the introduction of a reliable nut-cracking machine and the involvement of Colonial Sugar Refiners (CSR). It is estimated that in 1997 there were 3.1 million trees covering an area of 12,050 hectares.¹⁸¹ Ninety-eight percent of these trees are *Macadamia integrifolia*. Of these trees it is estimated that 45 percent are mature, 30 percent are in the early bearing stage, and 25 percent are not yet bearing.¹⁸²

Number and Location of Growers

Today, approximately 700 farms produce macadamia nuts commercially in Australia. Australian orchards average around 40 hectares.¹⁸³ A relatively large percentage of the farms are owned by people employed in professional occupations such as doctors, lawyers, engineers, pilots, and accountants.¹⁸⁴ Some farms are also owned by people who are retired and have moved to northern New South Wales or south-east Queensland for lifestyle and economic reasons.

During the 1970s and early 1980s, a number of macadamia plantations were established as corporate farming ventures. Investors bought shares in schemes that in many instances were managed on a day-to-day basis by management consultants. Absentee owners who are seeking returns on their investments as well as tax benefits are a significant feature of the north coast horticulture industry.¹⁸⁵

¹⁸⁰ The new varieties are being evaluated for yield, kernel recovery, percentage first grade kernels, and kernel size.

¹⁸¹ USDA, FAS, telegram No. AGR AS8010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

¹⁸² *Ibid.*

¹⁸³ R.A. Stephenson, "The Australian Macadamia Industry," *Australian Inst. of Ag. Sci.*, September 1990, p. 13.

¹⁸⁴ U.S. staff interviews: with A. Burnside, general manager, Australian MacFarms, Woombye, Queensland, Australia, Apr. 3, 1998; with I. Mulligan, owner, Honey and Nut Management Pty. Ltd., Dunoon, New South Wales, Australia, Apr. 7, 1998; with K. Wilson, manager, Gray Plantations, and an AMS director, and G. Hargreaves, an AMS director, at Gray Plantation Offices, Eureka, New South Wales, Australia, Apr. 4, 1998; and with R. Fayle, AMS president, and G. Hargreaves, an AMS director, at AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

¹⁸⁵ USDA, FAS, telegram No. AGR AS8010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

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.¹⁸⁶

*Grower/Processors and Processors*¹⁸⁷

There are approximately 10 commercial processors of macadamia nuts in Australia.¹⁸⁸ The six largest Australian macadamia processors listed in order of descending size, are: (1) Macadamia Processing Company Pty. Ltd. (MPC), (2) The Peninsular Group/Australian MacFarms, (3) Suncoast Gold Macadamias (Australia) Ltd. (Suncoast Gold), (4) Pacific Plantations, (5) Macadamia Plantations of Australia Pty. Ltd. (MPA), and (6) Agrimac International Enterprises Pty. Ltd. (Agrimac)¹⁸⁹ Suncoast Gold, Agrimac, and Pacific Plantations differ in size only marginally, such that the three firms are basically “tied” for fourth place in terms of processed volume. Information on these six processors was obtained by Commission staff during fieldwork in Australia and is provided in table 3-1. Australian processors are either owned and operated by groups of growers or are substantial growers themselves. Of these six firms, one is a corporate subsidiary and one is a family-owned company.

The six Australian firms processed volumes in 1997 which ranged from 683 metric tons to 1,000 metric tons (kernel basis).¹⁹⁰ Macadamia Processing Company, Australia’s largest processor, accounted for about one-quarter of 1997 processings, 6,250 metric tons (in-shell basis). The remaining processors each processed from 2,000 metric tons to 4,000 metric tons (NIS) in 1997. The Australian processors’ estimates of a breakeven price, the price above or below which profit or loss is generated, ranged from as low as US\$0.58 to as high as US\$1.28 per kilogram.¹⁹¹

Three Australian processors, Agrimac, MPC, and Pacific Plantations, are exclusively or nearly exclusively bulk kernel suppliers. The remaining 3 firms manufacture and market lines of retail products along with bulk kernels. MPA and Suncoast Gold spend from 9 to 10 percent of revenues on activities related to sales, product, and market development. MPC and Agrimac,

¹⁸⁶ Ibid.

¹⁸⁷ Toowoomba Pecan is a toll processor which processes macadamia nuts for independent growers for a fee and then delivers the recovered kernels back to the growers, and accounts for 10 percent of annual macadamia nut processing. Toowoomba Pecan’s main business focus is pecan processing. The macadamia growers serviced by this firm market their own production.

¹⁸⁸ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, Agrimac, Alstonville, New South Wales, Australia, and A. Beavis, international marketing manager Macadamia Processing Co., Alphadale, New South Wales, Australia, at the Peanut and Tree Nut Processors’ Annual Convention and Trade Show, Sanibel Island, FL, Jan. 11, 1998.

¹⁸⁹ The ranking of these six processors was received by USITC staff in two emails from the Australian Macadamia Society, May 8 and 9, 1998.

¹⁹⁰ Data do not include MPC, MPA, or Pacific Plantations which consider their processings business confidential.

¹⁹¹ The breakeven price or cost levels were obtained by USITC staff during interviews with various Australian processor personnel during fieldwork in Australia during Apr. 2-10, 1998.

Table 3-1
Comparative attributes for major Australian macadamia processors

Need title	Macadamia Processing Co.	Australian MacFarms	Macadamia Plantations of Australia	Suncoast Gold	Agrimac Unit	Pacific Plantations
Firm type	private grower-owned	privately owned	owned subsidiary	public, owned by 80 growers	unit trust, 5 shareholders	family-owned
General activities	processor	grower/processor	grower/processor	processor	processor	grower/processor, nursery
1997 processings:						
NIS (<i>metric tons</i>)	6,250	4,000	2,000-2,500	3,000	2,070	3,000
Kernel (<i>metric tons</i>)	(¹)	(¹)	(¹)	1,000	683	(¹)
Peak season employment	91	130	250	70	55	(¹)
Owned orchards (hectares)	none	720	(¹)	none	none	(¹)
Own orchard output, NIS (<i>metric tons</i>)	none	2,100	700	none	none	(¹)
Break-even price estimate for NIS ³ (dollar/kilogram)	\$0.58-\$0.87	\$1.16	(¹)	\$1.28	\$0.94-\$1.07 ²	(¹)
Purchases from other growers (<i>metric tons</i>)	varying	2,000	1,100	3,000	2,000	(¹)
Major products	bulk kernel	bulk kernel, retail, China/Hong Kong food service	bulk kernel, retail	bulk kernel, retail	bulk kernel, mgt. consulting, foreign consult.	bulk kernel, retail (oil only), indus. ingred.
Major export markets	USA Europe Asia	USA China/Hong Kong Japan	Other Asia Europe Japan	USA China Europe Japan & Korea	USA Germany Hong Kong other Europe	USA mainland Japan
Percent of revenue to market-related activities	2	10	(¹)	9-10	3.1	(¹)
Number of personnel in market-related activities	3-4	3-6	(⁴)	5-6	(⁴)	(¹)
State of 1998 business	declining price, rising inventories	declining Asian and tourist sales	increasing export and domestic retail sales	declining sales, Asia and Europe	declining sales, Asia and Europe	increasing export sales, Asia and U.S.

¹ This information is considered as confidential business information and was not reported.

² Agrimac did not report a breakeven price. This estimate is their estimate of the minimum price adequate to produce a profit, and is as close to a breakeven estimate as could be obtained. Facsimile sent to USITC staff from Agrimac, Alstonville, New South Wales, Australia, Aug. 10, 1998.

³ These breakeven price (or "cost") estimates are meant only as approximate indications of per-kilogram NIS production costs and should be examined and compared across the two industries with caution for a number of reasons. First, although the estimates were elicited by oral interview from U.S. and Australian macadamia processors, many of whom are growers or grower-associated, estimates were not elicited from independent and affiliated growers, who were too numerous to interview. Second, estimates were informally elicited orally, and although staff attempted to standardize the individual interviews as much as possible across processors, respondents may have had non-uniform conceptions of which production cost components to include in the breakeven price estimates. For example, some estimates may include, and some exclude, such cost components as interest charged on capital, all imputed management fees, and fixed costs not usually examined in day-to-day financing of production activities. And third, Australian estimates were converted to prices for NIS with a 20 percent moisture content (from a 10 percent content) and to U.S. dollars using formulas and monthly exchange rates. Such conversions are approximations. At the best, the estimates provide a general idea or estimates of NIS production costs by a major group of each industry's grower interests. The main point in the U.S./Australian comparison (with relevant information from table 2-2) is not so much the exact gap between the national estimate ranges, but rather that the Australian processor/grower interests feel that NIS production costs in Australia are lower than U.S. grower/processors feel that such costs are in Hawaii.

⁴ Not available.

Note.—US\$ refers to U.S. dollars. The term MT refers to metric tons. "Marketing related personnel" refer to workers with duties related to sales, product, and/or development. The term "mgt." refers to management, and "consult." to consulting. "Indus. ingred." refers to industrial ingredient products such as inputs into processed food products.

Source: USITC staff information gathered from field work and submitted briefs.

Australian bulk suppliers, spend only 2 to 3 percent of revenues on such marketing-related activities.

Peak season work forces of Australian firms ranged from 55 to 250 workers. The numbers of workers dedicated to sales, product, and market development ranged from 3 per firm to 8 per firm for MPC, Australia MacFarms, MPA, and Suncoast Gold.

All six Australian processors export macadamia nut products, with the most popular export markets being the United States, Europe, Japan, and other parts of Asia. Australian marketing initiatives have particularly focused on, and built sizable markets in, Europe (particularly Germany) and in food service industries (particularly restaurants) in China and Hong Kong. Products include both retail, bulk, and industrial ingredient products.

Most of the Australian processors (four of six) noted sluggish or declining 1998 business conditions reflected by falling prices, rising inventories, declining domestic sales to tourists, and/or declining sales, particularly in Asia and Europe. Two of the four firms reported strong and increasing 1998 sales, which include domestic sales of retail products, export sales in certain Asian countries, and sales of bulk macadamia products on the U.S. mainland.

Australian Processors

Macadamia Processing Co., Ltd.

Australia's largest processor, MPC, was founded in 1983 in Alphadale, New South Wales, Australia. MPC is a private company that is exclusively owned by 148 grower shareholders, operates as a cooperative, and supplies bulk kernel.¹⁹² Its grower/shareholders collectively account for 2,850 hectares which in 1997 produced roughly one-quarter of Australia's crop, 6,250 metric tons of NIS.¹⁹³ MPC employs 21 year-round workers, and employs up to as many as 70 additional seasonal workers during cracking season.¹⁹⁴

MPC membership is limited to macadamia growers (grower/shareholders) with orchards planted at a commercially viable density.¹⁹⁵ Shareholders are guaranteed MPC acceptance of their NIS crop, and are paid under a "revenue return" plan. Under this plan, shareholders are offered an early-season "notional" price formulated by MPC; are guaranteed payment of a minimum portion of the notional price within 4 months of delivery; and will possibly receive payment in excess of the notional price if there is an adequate residual from revenues less production and overhead expenses. When needed, MPC purchases NIS from independent growers on a cash basis.

¹⁹² Macadamia Processing Company (MPC), prehearing brief, Apr. 24, 1998, pp. 1-3.

¹⁹³ B. Raphael, general manager, MPC, Alphadale, New South Wales, Australia, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 18-20, and 43; and MPC, prehearing brief, Apr. 24, 1998, pp. 3-6.

¹⁹⁴ B. Raphael, general manager, MPC, Alphadale, New South Wales, Australia, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 19-21; and MPC, prehearing brief, p. 13.

¹⁹⁵ MPC, prehearing brief, Apr. 24, 1998, pp. 3-7.

MPC is strictly a bulk processor and markets more than 85 percent of its processings into primarily raw kernels in packs of 11.34 kg (25 lbs.) for export markets in the United States, Asia, and Europe, with the residual marketed domestically.¹⁹⁶ MPC occasionally supplies roasted, dry roasted, and/or salted kernel to domestic buyers.¹⁹⁷ To ensure a supply of product throughout the year, the firm has a substantial commitment to inventory and carryovers from 15 to 25 percent production annually.¹⁹⁸

MPC marketed 40 percent of its 1997 processed output in the United States, 37 percent in Europe, 8 percent in Asia, and 15 percent in the Australian market.¹⁹⁹ MPC considers Europe an area of particular marketing potential for macadamia products, and has targeted the area with marketing efforts.²⁰⁰

As a bulk supplier with no retail products, MPC spends about 2 percent of its annual revenues on sales, product, and market development activities.²⁰¹ Of MPC's year-round staff of 21, 3 or 4 are involved in sales, product, and market development.²⁰² MPC maintains 8 warehouses: 6 on the mainland United States; 1 in Honolulu, Hawaii; and 1 in Hamburg, Germany.²⁰³ Additionally, MPC attends food fairs and trade shows, advertises in trade magazines, develops buyer/supplier relationships, and allocates funds and personnel to maintain a web of nut brokers and agents throughout the world.²⁰⁴

Australian MacFarms Pty Ltd./The Peninsular Group

Australia MacFarms Pty. Ltd./The Peninsular Group (Peninsular/MacFarms) is a new entity that was created in October, 1996, when the Peninsular Group purchased MacFarms of Australia from Arnotts Biscuit, the parent of which is Campbell's Soup.^{205,206} Peninsular/MacFarms is a grower/processor with 9 macadamia orchards on the eastern Australian coast totaling 720 hectares

¹⁹⁶ Ibid

¹⁹⁷ Ibid.

¹⁹⁸ B. Raphael, general manager, MPC, Alpadale, New South Wales, Australia, transcript of the hearing, Apr. 30, 1998, Washington, DC, p. 50.

¹⁹⁹ MPC, prehearing brief, p. 10.

²⁰⁰ B. Raphael, general manager, MPC, Alpadale, New South Wales, Australia, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 36 and 41.

²⁰¹ MPC, prehearing brief, Apr. 24, 1998, p. 11.

²⁰² USITC staff interview with A. Beavis, international marketing manager, and B. Raphael, general manager, of MPC, and G. Hargreaves, an AMS director, at MPC headquarters, Alpadale, New South Wales, Australia, Apr. 6, 1998.

²⁰³ Email communication received by USITC staff from B. Raphael, general manager of MPC, May 21, 1998; MPC, prehearing brief, Apr. 24, 1998, p. 15; USITC staff interview with A. Beavis, international marketing manager, and B. Raphael, general manager, of MPC, and G. Hargreaves, an AMS director, at MPC headquarters, Alpadale, New South Wales, Australia, Apr. 6, 1998; and B. Raphael, general manager, MPC, Alpadale, New South Wales, Australia, transcript of the hearing, Apr. 30, 1998, Washington, DC, p. 52.

²⁰⁴ Mr. B. Raphael, general manager, MPC, Alpadale, New South Wales, Australia, transcript of the hearing, Apr. 30, 1998, Washington, DC, p. 22, and MPC, prehearing brief, Apr. 24, 1998, p. 11.

²⁰⁵ The Peninsular Group/Australian MacFarms Pty. Ltd. (Peninsular/MacFarms), prehearing brief, Apr. 3, 1998, p. 1.

²⁰⁶ Colonial Sugar Refiners sold its macadamia growing and processing interests to MacFarms of Australia in 1986.

and about 165,000 trees, and produced about 2,100 metric tons of NIS in 1997.²⁰⁷ Additionally, Peninsular/MacFarms also processed nearly an equal amount of NIS purchased from independent growers in 1997.²⁰⁸ With an annual NIS processing capacity of 6,000 metric tons, Peninsular/MacFarms processed 4,000 metric tons NIS in 1997, making the firm Australia's second-ranking processor in volume terms.²⁰⁹ Peninsular/MacFarms employs 130 individuals at the height of cracking season.²¹⁰

Peninsular/MacFarms is a processor of bulk kernel and a manufacturer of retail macadamia products. More than 80 percent of the firm's 1997 processed output was exported in vacuum-packed pouches, primarily to China and Hong Kong for use in restaurant food service. In addition, 7 percent was used in manufacturing the firm's three lines of retail products.^{211,212}

Peninsular/MacFarms has 2 retail product lines: *MacFarms of Australia* primarily for domestic consumption and *Byron Pearl* for domestic consumption. A third line, *Australian MacFarms*, is being developed for export.²¹³ Peninsular/MacFarms' three lines of retail products include, variously flavored kernel snack packs, jars, and cans; cookies and candies; chocolate-covered kernels; and macadamia cooking oil.

Peninsular/MacFarms currently spends about 10 percent of its revenues on sales, product, and market development activities.²¹⁴ Peninsular/MacFarms employs three individuals in sales, product, and/or market development; another three staff members spend significant portions of their time in export documentation, marketing logistics, and other marketing-related activities.²¹⁵ Representatives of both the U.S. and Australian industries acknowledge that the Peninsular Group is responsible for introducing the macadamia nut as an ingredient for Chinese dishes, especially chicken-based recipes, to Chinese and Hong Kong restaurants.²¹⁶ The firm allocates substantial revenues to maintain and expand this market. Other activities involved in sales, market, and product development include attendance at international food expositions, marketing- and sales-related travel and accommodation; salaries; and development of packaging and advertising materials.²¹⁷

²⁰⁷ Peninsular/MacFarms, prehearing brief, Apr. 3, 1998; and USITC staff interview with A. Burnside, general manager of Australian MacFarms and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

²⁰⁸ *Ibid.*

²⁰⁹ *Ibid.*

²¹⁰ USITC staff interview with A. Burnside, general manager of Australian MacFarms and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

²¹¹ Peninsular/MacFarms, prehearing brief, Apr. 3, 1998; and USITC staff interview with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

²¹² The use of the remainder of the kernel is considered confidential.

²¹³ Peninsular/MacFarms, prehearing brief, Apr. 3, 1998; and USITC staff interview with A. Burnside, general manager, of Australian MacFarms and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

²¹⁴ *Ibid.*

²¹⁵ Information on the staff numbers involved with sales, product, and market development was obtained by USITC staff in an email communication from P. Hanigan, Australian MacFarms, Woombye, Queensland, Australia, May 26, 1998.

²¹⁶ See R. Vidgen, president, and B. Loader, marketing vice-president, of MacFarms of Hawaii, transcript of the hearing, Washington DC, Apr. 30, 1998, pp. 109-11; and Peninsular/MacFarms, prehearing brief, Apr. 3, 1998, pp. 1-2.

²¹⁷ Peninsular/MacFarms, prehearing brief, Apr. 3, 1998, pp. 1-2.

Macadamia Plantations of Australia Pty. Ltd.

Owned by Consolidated Foods of Australia, Macadamia Plantations of Australia Pty. Ltd. (MPA) is a grower/processor of kernel, a bulk macadamia supplier, and the manufacturer and marketer of the *Pacific Gold* retail line of macadamia products.²¹⁸ MPA's offices and factory are located in Lismore, New South Wales. With an annual processing capacity of 3,000 metric tons of NIS, MPA annually processes from 2,000 metric tons to 2,500 metric tons of NIS.²¹⁹ This tonnage has been supplied by MPA's own orchards (700 metric tons NIS in 1997) and through purchases, as needed, from independent growers. At peak season, MPA employs 250 individuals.

MPA revenues are about evenly distributed between domestic and export markets.²²⁰ Primary export markets include Europe, Japan, and other Asian countries. MPA has invested heavily in sales, product, and market development of their expanding *Pacific Gold* line of retail products. The *Pacific Gold* line of products includes kernels of various flavors and in variously sized cans and jars; boxes of chocolate-covered macadamias and macadamia candies; variously sized packets of kernels of different flavors; packaged macadamia shortbread; macadamia cooking oil; and an array of multiproduct macadamia gift packs. The *Pacific Gold* line also includes a number of cosmetic products such as soap embedded with a skin-cleansing macadamia abrasive powder and a macadamia oil/lanolin skin-moisturizing cream.²²¹ Contrary to reports of other U.S. and Australian processors/manufacturers of retail macadamia products that export sales of such products are down, sales of MPA's *Pacific Gold* products are reported to be brisk and

²¹⁸ USITC staff interview with A. Scott, financial controller, J. Briggs, factory manager, and J. Underhill, factory and quality manager, of Macadamia Plantations of Australia (MPA); and G. Hargreaves, an AMS director, at MPA offices, Lismore, New South Wales, Australia, Apr. 7, 1998.

²¹⁹ *Ibid.*

²²⁰ *Ibid.*

²²¹ USITC staff interview with A. Scott, financial controller, J. Briggs, factory manager, and J. Underhill, factory and quality manager, of MPA; and G. Hargreaves, an AMS director, at the MPA factory offices, Lismore, New South Wales, Australia, Apr. 7, 1998. See transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 105-111.

expanding.²²² The recently completed MPA factory was built with excess capacity for future expansion of processing and manufacturing activities.²²³ MPA's parent firm, Consolidated Foods of Australia, has allocated an undisclosed amount of its advertising budget to promote the *Pacific Gold* line in 1998 and 1999.²²⁴ However, while MPA's factory facilities are recently built, the facilities appeared of a far smaller scale, and more labor intensive than the facilities of Hawaii's three largest processors.²²⁵

Suncoast Gold Macadamias (Australia) Ltd.

Established in 1985 in Gympie, Queensland, Australia, Suncoast Gold Macadamias (Australia) Ltd. (hereafter, Suncoast Gold) is a public company that operates as a cooperative of some 80 voting grower/shareholders.²²⁶ In 1998, Suncoast Gold processed about 3,000 metric tons of NIS into about 1,000 metric tons of kernel, placing the firm among Australia's four largest macadamia processors. The firm's employment varies up to a high of about 70 individuals during cracking season of which as many as six are dedicated to market-related activities.²²⁷ Suncoast Gold provides a "revenue-return" system of payment to macadamia growers. The grower/member is guaranteed NIS crop acceptance by the firm, and the price received by the grower is determined as a residual from gross sales less all costs (direct and indirect) of processing and marketing, and less a profit for Suncoast Gold.²²⁸

²²² Views of MPA sales were obtained in a USITC staff interview with A. Scott, financial controller, J. Briggs, factory manager, and J. Underhill, factory and quality manager, of MPA, and G. Hargreaves, an AMS director, at MPA factory offices, Lismore, New South Wales, Australia, Apr. 7, 1998. Views of slowing patterns of export sales of retail macadamia products were obtained from the following USITC staff interviews with both U.S. and Australian firms: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; with M. Nakamura, president, Hawaiian Macadamia Nut Co., Keaau, HI, Mar. 26, 1998; with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamia Nut Corporation, Hilo, HI, Mar. 26, 1998; with N. Arakaki, president, Hawaiian Candies & Nuts, Ltd., Honolulu, HI, Mar. 26, 1998; with R. Kamagaki, owner of Kamigaki Orchards/Kona Coast Nuts and Candy, Kailua-Kona, HI, Mar. 27, 1998; with A. Burnside, general manager of Australian MacFarms and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998; and with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²²³ USITC staff interview with A. Scott, financial controller, J. Briggs, factory manager, and J. Underhill, factory and quality manager, of MPA, and G. Hargreaves, an AMS director, at the MPA factory offices, Lismore, New South Wales, Australia, Apr. 7, 1998.

²²⁴ *Ibid.*

²²⁵ USITC staff interview with J. Briggs, factory manager, of MPA, during a tour of MPA's factory, Lismore, New South Wales, Australia, Apr. 7, 1998.

²²⁶ Of the shareholders, 80 are voting and 40 are non-voting members. Suncoast Gold Macadamias (Australia) Ltd. (Suncoast Gold), prehearing brief, Apr. 20, 1998, p. 2.

²²⁷ Suncoast Gold, prehearing brief, Apr. 20, 1998; and USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²²⁸ Suncoast Gold, prehearing brief, Apr. 20, 1998, p. 2.

Suncoast Gold supplies about 80 percent of its processings to bulk or industrial buyers, with the remaining 20 percent used for its retail line of *Suncoast Gold* retail macadamia products.²²⁹ Suncoast Gold's bulk line includes raw kernels in 11 different styles and roasted kernel with various flavorings.²³⁰ Bulk kernel is vacuum-packed in foil pouches ranging from 1 to 25 kg.²³¹

Suncoast Gold produces and markets a varied line of retail macadamia products, and is developing new products.²³² The *Suncoast Gold* line of retail products includes (among others) kernels of various flavors and in variously sized cans and jars; boxes of chocolate-covered macadamias and macadamia candies; variously sized packets of kernels of different flavors; and bottles of macadamia cooking oil.²³³ Of current Suncoast Gold revenues, 75 percent are generated from bulk sales and 25 percent from retail product sales, as compared with the early 1990s, when 95 percent of the firm's revenues were generated by bulk macadamia sales.²³⁴

Suncoast Gold's markets are divided nearly evenly between Australia's domestic market and exports. In 1997, Suncoast Gold marketed 46 percent of its processings in Australia; 44 percent in China, Europe, and Asia (Japan and Korea); and 8 percent in the United States.²³⁵ Suncoast Gold spends from 9 to 10 percent of its revenues on sales, product, and market development.²³⁶ Suncoast Gold is developing new retail products as well as expanding markets for existing products.²³⁷ Suncoast Gold spent US\$500,000 annually on promotions in Hong Kong and Korea alone during 1995, 1996, and 1997.²³⁸

²²⁹ Suncoast Gold, prehearing brief, Apr. 20, 1998, p. 2; and USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²³⁰ Suncoast Gold, *Suncoast Gold's Premium Range of Retail Products*, Oct. 1997, found at <http://www.goldmacs.au/nutprod1>, pp. 2-5, May 6, 1998. Flavorings include, among others, salt, chocolate (coating and chocolate chips), yogurt coatings, butter, sesame, seaweed, and smoke/barbeque flavoring.

²³¹ Suncoast Gold, *Suncoast Gold's Premium Range of Retail Products*, Oct. 1997, found at <http://www.goldmacs.au/nutprod1>, pp. 2-5, May 6, 1998.

²³² Suncoast Gold, *Suncoast Gold's Premium Range of Retail Products*, Oct. 1997, found at <http://www.goldmacs.au/nutprod1>, pp. 2-5, May 6, 1998; and USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²³³ USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²³⁴ Information was received by USITC staff in an email communication from J. Twentyman, general manager of Suncoast Gold, May 21, 1998; and from a facsimile sent to USITC staff by J. Twentyman, July 21, 1998. Information on past percentages of sales generated by bulk sales was obtained in a USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²³⁵ Suncoast Gold, prehearing brief, Apr. 20, 1998, p. 2.

²³⁶ USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²³⁷ *Ibid.*

²³⁸ Suncoast Gold, prehearing brief, Apr. 20, 1998, p. 4.

Agrimac International Enterprises Pty. Ltd.

Agrimac International Enterprises Pty. Ltd. (hereafter, Agrimac), was established in 1993, and is a unit trust owned and run by a board of five growers/directors; its processing facilities are situated in Alstonville, New South Wales.²³⁹ In addition to the NIS crop of the shareholder/directors, Agrimac encourages long-term purchase agreements with independent growers, and purchased from 228 growers in 1997.²⁴⁰ Employing about 55 individuals at peak season, Agrimac processed 2,070 metric tons of NIS into about 700 metric tons of kernel in 1997, about one-tenth of Australia's macadamia nut processings.²⁴¹ The firm expects to process about 3,000 metric tons of NIS into about 1,000 metric tons of kernel in 1998.²⁴²

Agrimac is primarily a processor and supplier of bulk kernel of various styles in 11.34 kg (or 25 pound) vacuum-packed foil pouches, and exports almost all (99 percent) of its processings.²⁴³ The firm's major 1997 export markets and market shares were as follows: North America (primarily United States), 40 percent; Hong Kong, about 37 percent; and Europe (primarily Germany), 14 percent.²⁴⁴ Agrimac also supplies small amounts of roasted kernel to the Australian market.²⁴⁵

The firm markets heavily in Germany, and has contributed towards developing this market.²⁴⁶ Agrimac has striven to develop and supply industrial macadamia ingredient demands by mainland U.S. firms, which Agrimac claims have difficulty in procuring steady, long-term supplies from Hawaiian processors that prioritize kernels for their own brands of retail and confectionary products.²⁴⁷ Agrimac allocated about 3 percent of its revenues in 1997 to sales, product, and market development activities.²⁴⁸

In addition to processing and marketing its membership's crop, Agrimac provides management and technical consulting services to macadamia farmers in Australia, as well as management, technical, training, and marketing services to foreign macadamia industries.²⁴⁹ Agrimac consultants focus on

²³⁹ Information on the the firm's unit trust status was received by USITC staff in an email from J. Wilkie, agricultural manager, Agrimac International Enterprises Pty. Ltd. (Agrimac), May 14, 1998; also see Agrimac, posthearing brief prepared by J. Wilkie, agricultural director of Agrimac, May 11, 1998, pp. 3-4.

²⁴⁰ Agrimac, posthearing brief, May 11, 1998; and USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998.

²⁴¹ Information on peak season employment was obtained by USITC staff in an email communication from J. Wilkie, agricultural director of Agrimac, May 26, 1998. See Agrimac, posthearing brief, May 11, 1998, pp. 4 & 8; Agrimac International Enterprises Pty. Ltd. (Agrimac), promotional brochure (Alstonville, New South Wales, Australia, 1997); and USITC staff interview with K. Ainsbury, chief executive officer and marketing director, of Agrimac, in Alstonville, New South Wales, Australia, Apr. 6, 1998.

²⁴² Agrimac, posthearing brief, May 11, 1998, pp. 4 & 24.

²⁴³ Agrimac, promotional brochure (Alstonville, New South Wales, Australia, 1997).

²⁴⁴ Agrimac, posthearing brief, May 11, 1998, p. 6.

²⁴⁵ Agrimac, posthearing brief, May 11, 1998, p. 5.

²⁴⁶ *Ibid.*

²⁴⁷ See Agrimac, posthearing brief, May 11, 1998, p. 6; and USITC staff interview with D. Macrae, managing director, Pacific Plantations, Bangalow, New South Wales, Australia, Apr. 7, 1998.

²⁴⁸ Agrimac, posthearing brief, May 11, 1998, pp. 6-8.

²⁴⁹ Agrimac, promotional brochure (Alstonville, New South Wales, Australia, 1997); and USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural manager, Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998.

the macadamia industries in Malawi, South Africa, Zimbabwe, and Costa Rica.²⁵⁰ In addition to commission and consulting fees, Agrimac's motivation for providing such services to foreign macadamia grower and processors is to help the firm's ability to steadily supply kernels year-round by sourcing acceptable foreign kernels during times of unsteady or inadequate Australian supplies.²⁵¹

Pacific Plantations

Pacific Plantations is a grower and Australia's largest family-owned processor of macadamias.²⁵² Pacific Plantations also operates a commercial macadamia nursery.

Pacific Plantations is almost exclusively a supplier of bulk industrial macadamia products; the firm's only retail product is a bottle of macadamia cooking oil.²⁵³ Pacific Plantations specializes in supplying the needs of U.S. mainland food processors and Japanese confectioners with bulk and industrial macadamia products that, according to Pacific Plantations' managing director, Hawaiian processors do not wish to supply and/or do not supply on a constant year-round basis. These products include diced, chopped, and other food ingredient forms of macadamia kernels. The firm has little or no inventory to carry over from year to year.

Pacific Plantations aggressively develops both products and markets for industrial ingredient macadamia products.²⁵⁴ Pacific Plantations incurs substantial expenses related to: sales, product, and market development; maintenance of U.S. warehouse facilities to ensure year-round supply; promotional efforts; travel and accommodations; marketing assistance efforts; and packaging development.

Trends in Production

Area devoted to macadamia nuts in 1997/98 totaled 12,050 hectares, a 100-percent increase over the area planted in 1992/93 (table 3-2). The total harvested area in 1997/98 is estimated at 9,200 hectares. Harvested area will continue to rise over the next several years because nearly 25 percent of the existing planted area contains trees that are not of bearing age.²⁵⁵ As a result,

²⁵⁰ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, in Alstonville, New South Wales, Australia, Apr. 6, 1998.

²⁵¹ Agrimac, posthearing brief, May 11, 1998, p. 8.

²⁵² USITC staff interview with D. Macrae, managing director, Pacific Plantations, Bangalow, New South Wales, Australia, Apr. 7, 1998.

²⁵³ *Ibid.*

²⁵⁴ *Ibid.*

²⁵⁵ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, Agrimac, Alstonville, New South Wales, Australia, and A. Beavis, international marketing manager, Macadamia Processing Co., Alphadale, New South Wales, Australia, at the Peanut and Tree Nut Processors' Annual Convention and Trade Show, Sanibel Island, FL, Jan. 11, 1998.

Table 3-2

Australian macadamia nuts: Nut-in-shell and kernel production, planted and bearing hectares, and yield, 1992/93 to 1997/98

Year	Production <i>Metric tons</i>	Planted <i>Hectares</i>	Bearing	Yield per hectare <i>Metric tons</i>	Raw kernels production ¹ <i>Metric tons</i>
1992/93	12,000	6,020	² 4,270	² 2.8	3,480
1993/94	16,000	8,900	² 4,300	² 3.7	4,640
1994/95	18,000	9,000	² 4,348	² 4.1	5,220
1995/96	19,500	11,900	7,000	2.8	5,655
1996/97	25,000	12,000	9,000	2.8	7,250
1997/98	27,500	12,050	9,200	3.0	7,975

¹ NIS converted to kernel by using a conversion factor of 29 percent. NIS data are believed to be on a 10 percent moisture content basis.

² Data are believed to be in error. Total number of bearing hectares was most likely considerably higher.

Source: U.S. Dept of Agriculture, FAS, *World Horticultural Trade and U.S. Export Opportunities*, May 1995, p. 46 and USDA, FAS, telegram No. AGR AS8010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

production is expected to steadily increase into the future as new orchards are planted and as all orchards mature into their bearing stages.

Macadamia nut production increased from 12,000 metric tons (NIS) in 1992/93 to 25,000 metric tons in 1996/97. Preliminary estimates place 1997/98 output at a record 27,500 metric tons. Some processors interviewed by USITC staff believe that production for 1997/98 will not exceed 1996/97 levels because of undesireably timed and disease-augmenting rains during the blooming period, followed by drought. It was also noted by such processors that future growth in yields may also be tempered by planting patterns. Many Australian orchards were planted at very high densities to maximize yield per hectare when the trees first begin to bear nuts. However, as the trees mature, as many as one-half of the trees may have to be removed to maintain tree vigor.²⁵⁶ Hence, yields per hectare will decrease temporarily because of the loss of fruiting area as trees are removed. The rise in production over the last 5-7 years reflects increasing yield per tree as trees that were planted in the 1980s and early 1990s reach maturity. Plantings expanded during the early 1980s as rates of return increased from high prices. Current estimates place the total number of macadamia trees in Australia at 3.1 million. The earliest plantings by the Australian industry are now more than 20 years old. There are substantial new plantings of macadamias in Australia, particularly around Bundaburg, Queensland.

²⁵⁶ USITC staff interviews: with J. Twentyman, general manager, I. McConachie, chairman and managing director, P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998; with D. Macrae, managing director, Pacific Plantations, Banagalow, New South Wales Australia, Apr. 7, 1998; and with K. Wilson, manager of Gray Plantations and an AMS director, and G. Hargreaves, an AMS director, at Gray Plantations offices, Eureka, New South Wales, Australia, Apr. 4, 1998.

Although Australian orchard acreage has doubled since the early 1990s, future production may rise less than proportionately as yield reductions from age-related problems occur.²⁵⁷ Yield-reducing problems associated with orchard age include increased infestations of insects; increased opportunities for fungal and other diseases; and product loss to vermin which hide in the canopies.²⁵⁸ Indeed, a number of problems have been reported in the older Australian orchards: overall increased insect and pest problems during the last 5-6 years; botrytus, a fungus; and increased infestations by the tropical nut bore and fruit spotting bug in both New South Wales and Queensland.²⁵⁹

The Australian Market

Trends in Consumption

Australian consumption of macadamia nuts nearly doubled, from 2,600 metric tons, NIS, in 1991/92,²⁶⁰ to 4,683 metric tons in 1992/93, and then nearly doubled again to an estimated 9,000 metric tons in 1997/98 (table 3-3).²⁶¹ According to Australian Macadamia Society officers, this increase in apparent consumption resulted from a concerted effort to decrease dependence on the U.S. market.²⁶² Until the early 1990s, world macadamia supply was unable to keep up with expanding world demand, and most Australian production was exported, particularly to the United States (including Hawaiian processors).²⁶³ For example, about 36 percent of Australia's 1992/93 production was exported to the United States.²⁶⁴ Yet in 1990/91, growth in world demand began

²⁵⁷ G. Hargreaves, AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 47-49; and USITC staff interview with D. Macrae, managing director, Pacific Plantations, Bangalow, New South Wales, Australia, Apr. 7, 1998.

²⁵⁸ USITC staff interviews: with K. Wilson, manager of Gray Plantations, and an AMS director, and G. Hargreaves, and AMS directors, at Gray Plantation offices, Eureka, New South Wales, Australia, Apr. 7, 1998; and with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Co., Hilo, HI, Mar. 26, 1998.

²⁵⁹ USITC staff interviews with K. Wilson, manager of Gray Plantations, and an AMS director, and G. Hargreaves, and AMS director, at Gray Plantations offices, Eureka, New South Wales, Australia, Apr. 4, 1998; with I. Mulligan, owner, Honey and Nut Mangement Pty. Ltd., Dunoon, New South Wales, Australia, Apr. 7, 1998; and with G. Garratt, grower and former AMS president, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

²⁶⁰ USDA, FAS, telegram No. AGR AS8010, "Tree Nuts--Macadamia Nut Annual Report --Australia," prepared by the U.S. Embassy staff, Feb. 24, 1994.

²⁶¹ USDA, FAS, *World Horticultural Trade & U.S. Export Opportunities*, May 1995, p. 46 and April. 1997, p. 24, and telegram No. AGR AS8010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

²⁶² USITC staff interviews: with T. Davenport, an AMS director, Brisbane, Queensland, Australia, Apr. 2, 1998; and with R. Fayle, president, and G. Hargreaves, a director, of AMS, at AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

²⁶³ *Ibid.*

²⁶⁴ This ratio was calculated from 1992/93 data from two separate source publications. The 4,311 MT of Australian exports to the United States (in-shell basis) was provided by USDA, FAS, "Tree Nuts--Macadamia Annual Report--Australia," telegram No. AGR AS4010, prepared by U.S. Embassy staff, Canberra, Feb. 24, 1994. The 12,000 MT Australian production estimate (in-shell basis) was provided by USDA, FAS, *World Horticultural Trade and U.S. Export Opportunities*, May 1995, p. 46. Data to calculate the 1990/91 share were judged of ambiguous reliability.

Table 3-3
Australian macadamia nuts: Production, imports, exports, and apparent consumption, 1992/93 to 1997/98

(Metric tons, in-shell basis)

Year ¹	Beginning stocks	Production	Imports	Exports	Apparent consumption	Ending stocks
1992/93	763	12,000	0	8,080	4,683	0
1993/94	0	16,000	0	8,525	7,475	0
1994/95	0	18,000	0	12,609	5,391	0
1995/96	0	19,500	0	12,727	6,773	0
1996/97	0	25,000	0	14,141	8,000	2,859
1997/98 ²	0	27,500	0	16,000	9,000	2,500

¹ Marketing year beginning July 1 of first year shown.

² Estimated.

Source: U.S. Department of Agriculture, FAS, *World Horticultural Trade and U.S. Export Opportunities*, May 1995, p. 46 and U.S. Department of Agriculture, FAS, telegram No. AGR AS8010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

slowing and production started rising, and this ultimately led by late 1996, to world inventory accumulations, world price decreases, and a slackening in U.S. purchases of Australian kernel.²⁶⁵

Marketing and Promotion Efforts

Given the developments of the early 1990's just described, the Australian industry reduced its dependence on the U.S. market by developing new domestic and foreign markets. The industry undertook generic domestic promotions that included television advertising, advertisements in trade journals and magazines, promotion of macadamia usage in food service, and promotion of beneficial nutritional and health attributes of macadamia nuts.²⁶⁶ Three firms have developed and market to both Australians and Australia-bound Asian tourists, a wide array of retail macadamia products.²⁶⁷

²⁶⁵ USITC staff interviews: with T. Davenport, an AMS director, Brisbane, Queensland, Australia, Apr. 2, 1998; and with R. Fayle, president, and G. Hargreaves, a director, of AMS, at AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

²⁶⁶ T. Davenport, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 5-9; and USITC staff interviews: with W. Prowse, industry manager of AHC, and G. Hargreaves, an AMS director, at AHC headquarters, Sydney, New South Wales, Australia, Apr. 8, 1998; and with T. Davenport, an AMS director, Brisbane, Queensland, Australia, Apr. 2, 1998.

²⁶⁷ USITC staff interviews: with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998; with A. Scott, financial controller, J. Briggs, factory manager, and J. Underhill, factory and quality manager, of MPA, and G. Hargreaves, an AMS director, of the MPA factory office, Lismore, New South Wales, Australia, Apr. 7, 1998; and with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

Aside from small quantities of NIS sold in fresh produce stores in Australia, the vast majority of macadamias are consumed as kernels or in value-added products. Increasing amounts of kernels are used in Australian restaurants and food service as a result of Australian Horticultural Corporation (AHC) efforts to increase macadamia usage in home and restaurant recipes.²⁶⁸ AHC's stated goal is to have at least one recipe using macadamias in every reputable Australian restaurant.²⁶⁹

Peninsular/MacFarms has developed the mainland Chinese and Hong Kong food service markets for macadamias through promotion of macadamias as a recipe ingredient for Chinese cuisine. Macadamia Plantations of Australia (MPA) has developed and is marketing cosmetic products such as soaps embedded with a skin-cleansing macadamia abrasive and skin lotions containing macadamia oil and lanolin.²⁷⁰ One firm is developing, designing, and aggressively marketing new industrial ingredient macadamia-based products for mainland U.S. processed food manufacturers available elsewhere. U.S. industry representatives have claimed that the Australian industry has not fully understood the marketing responsibility of expanding market demand for its increasing Australian macadamia production, and has invested, what the U.S. representatives claim to be an inadequate 5 percent of revenues in sales, product, and market development activities.²⁷¹ The above discussion and table 3-1 suggests that the six Australian processors, especially those with established retail product lines, have expended more efforts and made more of the investments in such activities than acknowledged by the U.S. representative's testimony.

As a result of the above efforts, the share of Australian production sold to the United States decreased from 36 percent in 1992/93 to 11 percent in 1997/98,²⁷² apparent consumption in Australia increased significantly, and Australian exports of macadamias to other countries grew rapidly.

²⁶⁸ USITC staff interview with W. Prowse, industry manager of AHC, and G. Hargreaves, an AMS director, at AHC headquarters, Sydney, New South Wales, Australia, Apr. 8, 1998.

²⁶⁹ Ibid.

²⁷⁰ USITC staff fieldwork in Hawaii and Australia, Mar. 23-Apr. 10, 1998.

²⁷¹ This view was expressed by R. Vidgen, president of MacFarms of Hawaii, transcript of the hearing, March 25, 1998, Kailua-Kona, HI, pp. 39-48; by R. Vidgen, president of MacFarms of Hawaii, transcript of the hearing, April 30, 1998, Washington, DC, pp. 57-71; by B. Loader, vice president for marketing of MacFarms of Hawaii, transcript of the hearing, April 30, 1998, Washington, DC, pp. 81-82; and by T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 58-61. Such opinions were also expressed in an USITC staff interview with B. Loader, vice president for marketing, and T. Pogson, industrial sales, of MacFarms of Hawaii, at the Peanut and Tree Nut Processors' Annual Convention and Trade Show, Sanibel Island, FL, Jan. 12, 1998.

²⁷² This ratio was calculated from 1992-93 data from two separate source publications. The 4,311 metric tons (in-shell basis) of Australian exports to the United States was provided by USDA, FAS, telegram No. AGR AS4010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 24, 1994. The 12,000 metric tons Australian production estimate (in-shell basis) was provided by USDA, FAS, World Horticultural Trade and U.S. Export Opportunities, May 1995, p. 46.

Australian Imports of Macadamia Nuts and Nut Products

Trends in Imports

Australian imports of macadamia nuts enter in a basket category “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 macadamia nuts are believed by Australian industry sources to be negligible.

Tariff Treatment

The following are the Australian rates of import duties imposed on macadamias or products containing macadamias:²⁷³

Product	HTS heading	Rates of duty
Macadamias in shell	0802.90.0033	Free
Macadamias shelled but not further treated or processed	0802.90.00	Free
Oil, not elsewhere specified	1515.90.00	Free
Sugar confectionary containing nuts	1704.90.00	5 percent ad valorem
Chocolate containing nuts: in blocks, slabs or bars weighing more than 2 kg.	1806.20.00	5 percent ad valorem
Other in blocks, slabs, or bars -- filled	1806.31.00	5 percent ad valorem
Other in blocks, slabs, or bars -- not filled	1806.32.00	5 percent ad valorem
Other	1806.90.00	5 percent ad valorem
Otherwise prepared or preserved fruit, nuts, and other edible parts of plants	2008.19	5 percent ad valorem
Ice cream, containing nuts	2105.00.00	4 percent ad valorem

Australian Exports of Macadamia Nuts and Nut Products

Australia’s exports consist largely of kernels and macadamia kernel products. The majority of the exports are bulk raw kernels.²⁷⁴ The United States, Hong Kong, and Japan were the principal

²⁷³ Rates of Australian import duties were provided by the Embassy of Australia, posthearing brief, May 15, 1998, attached Australian Customs Service facsimile, May 12, 1998, pp. 1-2.

²⁷⁴ Information was obtained from two USITC staff interviews: with R. O’Connor, export manager, Jorgenson Waring Foods, and G. Hargreaves, and AMS director, at Jorgenson Waring offices, Sydney, New South Wales, Australia, Apr. 8, 1998; and with G. Brunton, manager, nuts and dried fruit, of Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis Commodities offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

Australian export markets in 1996/97 (table 3-4). The United States accounted for 22 percent (3,053 metric tons in-shell basis) of Australia's macadamia nut exports from July 1, 1996 to June 30, 1997. Hong Kong and Japan were the next largest markets, with 21 percent each. Other important markets are Belgium and Germany. Industry sources indicate that recent Asian economic problems may have an adverse effect on export sales to Asia as the bulk of such exports go to Hong Kong and Japan.²⁷⁵ According to the USDA, exports to Europe are likely to continue to increase modestly. Data on the quantity and value of Australian exports of macadamia kernel products are not available.

Industry Institutions: Relations Among Growers, Processors, Governments, and Consumers

The Australian macadamia industry's growers, processors, governments (State and Federal), and consumers (domestic and foreign) are tied together by three Australian institutions or organizations: the Australian Macadamia Society (AMS), the Australian Horticultural Corporation (AHC), and the Horticultural Research and Development Corporation (HRDC). These organizations work together to plan, fund, and implement the levy-funded promotion and scientific research programs for the industry.²⁷⁶

The Australian Macadamia Society

The Australian Macadamia Society (AMS) is a society of growers, processors, scientists, consumers, and others interested in macadamias, and is recognized as the Australian macadamia industry's most important industry body by growers, processors, processor/growers, commercial firms, and governments.²⁷⁷ The AMS' 670 members account for about 95 percent of Australian production.²⁷⁸ The society's goal is to promote the welfare and augment the financial health of the Australian macadamia industry. In so doing, the AMS collects membership fees and sets levels and distribution patterns for the legislated and mandatory macadamia levy that was implemented in 1992. The AMS funds and promotes macadamia usage through the AHC; funds and coordinates the implementation of scientific research projects through the HRDC; and funds the macadamia industry's participation in Australia's national residue testing program through the National Residue Survey (NRS).²⁷⁹

²⁷⁵ USDA, FAS, telegram No. AGR AS8010, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

²⁷⁶ USITC staff interview with T. Davenport, an AMS director, in Brisbane, Queensland, Australia, Apr. 2, 1998.

²⁷⁷ Australian Macadamia Society (AMS), *Australian Macadamia Society*, undated, found at <http://www.nor.com.au/agriculture/ams/macasoc.htm>, May 11, 1998.

²⁷⁸ AMS, prehearing brief, Apr. 20, 1998, p. 3; T. Davenport, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 8-9; and USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

²⁷⁹ USITC staff interview with T. Davenport, an AMS director, in Brisbane, Queensland, Australia, Apr. 2, 1998.

Table 3-4
Australia: Exports of macadamia nuts, marketing years, 1993-96

(Metric tons, in-shell basis)

Country	1993	1994	1995	1996
United States	3,436	4,246	3,475	3,053
Hong Kong	1,364	1,970	2,870	3,041
Japan	2,077	2,327	2,222	3,032
Belgium/Luxembourg	113	1,328	1,662	1,896
Germany	524	1,311	1,165	1,086
All other	1,011	1,427	1,333	2,033
Total	8,525	12,609	12,727	14,141

Note.—Marketing year begins July 1 of year indicated and ends June 30 of the following year.

Source: U.S. Department of Agriculture, FAS, *World Horticultural Trade and U.S. Export Opportunities*, May 1995, p. 46 and U.S. Department of Agriculture, FAS, telegram No. AGR AS5014, "Tree Nuts--Macadamia Annual Report--Australia," prepared by U.S. Embassy staff, Canberra, Feb. 24, 1995, and message reference No. AGR AS8010, prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

Coordination and informing AMS membership

At each general annual meeting, the AMS votes on the amount and distribution of the levy collected at the processing level by the Australian Department of Primary Industries and Energy.²⁸⁰ At the 1997 general annual meeting, the AMS voted for a levy of 7 cents²⁸¹ per kilogram to be collected and distributed by the Australian Department of Primary Industries and Energy as follows: 3.5 cents per kilogram for marketing and promotion projects developed, funded, and implemented through the AHC; 3.3 cents per kilogram for research and development projects developed, funded, and implemented through the HRDC; and 0.2 cents per kilogram for residue testing.²⁸² The AMS increased the promotional portion from 1.5 cents to 3.5 cents per kilogram at its 1997 general meeting.

The society publishes a newsletter six times annually to disseminate current news of interest for the membership. Additionally, the AMS members have internet access to an electronic bulletin board that stores and provides access to essays, articles, and news features of interest and relevance to the industry.²⁸³ The society has also developed the "MacMan" computer program that catalogs the industry's best trade, farming, and bookkeeping practices for dissemination throughout the membership. Through its promotional efforts with the Australian Horticultural Corp., the society

²⁸⁰ USITC staff interviews: with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998; and with T. Davenport, an AMS director, in Brisbane, Queensland, Australia, Apr. 4, 1998.

²⁸¹ Unless otherwise stated, the levy is presented in Australian cents per kg.

²⁸² USITC staff interviews: with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998; and with T. Davenport, an AMS director, in Brisbane, Queensland, Australia, Apr. 2, 1998. Information concerning collection by the Levies Management Unit was received by USITC staff in an email from the Australian Macadamia Society, May 19, 1998.

²⁸³ USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Apr. 4, 1998.

also maintains a website on the internet and publishes brochures and information bulletins.²⁸⁴

Australian Horticultural Corporation and generic macadamia promotion

The Australian Horticultural Corp. (AHC) is an Australian Federal Corporation which aims to add value to numerous Australian horticultural products through developing and managing marketing support and promotion programs for its participant industries, including the macadamia industry.²⁸⁵ This is accomplished through AHC expertise in domestic and international marketing, marketing and economic research, and market development. The AHC participates with the AMS in order to develop and implement a marketing support and promotional program for Australian macadamias (described below) funded by an allotted portion of the legislated macadamia levy.²⁸⁶

During 1998, levy funds for macadamia promotions are expected to increase from 1997's A\$285,000 (US\$186,100) to over A\$800,000 (over US\$522,000).²⁸⁷ The promotional fund generated in 1996/97 was distributed as follows: 30 percent for AHC overhead costs; 40 percent for promotion activities; 30 percent less \$A12,000 for an accumulated reserve fund to finance future promotions; and A\$12,000 for advertisements.²⁸⁸ Levy funds allocated to the AHC are not matched with Federal dollars as are levy funds allocated to the HDRC.²⁸⁹

The AHC promotes awareness and demand for macadamias through advertising in various media, such as the trade journals, *The Cracker* and *The Clipper*. AHC and AMS have developed a number of information bulletins such as *The Macadamia Story*, which provides information about macadamias and the Australian industry.²⁹⁰ Further, the AHC publishes an annual informational newsletter, *Macadamia Industry*, which summarizes and reports program progress, industry developments, etc.²⁹¹ Industry summaries are also published in *AHC News*.²⁹²

The AHC organizes trade shows, chefs' meetings and workshops, and other conventions in order to promote macadamia use, especially in food service. The AHC sponsored the Third Australian

²⁸⁴ The AMS website is found at <http://www.nor.com.au/agriculture/ams/macasoc.htm>. As an example, see AMS, *Macadamia Industry* (Sydney, New South Wales, Australia: Australian Horticultural Corporation, 1997).

²⁸⁵ Australian Horticultural Corporation (AHC), *Macadamia Industry* (Sydney, New South Wales, Australia: AHC, 1997), p. 4.

²⁸⁶ AHC, *Macadamia Industry*, 1997, p. 4; and USITC staff interview with W. Prowse, industry manager of the AHC, and G. Hargreaves, an AMS director, at AHC headquarters, Sydney, New South Wales, Australia, Apr. 8, 1998.

²⁸⁷ USITC staff interview with T. Davenport, an AMS director, in Brisbane, Queensland, Australia, Apr. 2, 1998.

²⁸⁸ USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

²⁸⁹ USITC staff interview with W. Prowse, industry manager of AHC, and G. Hargreaves, an AMS director, at AHC headquarters, Sydney, New South Wales, Australia, Apr. 8, 1998.

²⁹⁰ AMS, *The Macadamia Story*, an undated informational brochure (Lismore, New South Wales, Australia: AMS). The brochure is also found at <http://www.nor.com.au/agriculture/ams/macadami.htm>.

²⁹¹ AHC, *Macadamia Industry* (Sydney, New South Wales, Australia: AHC, 1997).

²⁹² See AHC, *AHC News*, April 1998.

Macadamia Culinary Awards where 105 chefs met in Sydney to enter a contest for the best new recipe using macadamias.²⁹³ In March 1998, the AHC participated in the 28th World Association of Cooks Congress, where 2,000 chefs gathered to develop and trade recipes.²⁹⁴ At this congress, the AHC promoted a number of new dishes using macadamias. The AMS and AHC then use such events to develop and distribute brochures of new macadamia recipes and uses to food service establishments.

The AHC and the AMS have committed A\$450,000 (US\$293,850) to promote macadamia nuts in Germany, a market which the AMS and AHC believe to be only 5 percent saturated.²⁹⁵ Buyers in Germany have slowed purchases, presumably as world prices started to fall and in anticipation of lower prices, and the AMS and AHC decided that such a promotional initiative was needed to “jumpstart” the market again.²⁹⁶ The program consists of marketing research, trade and consumer magazine advertising, public relations activities, and free samples for prospective German buyers and end users.²⁹⁷

Funding and conducting research and development through the HRDC

As noted above, nearly one-half of the mandatory levy, or 3.3 cents/kg, is allocated to the Horticultural Research and Development Corporation (HRDC), where the funds are federally matched, dollar for dollar, and then used to conduct research and development studies needed by, and of benefit to, the Australian macadamia industry.²⁹⁸ In 1998, over A\$800,000 (US\$522,400) were committed to finance new research, and in early 1998, A\$1.2 million (US\$783,600) in macadamia research projects were funded and ongoing.²⁹⁹ Another A\$1 million (US\$653,000) is expected to be committed to new research in 1998/99.³⁰⁰ And even without changes in the levy itself, levy-generated, federally-matched research funds allocated to the HRDC should increase with

²⁹³ AHC, *Macadamia Industry*, 1997, pp. 1-2.

²⁹⁴ AHC, *Macadamia Industry*, 1997, p. 2; and USITC staff interview with W. Prowse, industry manager of AHC, and G. Hargreaves, an AMS director, at AHC headquarters, Sydney, New South Wales, Australia, Apr. 8, 1998.

²⁹⁵ *Ibid.*

²⁹⁶ USITC staff interview with G. Brunton, manager, Orbis Commodities Pty. Ltd, Sydney, New South Wales, Australia, Apr. 8, 1998; and USITC staff interview with W. Prowse, industry manager of AHC, and G. Hargreaves, an AMS director, at AHC headquarters, Sydney, New South Wales, Australia, Apr. 8, 1998.

²⁹⁷ AHC, *Macadamia Industry*, 1997, p. 2; and USITC staff interview with W. Prowse, industry manager of AHC, and G. Hargreaves, an AMS director, at AHC headquarters, Sydney, New South Wales, Australia, Apr. 8, 1998.

²⁹⁸ USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 1998; and T. Davenport, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC. pp. 5-9.

²⁹⁹ USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

³⁰⁰ USITC staff interview with Dr. C. McConchie, research scientist, Commonwealth Scientific and Industrial Research Organisation (CSIRO) and University of Queensland’s Division of Horticulture, and G. Hargreaves, an AMS director, at the University of Queensland campus, Brisbane, Queensland, Australia, Apr. 3, 1998.

increasing Australian macadamia production and processings.³⁰¹

The HDRC has arranged to implement much of the federally-matched levy funds for research and development through the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The CSIRO is an independent statutory authority that assembles research teams from numerous physical and social science disciplines to conduct inquiries and research studies of scientific, environmental, and/or economic value to Australia.³⁰² Potential areas of inquiry and research include agriculture and horticulture, and the CSIRO is conducting a number of research studies relevant to the macadamia industry.³⁰³

There are seven ongoing CSIRO research projects of note funded through the HDRC. Funded at A\$200,000 (US\$130,600), the macadamia-breeding program has reportedly realized a 10-15 percent rise in the revenue value of yield increases through examination of macadamia variety trial and selection experiments.³⁰⁴ The Canopy Management study, funded at A\$100,000 (US\$65,300), examines yield implications of alternative tree densities and pruning programs - - currently an area of debate among Australia's growers and horticulturalists, as the country's orchards mature and canopies develop.³⁰⁵ Other research projects of note include, among others, a nut abscission project; research on kernel quality; germplasm research; a study on root stock trials; and various experiments on pollination.³⁰⁶

Funding participation in the National Residue Survey

National Residue Survey (NRS) is a national program aimed at monitoring, assessing, and reporting the levels of chemical residues in Australian agricultural, horticultural, and aquacultural products, in order to increase domestic and international confidence in the safety and quality of such products.³⁰⁷ The program audits the chemical residue status of macadamias; identifies chemical residue problems, causes, and solutions; and has input into formulating relevant public policies when needed.

Other Government Programs

³⁰¹ USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

³⁰² Commonwealth Scientific and Industrial Research Organisation (CSIRO), *CSIRO Overview, Australian Science, Australia's Future*, Mar. 23, 1998, found at <http://www.csiro.au/csiro/about.html>, May 14, 1998.

³⁰³ CSIRO, *CSIRO Overview, Australian Science, Australia's Future*, Mar. 23, 1998, found at <http://www.csiro.au/csiro/about.html>, May 14, 1998; and USITC staff interview with Dr. C. McConchie, research scientist, Commonwealth Scientific and Industrial Research Organisation (CSIRO) and University of Queensland's Division of Horticulture, and G. Hargreaves, an AMS director, at the University of Queensland campus, Brisbane, Queensland, Australia, Apr. 3, 1998.

³⁰⁴ USITC staff interview with Dr. C. McConchie, research scientist, Commonwealth Scientific and Industrial Research Organisation (CSIRO) and University of Queensland's Division of Horticulture, and G. Hargreaves, an AMS director, at the University of Queensland campus, Brisbane, Queensland, Australia, Apr. 3, 1998.

³⁰⁵ *Ibid.*

³⁰⁶ *Ibid.*

³⁰⁷ Bureau of Resource Sciences Australia, *National Residue Survey*, July 25, 1997, found at <http://www.brs.gov.au/residues/nrs.html>, May 14, 1998.

The Federal Government offers the Export Market Development Grant (EMDG) Program.³⁰⁸ Such grants are available to Australian firms, cooperatives, corporations, and other Federally approved organizations that (a) spend at least A\$20,000 (US\$13,060) annually on export market activities; (b) have a total annual income of less than A\$50 million (US\$32.7 million) and an export-generated income of less than A\$25 million (US\$16.33 million); and have received less than eight grants in the past.³⁰⁹ Macadamia nuts and products are among the goods eligible for the EMDG program. Grant monies may be used for expenses related to overseas representation; overseas market visits and travel expenses related to export marketing; expenses incurred in developing and maintaining foreign market contacts; provision of product samples for distribution to overseas clients; costs of developing and distributing promotional materials; expenses incurred by attending trade fairs; and costs involved in retaining short term market consultants in foreign markets.

The Macadamia Processing Company has received 8 of these grants and is no longer eligible for any more grants.³¹⁰ The Australian Horticultural Corporation has received EMDG grants of A\$2,831 (US\$1,849) in 1995; A\$8,267 (US\$5,398) in 1996; A\$6,000 (US\$3,918) in 1997; and a projected A\$4,653 (US\$3,038) in 1998.³¹¹

³⁰⁸ Embassy of Australia, posthearing brief, attached exhibit "Grants at a Glance," May 15, 1998.

³⁰⁹ *Ibid.*

³¹⁰ B. Raphael, general manager of MPC, transcript of the hearing, Apr. 30, 1998, pp. 46-47.

³¹¹ AMS, posthearing brief, May 13, 1998, p. 6.

CHAPTER 4

MAJOR FOREIGN SUPPLIERS

OUTSIDE AUSTRALIA

While the United States and Australia together supplied about 74 percent of world macadamia production in 1997 (table 1-1), six African and Latin American producers (Kenya, South Africa, and Malawi, Guatemala, Costa Rica, and Brazil) supplied the remainder. The African and Latin American countries mainly export macadamia kernels, with little domestic consumption.

Of the 1997/98 world macadamia exports, Australian and U.S. exports accounted for 49 percent, African exports accounted for 35 percent, and Latin American exports accounted for the remaining 16 percent, as shown in the following tabulation (in metric tons):³¹²

Source	Exports	Share
		<i>(Percent)</i>
Australia	16,000	41
United States	3,200	8
Africa:		
Kenya	6,900	18
South Africa	4,900	12
Malawi	2,000	5
Subtotal	13,800	35
Latin America:		
Guatemala	2,730	7
Costa Rica	2,400	6
Brazil	1,250	3
Subtotal	6,380	16
Grand total	39,380	100

Kenya, South Africa, and Malawi have increased production rapidly in recent years to meet growing world demand. Africa has limited domestic demand for macadamia products, and exports over 90 percent of its output, primarily to the United States, Europe, Japan, and Hong Kong. African production and exports are likely to continue expanding as the large number of macadamia trees planted in the past few years moves into the bearing stage, and farmers and processors devote greater attention and resources to the crop. With such minor domestic demands, the three African countries do not import macadamia nuts.

The extent of macadamia processing in Africa varies by country. South Africa has five processors, although processing does not extend beyond the roasted kernel stage, except for a limited amount for the domestic market. Kenya has three processors, while Malawi reportedly has two nut processing facilities.

³¹² Data were converted from reported shelled to in-shell basis using a factor of .228.

Production in Latin America is dispersed widely among growers who interspace macadamia trees with coffee trees and bananas plants, as well as with annual crops such as beans. However, countries such as Guatemala and Costa Rica have faced a series of yield-reducing climatic and agronomic problems, such as variable rainfall, diseases, and pests.³¹³ Further, rising coffee prices have led many Latin American farmers, particularly in Costa Rica, to abandon macadamia production and re-plant with coffee trees.³¹⁴ Brazil, Costa Rica, and Guatemala each have a handful of macadamia processors, with generally excess processing capacity beyond each country's production level. About 80 percent of Latin American production in 1996/97 was exported, with about 80 percent of these exports going to the United States.

Kenya

With production having nearly doubled in the past 6 years, Kenya is the third-largest producer of macadamia nuts in the world, after the United States and Australia (table 4-1). Many Kenyan farmers are embracing macadamia cultivation as an alternative to coffee and other crops, and most are interested in adding more trees to their orchards.³¹⁵

The number of macadamia trees planted has increased rapidly over the past 5 years. Currently, Kenya has 969,355 macadamia nut trees on 6,155 hectares (table 4-1).³¹⁶ About 85 percent of these trees are bearing trees. Most macadamia nuts are produced by small farmers, located in the Central, Eastern, Western, and Rift Valley Provinces, who typically intercrop macadamia trees with coffee and other crops. The Bob Harris Company, which introduced the crop to Kenya, and the Kenya Farm Nut Company are the only firms that have large plantings.

Macadamia production in Kenya has increased steadily in recent years; between 1992 and 1996, it rose 38 percent, from 3,555 metric tons (in-shell basis) to 4,900 metric tons. In 1997, production increased another 39 percent to 6,800 metric tons, or 9 percent of world production (table 4-1). Production is forecast to rise to only 7,000 metric tons in 1998 because unseasonably heavy rains in late 1997 and early 1998 will likely reduce the crop yield.

A number of factors have stimulated the growth of macadamia production in Kenya. Growing world demand for macadamia nuts has led to increased interest in the crop by the government, processors, and farmers. The Kenyan Government, through the Horticultural Crops Development Authority, has actively promoted the industry by offering extension services to farmers, conducting research, producing macadamia seedlings, and working to spread

³¹³ USITC staff interviews: with M. Nakamura, president, Hawaii Macadamia Company, Keaau, HI, Mar. 26, 1998; and with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, and G. Hargreaves, an AMS director, at Agrimac offices, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³¹⁴ USDA, FAS, telegram No. AGR CS8002, "Tree Nuts--Macadamia Annual Report--Costa Rica," Jan. 29, 1998.

³¹⁵ USDA, FAS, *World Horticultural Trade and U.S. Export Opportunities*, Apr. 1997, pp. 21-22.

³¹⁶ USDA, FAS, telegram No. AGR KE8001, "Tree Nuts--Macadamia Annual Report--Kenya," prepared by U.S. Embassy staff, Nairobi, Feb. 1, 1998.

Table 4-1
Kenya macadamia nuts: Area, yield, production, exports, imports, and domestic consumption, 1992-98

Marketing year	Area		Yield	Production	Exports			Domestic consumption ³
	Planted	Harvested			United States	Total	Imports	
	)))))) Hectares)))))))		Kilos per hectare	))))))))) Metric tons (<i>in-shell basis</i>)))))				
1992	5,314	4,780	744	3,555	154	3,085	0	109
1993	5,414	4,870	677	3,299	387	3,365	0	77
1994	5,600	5,000	814	4,070	856	3,436	0	257
1995	5,750	5,100	804	4,100	858	3,714	0	286
1996	6,050	5,360	914	4,900	1,072	4,450	0	350
1997	6,150	5,480	1,241	6,800	1,875	6,819	0	321
1998 ¹	6,155	5,485	1,276	7,000	(²)	6,900	0	321

¹ Projected.

² Not available.

³ Domestic consumption takes into consideration changes in stocks.

Source: Compiled from official data of the U.S. Department of Agriculture.

production to other regions of the country.³¹⁷ Additionally, the Kenyan Agricultural Research Institute has worked through its Macadamia Research Station to promote production in new areas.

To meet strong export demand, Kenya processors have competed vigorously for the farmers' macadamia output.³¹⁸ Consequently, in 1997, the price received by farmers for in-shell macadamia nuts rose by 30 percent. These processing firms have also assisted farmers by providing seedlings and offering extension services.

Farmers have devoted greater efforts to macadamia production not only because of rising prices but because they regard macadamias as insurance against any downturn in their main cash crops, such as coffee and tea. In addition, care of macadamia trees is relatively easy because much of their agronomical care is provided during the course of attending to the main crop, usually coffee.

The major constraint on the continued growth of the macadamia industry in Kenya is the shortage of macadamia seedlings. Growing high-quality seedlings involves a difficult, 2-year grafting process. Although the government, processing firms, cooperative societies, and even individual farmers are all involved in producing seedlings, demand still exceeds supply. In 1997, the price for a macadamia seedling increased 67 percent over that in the prior year.

There are three firms that process and market macadamia nuts in Kenya—the Kenya Nut Company, the country's first processor; the Kenya Farm Nut Co.; and Kenya Cashewnuts LTD, the most recent entrant.³¹⁹ The Kenya Nut Company's processing facility is in Thika, while facilities of the Kenya Farm Nut Company and Kenya Cashewnuts LTD are in Muranga and Kilibi. At present, macadamia processing in Kenya only goes to the roasted kernel stage; that is, there is no known production of confectionery or other products containing macadamias.

While data on Kenya's total macadamia exports were reported on an in-shell basis (table 4-1) and a kernel basis, exports to specific countries were available only on a kernel basis. As Kenya's macadamia production has expanded rapidly in recent years, so too have exports. Kenya's exports of macadamia kernels grew from 402 metric tons in 1992 to 664 metric tons in 1996, and then jumped 38 percent to 918 metric tons in 1997. Japan accounted for the largest share of these exports (57 percent), followed by the United States (27 percent) and Germany (13 percent).³²⁰ As described earlier, Kenya is the second-largest exporter of macadamias in the world, after Australia.³²¹

Because Kenyan production of macadamias is destined primarily for the export market, domestic consumption of macadamia kernels is equivalent to only 5 percent of total output (table 4-1). After growing steadily between 1993 and 1996, domestic consumption declined by 8 percent in 1997; Kenya does not import macadamia nut products.

³¹⁷ Ibid.

³¹⁸ A third processor, Kenya Cashewnuts LTD, entered the market for in-shell macadamia nuts during 1997. An insufficient supply of cashew nuts to process prompted this company to expand into macadamia nut processing in order to utilize excess capacity.

³¹⁹ USDA, FAS, telegram No. AGR KE8001, "Tree Nuts--Macadamia Annual Report--Kenya," prepared by U.S. Embassy staff, Nairobi, Feb. 1, 1998, p. 4.

³²⁰ Ibid.

³²¹ USDA, FAS, *World Horticultural Trade and U.S. Export Opportunities*, Mar. 1998, p. 49.

In Kenya, the tariff on macadamia nuts (in-shell, raw kernels, and roasted kernels) is 70 percent ad valorem. Other than the research and extension assistance noted earlier, there are no known government programs for macadamia nuts in Kenya.

South Africa

South Africa, the world's fourth-largest macadamia producer, more than tripled production since 1992 (table 1-1). The number of macadamia trees planted has risen significantly in recent years, from 1.1 million trees on 3,533 hectares in 1996 to an estimated 1.5 million trees on 5,000 hectares in 1998 (table 4-2).³²² One-half of the trees are bearing trees. With 78 percent of the macadamia trees 10 years old or less in 1995, South African production should expand rapidly over the next decade as these trees move into peak production.

Macadamia nut production in South Africa has been stimulated by increased world demand, as well as rising prices paid to growers. New growers have entered the business and new processing facilities have been built.³²³ Sixty percent of the growers have between 1,000 and 10,000 macadamia trees, 7 percent have more than 10,000 trees, and the remainder have fewer than 1,000 trees.

Aided by favorable weather conditions and more trees reaching bearing age, South African macadamia nut production was an estimated 5,460 metric tons (wet-in-shell) in 1997, an increase of 39 percent over production in 1996 and more than double the production in drought-plagued 1995. In 1998, production is forecast to jump another 23 percent to 6,720 metric tons. South Africa's share of total world output of macadamia nuts was 7 percent in 1997.

Prices paid to farmers in nominal terms also rose in South Africa, from an average of 36 South African rand per kilogram in 1996 to 38 rand per kilogram in 1997. Although retail prices for macadamia nuts in South Africa reportedly vary according to the product and the outlet, they are expected to continue rising in 1998.³²⁴

There are five major macadamia nut processing facilities in South Africa. One facility processes and packs the farmers' macadamias on a toll basis, and then the farmers market the product themselves. Three other facilities purchase the farmers' nut-in-shell macadamias, and then process and market them. One other facility produces processed macadamia products primarily for the domestic market.³²⁵

South African exports have also risen commensurately with the growth in output. Exports of macadamias rose 38 percent between 1996 and 1997, from 3,570 metric tons to an estimated 4,915 metric tons (table 4-2). Exports are forecast to increase 23 percent to 6,050 metric tons in 1998. In 1996, the United States accounted for 33 percent of total South African exports of macadamias, followed by Hong Kong (24 percent), the Netherlands (13 percent), and Germany

³²² USDA, FAS, telegram No. AGR SF8003, "Tree Nuts--Macadamia Annual Report--South Africa," prepared by U.S. Embassy staff, Pretoria, Jan. 29, 1998.

³²³ Ibid.

³²⁴ Ibid.

³²⁵ Ibid.

Table 4-2
South Africa macadamia nuts: Area, yield, production, exports, imports, and domestic consumption, 1992-98

Marketing year	Area		Yield	Production	Exports		Imports	Domestic consumption
	Planted	Harvested			United States	Total		
	)))))) Hectares)))))))		Kilos per hectare	))))))))) Metric tons (<i>in-shell basis</i>))))))))				
1992	(¹)	(¹)	(¹)	1,715	(¹)	1,000	(¹)	(¹)
1993	3,830	(¹)	(¹)	1,260	(¹)	(¹)	(¹)	(¹)
1994	3,800	(¹)	(¹)	3,115	1,153	2,825	0	290
1995	4,300	(¹)	(¹)	2,455	730	2,122	0	333
1996	3,533	(¹)	(¹)	3,920	1,182	3,570	0	350
1997 ²	4,265	(¹)	(¹)	5,460	(¹)	4,915	0	545
1998 ³	5,000	(¹)	(¹)	6,720	(¹)	6,050	0	670

¹ Not available.

² Estimated.

³ Projected.

Source: Compiled from official data of the U.S. Department of Agriculture.

(9 percent).³²⁶ In 1997/98, South Africa was the third-largest exporter of macadamias in the world, and accounted for 12 percent of total world exports.

South Africa consumes only 10 percent of its production, and exports the remainder. Nevertheless, domestic consumption rose sharply between 1994 and 1997, from 290 metric tons (wet-in-shell) to an estimated 545 metric tons. Consumption is projected to grow strongly in 1998. Despite these increases in domestic consumption, South Africa does not import macadamia nuts.

South Africa has no tariffs on macadamia nuts. The South African Government provides no export incentives or rebates for the exportation of roasted or dry macadamia kernels.³²⁷ The only government assistance to the macadamia industry is some basic research conducted by the Agricultural Research Council. The industry's trade association, South African Macadamia Growers' Association, also funds research.

South Africa is rapidly emerging as a strong competitor to Hawaii and Australia. Industry representatives believe that South Africa has the potential to produce a macadamia product equal in quality to that of Hawaii and Australia.³²⁸ With established reputations for horticultural skill, South African growers are improving the quality of their crop.³²⁹ However, industry officials identified a number of problems that still need to be resolved before the South African industry achieves the same high quality standards set by Hawaii and Australia. Some of the kernel is of a darker color than desired, and certain growers insist on tree selections that produces a kernel that is below the standard demanded by foreign buyers.³³⁰ And finally, some of the processing techniques are substandard. South African growers have planted new orchards in cooler areas that will help alleviate some of these problems.

Malawi

Malawi is the third-largest macadamia nut producer in Africa, after Kenya and South Africa. Plantings of macadamia trees in Malawi have increased in recent years as the country has moved to expand output. In 1995, there were 2,000 hectares of macadamia plantings, with an additional 2,000 hectares likely to be planted over the next few years by the private sector.³³¹ Further, the

³²⁶ Ibid.

³²⁷ USDA, FAS, telegram Nos. AGR SF7002 and SF8003, "Tree Nuts--Macadamia Annual Report--South Africa," prepared by U.S. Embassy staff, Pretoria, Jan. 31, 1997 and Jan. 29, 1998.

³²⁸ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, and G. Hargreaves, an AMS director, at Agrimac offices, Alstonville, New South Wales, Australia, Apr. 6, 1998; and with R. O'Connor, export manager, of Jorgenson Waring Foods, and G. Hargreaves, an AMS director, at Jorgenson Waring offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

³²⁹ USITC staff interviews: with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 4, 1998; and with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, and G. Hargreaves, an AMS director, at Agrimac offices, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³³⁰ USITC staff interview with K. Ainsbury, chief financial officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, and G. Hargreaves, an AMS director, at Agrimac offices, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³³¹ Agrimac International Enterprises Pty. Ltd., posthearing submission, May 1998, pp. 12-13.

Government of Malawi is considering the establishment of a smallholder project of up to 500 hectares.³³²

Macadamia trees in Malawi are grown primarily on large estates owned by international investment companies. One such company, the Commonwealth Development Corp. (a British government corporation currently being privatized), owns several large macadamia estates in Malawi.³³³

Because of rancidity, Malawi kernels are often inferior in quality to Hawaiian and Australian kernels.³³⁴ Nevertheless, Malawi growers are able to produce a respectable product, particularly for industrial uses, and kernel quality is reported to be improving.

In the 1996/97 marketing year, Malawi produced an estimated 2,624 metric tons of macadamias.³³⁵ Production is expected to grow by 50 percent in the next few years as older orchards are rehabilitated and the kernel recovery rate increases.³³⁶

Malawi has two macadamia nut-processing facilities. The largest, the Kawalazi Estate, is located in the northern part of the country; the other, Namingomba Tea Estates Ltd., is in the south near Blantyre.³³⁷ The macadamia kernels are sold primarily into industrial, rather than retail, channels.³³⁸ Official statistics on macadamia product exports for Malawi were not available. Malawi has increased its exports of macadamia kernel in the past few years. Key export markets include Europe, Hong Kong/China, and the United States.³³⁹ Malawi is not a substantial domestic consumer or an importer of macadamia nuts.

Malawi has a 10-percent ad valorem tariff on in-shell macadamias and raw kernels and a 45 percent ad valorem tariff on roasted kernels. Malawi also applies an additional 10-percent import levy on in-shell macadamias and raw kernels and a 55-percent surtax and a 10-percent import levy on roasted kernels.³⁴⁰

Guatemala

Guatemala has steadily increased its production as new plantings have begun bearing fruit and the age of trees has risen. Prices for the nuts within Guatemala are attractive to growers, and coffee producers intermix macadamia trees easily, so that higher coffee prices often reinforce macadamia

³³² Ibid.

³³³ Agrimac International Enterprises Pty. Ltd., e-mail to USITC staff, May 14, 1998.

³³⁴ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, and G. Hargreaves, an AMS director, at Agrimac offices, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³³⁵ International Nut Council, "World Production Estimates," *The Cracker*, Vol. No. 3, Ed. 25, Sept. 1997, p. 31. Data for macadamia production in Malawi in earlier years are not available.

³³⁶ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and John Wilkie, agricultural director, of Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³³⁷ Agrimac International Enterprises Pty. Ltd., e-mail to USITC staff, May 14, 1998.

³³⁸ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and John Wilkie, agricultural director, of Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³³⁹ Agrimac International Enterprises Pty. Ltd., posthearing brief, May 1998, p. 15.

³⁴⁰ Fax from the U. S. Department of Commerce, International Trade Administration, Feb. 13, 1998. Data for Kenya and Malawi are for 1991 and 1989, respectively, the latest years for which data are available.

production.³⁴¹ Most of the macadamia groves are not irrigated, and depend on rainfall. Guatemalan kernels are reported to be of an unpredictable quality, well below the Hawaiian/Australian kernel standard, the world's highest, and also below the quality of Costa Rican kernels.³⁴²

Since 1991, Guatemalan yields have risen from about 1,900 kilos per hectare to nearly 2,300 kilos per hectare in 1997/98³⁴³ (table 4-3). Growers receive technical assistance to improve the quality of their nuts from the country's two largest processors, Agronomicas de Guatemala (Agronomicas) and Nueces del Pacifico (Nueces).

Agronomicas currently accounts for 76 percent of exports and Nueces the remainder.³⁴⁴ Agronomicas has a plant capacity of 0.8 million kilograms of kernels, while Nueces has a plant capacity of 0.4 million kilograms.³⁴⁵ Thus, these two processors have a combined processing capacity of about double the shelled kernel weight of the 1997/98 Guatemalan crop.

Both Guatemalan processors cultivate their own trees as well as purchase nuts from approximately 100 independent growers.³⁴⁶ Processors initially grade the kernels by size and color by machine; after processing, the nuts are hand-sorted. Kernels for the domestic market are distributed directly to groceries, bakeries, and food and candy producers. Some kernels are sold in jars. Kernels for export are vacuum-packed, refrigerated, and transported to the port. Processed Guatemalan kernels are exported at 1.0 to 1.5 percent humidity levels in 11.3 kilogram (25-pound) bags.

Prices of macadamia nuts in Guatemala at the retail level varied in late 1997, with two brands ("IGESA and John Macadam") available at prices ranging from \$14.48 per kilogram (bagged) to \$24.00 per kilogram, according to USDA. The export price for kernels averaged \$9.92 per kilogram (11-kilo bags, vacuum-packed) in 1997. Wet-in-shell prices paid to producers vary depending on moisture level and quality, and in 1997 averaged between \$1.28 and \$1.76 per kilogram.

Guatemalan exports doubled during 1991/92 to 1997/98 to 2,735 metric tons (table 4-3) or about 7 percent of world exports. In 1996/97, Guatemalan exports to the United States reached 2,029 metric tons; to Japan, 239 metric tons; and to Germany, 239 metric tons.

In Guatemala, macadamia nuts are a high-priced luxury food generally unknown to consumers. Consumption accounted for less than one percent of Guatemala's 1997/98 production. Aside from occasional instances where Guatemalan processors import fresh kernel from Costa Rica for subsequent re-export, Guatemala is not a significant importer.

In Guatemala, the import tariff for macadamia nut kernels (either fresh or processed) was 17 percent ad valorem in 1998. No significant nontariff barriers exist, according to the U.S. State

³⁴¹ U.S. Department of State, telegram No. 0221087, prepared by U.S. Embassy staff, Guatemala City, Feb. 2, 1998.

³⁴² USITC staff interview with B. Wright and J. Wagaman of Blue Diamond, Jan. 12, 1998.

³⁴³ USDA, FAS, telegram No. AGR GT8002, "Tree Nuts--Macadamia Annual Report--Guatemala," prepared by U.S. Embassy staff, Guatemala City, Jan. 12, 1998.

³⁴⁴ U.S. Department of State telegram No. 022108Z, prepared by U.S. Embassy staff, Guatemala City, Feb. 2, 1998.

³⁴⁵ USDA, FAS, telegram No. AGR GT8002, "Tree Nuts--Macadamia Annual Report--Guatemala," prepared by U.S. Embassy staff, Guatemala City, Jan. 12, 1998.

³⁴⁶ Ibid.

Department.³⁴⁷ There are no known government programs for macadamia products in Guatemala.³⁴⁸

Costa Rica

Costa Rican production rose only slightly during 1991/92 to 1997/98, as yields plummeted because of El Nino weather, and as strong coffee prices induced growers to switch from macadamia nut to coffee production.³⁴⁹ Planted acreage in macadamia nuts in Costa Rica dropped from 6,500 to 5,000 hectares during 1991/92 to 1997/98, although the harvested hectares doubled (table 4-4). Part of this area reduction may have arisen from reported investor dissatisfaction with realized returns on investments in the Costa Rican industry.³⁵⁰ Production levels are expected to stabilize in 1998 with higher yields offsetting lower acreage, according to USDA.

Costa Rican yields have declined by more than 40 percent since 1991/92, from 1.1 metric tons to 625 kilograms per hectare. Australian industry representatives with considerable experience in Costa Rica have made two points concerning the low levels and poor performance of Costa Rican yields since 1991/92. First, the Costa Rican climate is too hot and wet to realize the much higher yields achieved in Hawaii and Australia.³⁵¹ Second, poor management practices and sub-optimal use of inputs such as fertilizers and pesticides have reduced yields.

Production in Costa Rica was affected over the past several years by the El Nino weather that delayed harvesting of crops, causing a delay in harvesting until the next calendar year. For example, the 1996 crop was processed as late as February 1997, and the USDA reports that a similar situation may occur in 1997/98. Industry sources report that the quality of Costa Rican kernels, while below the high Hawaiian/Australian kernel standard, is considered “respectable” and above Guatemalan kernel standards.³⁵²

³⁴⁷ Facsimile received by USITC staff from the U.S. Department of Commerce (USDOC), ITA, Feb. 13, 1998.

³⁴⁸ USDA, FAS, telegram No. AGR GT8002, “Tree Nuts--Macadamia Annual Report--Guatemala,” prepared by U.S. Embassy staff, Guatemala City, Jan. 12, 1998.

³⁴⁹ USDA, FAS, telegram No. AGR CS8002, “Tree Nuts--Macadamia Annual Report--Costa Rica,” prepared by U.S. Embassy staff, San Jose, Jan. 29, 1998.

³⁵⁰ USITC staff interview with B. Tankersley of the Young Pecan Company, a Florence, South Carolina firm involved in marketing Costa Rican macadamias in the United States, at the Peanut and Tree Nut Processors’ Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 11, 1998.

³⁵¹ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³⁵² USITC staff interviews at the Peanut and Tree Nut Processors’ Annual Convention and Trade Show, Sanibel Island, FL: with B. Tankersley, Young Pecan Co., Florence, South Carolina, Jan. 11, 1998; and with B. Wright and J. Wagaman, Blue Diamond, Sacramento, CA, Jan. 12, 1998.

Table 4-3

Guatemalan macadamia nuts: Area, yield, production, exports, imports, and domestic consumption, 1991/92 to 1997/98

Year	Area		Yield	Production	Exports		Imports	Domestic consumption ³
	Planted	Harvested bearing			To the U.S.	Total		
	)))))) Hectares	))))))	Kilos per hectare	))))))))))))))))))))))))))	Metric tons (in-shell basis)))))))))))))))))))))))))))		
1991/92	2,800	733	1,949	1,429	1,335	1,359	0	10
1992/93	2,800	787	2,018	1,588	(²)	1,769	181	15
1993/94	2,800	907	2,142	1,943	1,818	2,080	227	15
1994/95	3,080	950	3,142	2,130	2,045	2,265	150	15
1995/96	3,200	1,000	2,272	2,272	2,000	2,327	70	15
1996/97	3,300	1,103	2,273	2,507	2,029	2,507	0	15
1997/98	3,400	1,208	2,272	2,745	(²)	2,735	0	15

¹ Projected.

² Not available.

³ Domestic consumption takes into consideration changes in stocks.

Source: Compiled from official data of the U.S. Department of Agriculture.

4-11

Table 4-4

Costa Rican macadamia nuts: Area, yield, production, exports, imports, and domestic consumption, 1991/92 to 1997/98

Year	Area		Yield	Production	Exports		Imports	Domestic consumption ³
	Planted	Harvested bearing			To the U. S.	Total		
	)))))))) Hectares	))))))))	Kilos per hectare	))))))))))))))))))))))))))	Metric tons (in-shell basis)))))))))))))))))))))))))))		
1991/92	6,500	2,000	1,100	2,200	996	1,104	0	850
1992/93	6,500	2,500	1,080	2,700	1,245	1,735	0	700
1993/94	6,500	3,000	1,000	3,000	1,223	1,804	0	750
1994/95	6,600	3,500	657	2,300	1,703	2,187	0	400
1995/96	6,000	4,000	575	2,300	1,278	2,035	0	250
1996/97	4,250	3,500	714	2,500	2,144	2,800	0	265
1997/98 ¹	5,000	4,000	625	2,500	(²)	2,400	0	280

¹ Projected.

² Not available.

³ Domestic consumption takes into consideration changes in stocks.

Source: Compiled from official data of the U.S. Department of Agriculture.

Costa Rica has a large processing capacity, with three sizable processors, Macadamia de Costa Rica, Macadamia de Miravalles, and a new entry Sol Caribe S.A. (owned by six growers). The majority of processed products are exported in bulk (11.3 kg. or 25 lb. bags) for further processing. Macadamia de Miravalles marketed some finished (retail) products in 1997, but the other two processors exported only bulk products.³⁵³ With excess processing capacity, competition for raw nuts has augmented grower prices. The two larger processors have followed a rigorous system of price incentives, with the average 1997 price received by growers reportedly at \$5.50 per kilogram for shelled nuts. These price incentives require growers to sort raw product at the farm to reduce delivery of low-grade product to the plant, and have resulted in better quality and kernel yields at the Costa Rican plants, even though this reduces farm level yields.

Total Costa Rican exports rose from 1,104 metric tons in 1991/92 to 2,400 metric tons in 1997/98. In 1996/97, Costa Rica exported 2,144 metric tons to the United States and 408 metric tons to Germany. About 11 percent of Costa Rican macadamia output was consumed domestically during 1997/98, with a portion of this product sold to tourists and high-income Costa Rican consumers.³⁵⁴

In 1997, Costa Rica imposed a 19-percent ad valorem tariff on fresh macadamia nuts, and a 9 percent ad valorem tariff on processed nuts.³⁵⁵ There are no nontariff measures (NTMs) in Costa Rica on these products. Additionally, there are no government programs for macadamia nuts in Costa Rica, although international assistance and development programs provide some technical assistance to growers.

Brazil

The area planted with macadamia nuts in Brazil doubled during 1991/92 to 1997/98, while the harvested area more than doubled (table 4-5). Improved growing conditions and higher numbers of bearing trees in Brazil's three key producing States, Espirito Santo, Sao Paulo, and Minas Gerais, increased macadamia nut production. According to the USDA, the planted area is likely to remain fairly constant in Brazil in the near future, and is constrained by a lack of farm financing, poor cultural management of groves, and adverse weather.³⁵⁶

Processors in Brazil are concentrated mainly in the three key producing States that together supplied 84 percent of Brazil's macadamia nuts in 1997/98. A foreign company recently acquired the largest processor in Espirito Santo. Espirito Santo, according to USDA, produces about one third of the Brazilian output of macadamia nuts.

USDA data indicate that 90 percent of Brazil's 1997/98 exports of 1,250 metric tons (in-shell basis) went to the United States. Until 1995/96, Brazil did not export macadamia nuts.

³⁵³ USDA, FAS, telegram No. AGR CS8002, "Tree Nuts--Macadamia Annual Report--Costa Rica," prepared by U.S. Embassy staff, San Jose, Jan. 29, 1998.

³⁵⁴ *Ibid.*

³⁵⁵ Facsimile received by USITC staff from the U.S. Department of Commerce (USDOC), ITA, Feb. 13, 1998.

³⁵⁶ USDA, FAS, telegram No. AGR BR4602, "Tree Nuts Annual," prepared by U.S. Embassy staff, Brasilia, Feb. 1, 1998.

Table 4-5
Brazilian macadamia nuts: Area, yield, production, exports, imports, and domestic consumption, 1991/92 to 1997/98

Year	Area		Yield	Production	Exports		Imports	Domestic consumption
	Planted	Harvested bearing			To the U.S.	Total		
	)))))) Hectares	))))))	Kilos per hectare	)))))))))))))	Metric tons (in-shell basis))))))))))))))	
1991/92	3,200	¹ 900	¹ 300	260	0	0	0	260
1992/93	4,500	¹ 1,000	¹ 327	360	0	0	0	360
1993/94	5,350	1,140	526	600	0	0	0	600
1994/95	5,800	1,150	809	930	0	0	0	930
1995/96	6,000	1,150	826	950	550	610	0	340
1996/97	6,300	2,480	524	1,300	585	650	0	650
1997/98	6,500	2,925	547	1,600	1,125	1,250	0	350

¹ Estimated by the staff of the U.S. International Trade Commission.

Note.—Exports to the United States are estimated as 90 percent of total exports. Reported shelled exports were corrected to in-shell basis with conversion factor of 5.

Source: Compiled from official data of the U.S. Department of Agriculture.

Brazil, with a population exceeding 164 million people and a per capita income exceeding \$4,000, consumed only about 22 percent of its macadamia nut production in 1997/98. There are abundant supplies of competitively-priced nuts, including almonds, hazelnuts, Brazil nuts, cashews, pistachios, peanuts, and walnuts, and macadamia nuts are still relatively unknown. Brazilian consumption of macadamia nuts fluctuated widely during 1991/92 to 1997/98, averaging 500 tons annually. Most of the macadamia nuts are consumed in Brazil as snacks, although some are used in foods, such as ice cream, cookies, and chocolates.³⁵⁷

According to U.S. Department of Commerce data, Brazilian tariffs are 10 percent ad valorem on fresh macadamia nuts, and 14 percent ad valorem on processed kernels. There are no special Federal Government programs in Brazil for macadamia nut growers, although the State government in Espirito Santo has provided long-term financial assistance for plantings. This program was suspended prior to 1997.³⁵⁸

³⁵⁷ Ibid.

³⁵⁸ Ibid.

CHAPTER 5

MAJOR FOREIGN CONSUMERS

Macadamia consumption outside of the United States and Australia is located primarily in Japan, Hong Kong, and the European Community. In 1996/97, apparent world consumption³⁵⁹ of macadamia nuts (based on reported world production of leading producers and adjusted for changes in inventory) amounted to about 63,755 metric tons (NIS) basis. The United States accounted for slightly more than one-half of world consumption of macadamia nuts in that year, with Japan accounting for 15 percent, Australia 13 percent, and the European Union (EU), and Hong Kong accounting for 7 percent each as shown in the following tabulation (in metric tons).³⁶⁰

Market	Macadamia consumption	Share
		<i>Percent</i>
United States ¹	32,440	51
Japan ²	9,605	15
Australia ³	8,000	13
China (Hong Kong) ⁴	4,600	7
EU ⁵	4,200	7
All other	4,910	8
Total	63,755	100

¹ Source: Table 2-17 of report.

² Imports for consumption of macadamia nuts and kernels (source: table 5-1).

³ Source: Table 3-3 of report.

⁴ Compiled from tables 2-21, 2-22, 3-4, and 4-2; Australian, U.S., and South African exports only.

⁵ Australian, U.S. and Kenyan exports only; compiled from tables 2-21, 2-22, 3-4, and 4-1.

The five leading markets together accounted for 93 percent of apparent world consumption in 1996/97. This chapter provides an overview of the Japanese, EU, and Hong Kong markets.

³⁵⁹ World consumption is world production less net change in inventories. Source: World Production, Table 1-1; inventories—USDA, FAS, “Macadamia Situation and Outlook,” *Horticultural Products*, July 1998, retrieved from the Internet www.fas.usda.gov/htp, on July 15, 1998.

³⁶⁰ Data were converted from reported shelled to in-shell basis using a factor of .228.

Japan

Japanese Imports of Macadamia Nuts and Nut Products

Japan is the second leading 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 since there is no domestic production. Imports of the macadamia kernels and kernel products into Japan grew by an average 9.7 percent annually during the years 1992 to 1997, to 2,190 metric tons in 1997 (table 5-1).³⁶¹ In 1997, imports of fresh or dried macadamia nuts amounted to about 1,528 metric tons (table 5-2), and imports of roasted and/or prepared or preserved macadamia nuts amounted to about 662 metric tons (table 5-3). About 30 percent of total Japanese imports in 1997 were processed kernels and about 70 percent were raw nuts.

Australia, the United States, and Kenya supplied 96 percent of the volume of Japanese imports in 1997. Japanese imports of all types of tree nuts amounted to 78,000 metric tons (valued at \$331 million) in 1997,³⁶² and macadamia nuts accounted for 3 percent of the volume and 8 percent of the value of these imports.

Australian and U.S. macadamia nut exports to Japan rose in volume by 119 and 52 percent, respectively, during 1992-97, whereas those of Kenya declined by 9 percent. Australia surpassed the United States on a volume basis as the leading supplier to Japan of these nuts in 1993; however, the United States remained the leading supplier on a value basis throughout period. The Australian nuts are largely imported in bulk for repackaging in Japan; some Australian “MacFarm” brand, retail-packed nuts are sold there as well.³⁶³ The Kenyan nuts go mainly into the food-processing sector for manufacturing of chocolate-covered nuts.

A Slowing Japanese Macadamia Import Market: Gains for Australia and Kenya at U.S. Expense

Despite the longer-term increases in Japan’s imports of macadamia kernels and kernel products since 1992, growth in the volume and value of Japan’s imports of macadamia kernels and kernel products slowed considerably in recent years to 6.2 percent in volume and 3.8 percent in value during 1996-1997 (tables 5-1 and figure 5-1). During the 1996-1997 period, Japan’s imports of roasted and prepared or preserved macadamia nuts actually declined (see tables 5-2, 5-3, and 5-4). However, growth in Japan’s volume and value of imported fresh or dried kernels increased over 1996-1997 period, from mid-1990s growth rates.

In 1997, there was a shift in Japanese purchases away from roasted (prepared or preserved) kernels supplied by the United States to fresh or dried nuts supplied by Australia and Kenya.

³⁶¹ Table 5-1 is an aggregation of data presented in tables 5-2 and 5-3.

³⁶² Fax from U.S. Agricultural Attache, U.S. Embassy, Tokyo, March 18, 1998.

³⁶³ Ibid.

Table 5-1
Total Japanese imports of macadamia kernels and kernel products,¹ by principal sources, 1992-97

Country	1992	1993	1994	1995	1996	1997
Quantity (<i>metric tons</i>)						
United States	458	437	519	522	798	694
Australia	409	443	560	777	748	894
Kenya	566	443	458	573	449	513
South Africa	24	21	46	43	33	55
All other	20	22	12	26	34	34
Total	1,477	1,366	1,595	1,943	2,062	2,190
Value (<i>1,000 dollars</i>) ²						
United States	6,900	6,696	8,648	9,415	12,420	10,966
Australia	4,020	4,432	6,017	8,408	8,818	9,752
Kenya	4,219	3,118	3,230	3,994	3,354	4,764
South Africa	196	134	336	354	28	202
All other	180	197	201	362	527	428
Total	15,515	14,577	18,432	22,533	25,147	26,112
Unit value (<i>per kilogram</i>)						
United States	\$15.07	\$15.32	\$16.66	\$18.04	\$15.56	\$15.80
Australia	9.83	10.00	10.74	10.82	11.79	10.91
Kenya	7.45	7.04	7.05	6.97	7.47	9.29
South Africa	8.17	6.38	7.30	8.23	0.85	3.67
All other	9.00	8.95	16.75	181.00	15.50	12.59
Average	10.50	10.67	11.56	11.60	12.20	11.92

¹ Data covers Japanese HTS 0802.90.200, 2008.19.221, and 2008.19.227.

² The following are the average exchange rates (¥/US\$) for 1992--126; 1993--111; 1994--102; 1995--94; 1996--109; and 1997--121.

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

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

Table 5-2
Japanese imports: Macadamia nuts, fresh or dried,¹ by source, 1992-97

Country	1992	1993	1994	1995	1996	1997
<i>Quantity (metric tons)</i>						
Australia	363	382	454	668	646	824
Kenya	566	441	458	573	449	513
United States	81	23	67	24	174	138
Guatemala	0	0	2	0	9	27
South Africa	24	21	25	27	0	19
Costa Rica	15	20	0	22	20	7
Total	1,049	887	1,006	1,314	1,298	1,528
<i>Value (1,000 dollars)¹</i>						
Australia	3,316	3,596	4,585	6,912	7,320	8,740
Kenya	4,218	3,106	3,230	3,994	3,352	4,762
United States	861	214	636	270	1,890	1,525
Guatemala	0	0	23	0	117	331
South Africa	196	134	176	246	0	184
Costa Rica	132	175	0	235	263	97
Total	8,723	7,225	8,650	11,657	12,942	15,639
<i>Unit value (per kilogram)</i>						
Australia	\$9.13	\$9.41	\$10.10	\$10.35	\$11.33	\$10.61
Kenya	7.45	7.04	7.05	6.97	7.47	9.28
United States	10.63	9.30	9.49	11.25	10.86	11.05
Guatemala	⁽³⁾	⁽³⁾	11.50	⁽³⁾	13.00	12.26
South Africa	8.17	6.38	7.04	9.11	⁽³⁾	9.68
Costa Rica	8.80	8.75	⁽³⁾	10.68	13.15	13.86
Average	8.32	8.15	8.60	8.87	9.97	10.23

¹ Japanese HTS 0802.90.200.

² Exchange rates (¥/US\$) for 1992--126; 1993--111; 1994--102; 1995--94; 1996--109; and 1997--121.

³ Not applicable.

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

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

Table 5-3**Japanese imports: Macadamia nuts, roasted and prepared or preserved, not containing added sugar, not elsewhere specified,¹ by source, 1992-97**

Country	1992	1993	1994	1995	1996	1997
	Quantity (metric tons)					
United States	377	414	452	498	624	556
Australia	46	61	106	109	102	70
Kenya	0	2	0	0	(²)	(²)
South Africa	0	0	21	16	33	36
Malaysia	0	0	5	2	1	0
Singapore	0	0	2	2	0	0
Costa Rica	5	2	3	2	0	0
France	0	0	0	0	0	0
Thailand	0	0	0	0	0	0
Spain	0	0	0	0	0	0
New Zealand	0	0	0	0	4	0
Total	428	479	589	629	764	662
	Value (1,000 dollars) ¹					
United States	6,039	6,482	8,012	9,145	10,530	9,441
Australia	704	836	1,432	1,496	1,498	1,012
Kenya	1	12	0	0	2	2
South Africa	0	0	160	108	28	18
Malaysia	0	0	104	47	23	0
Singapore	0	0	46	54	0	0
Costa Rica	47	22	29	26	0	0
France	1	0	0	0	0	0
Thailand	0	0	0	3	0	0
Spain	0	0	0	6	0	0
New Zealand	0	0	0	10	124	0
Total	6,792	7,352	9,783	10,895	12,205	10,473
	Unit value (per kilogram)					
United States	\$16.02	\$15.66	\$17.73	\$18.36	\$16.88	\$16.98
Australia	15.30	13.70	13.51	13.72	14.69	14.46
Kenya	(⁴)	6.00	-4.00	0.04	11.10	13.64
South Africa	(⁴)	(⁴)	7.62	6.75	0.85	0.50
Malaysia	(⁴)	(⁴)	20.80	23.50	23.00	(⁴)
Singapore	(⁴)	(⁴)	23.00	27.00	(⁴)	(⁴)
Costa Rica	9.40	11.00	9.67	13.00	(⁴)	(⁴)
France	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)
Thailand	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)
Spain	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)
New Zealand	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)	(⁴)
Average	15.87	15.35	16.61	17.32	15.98	15.82

¹ Japanese HTS 2008.19.221 and 2008.19.227.

² Less than 0.5 metric tons.

³ Exchange rates (¥/US\$) for 1992-97: 1992--126; 1993--111; 1994--102; 1995--94; 1996--109; and 1997--121.

⁴ Not applicable.

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

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

During 1996-97, the volume of Japanese imports of roasted nuts fell by 14 percent, while imports of fresh or dried nuts rose by 18 percent (table 5-4). Japan's declining imports of prepared or preserved macadamia kernels primarily from the United States and increasing imports of raw kernel primarily from Australia and Kenya arises from increased competition among Japanese business enterprises that have developed and are marketing their own retail macadamia products in Japan.³⁶⁴

Table 5-4
Annual changes in Japanese imports of macadamia products

	<i>(Percentage)</i>				
Product	1992-93	1993-94	1994-95	1995-96	1996-97
Total macadamia kernel and kernel products:					
Change in volume	(7.5)	16.8	21.8	6.1	6.2
Change in value	(6.0)	26.4	22.2	11.6	3.8
Macadamia nuts, fresh or dried:					
Change in volume	(15.4)	13.4	30.6	(1.2)	17.7
Change in value	(17.2)	19.7	34.8	11.0	20.8
Roasted and/or prepared or preserved macadamia nuts:					
Change in volume	8.2	33.1	11.2	12.0	(14.2)
Change in value	11.9	23	6.8	21.5	(13.3)

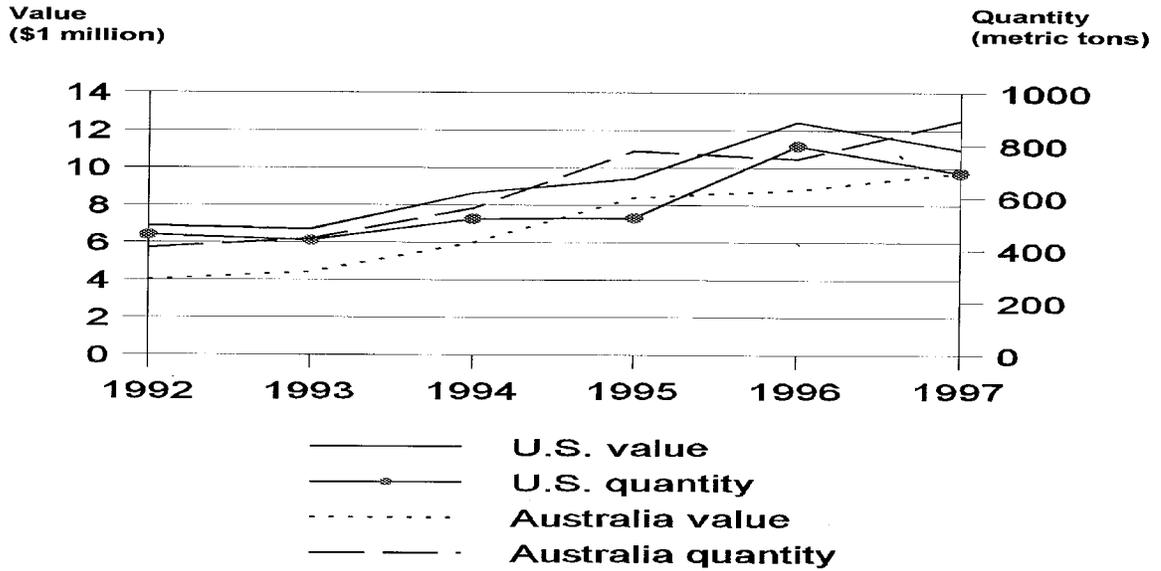
Source: USITC staff calculations of selected data from tables 5-1, 5-2, and 5-3.

While Japan's imports of macadamia products have recently begun to either decline or slow in growth, data in tables 5-1, 5-2, and 5-3, and plotted in figures 5-1, 5-2, and 5-3, suggest that Japan's imports of most of these products from Australia have been recently growing in volume and value, while imports from the United States have declined. During the 1996-1997 period, data in table 5-1 demonstrate that Japan's imports of U.S. macadamia kernel and kernel products declined by 13 percent in volume and by 12 percent in value, while such imports from Australia increased by 20 percent in volume and 11 percent in value (table 5-1 and figure 5-2). Over the same period, Japan's imports of U.S. fresh or dried macadamia nuts fell by 21 percent in volume and by 19 percent in value, while such imports from Australia increased by nearly 28 percent in volume and by 19 percent in value (table 5-2 and figure 5-2). During the 1996-1997 period, Japanese imports of U.S. and Australian roasted and/or prepared or preserved macadamia nuts declined in both volume and value (table 5-2 and figure 5-3).

As with purchases of Australian product, Japan's imports of Kenyan macadamia kernel and kernel products during 1996-1997 have risen as imports from the United States declined. During this period, Japan's imports of macadamia kernel and kernel products were exclusively imports of fresh or dried nuts, and increased 14 percent in volume and 42 percent in value (tables 5-1, 5-2, and 5-3). That the 1996-97 percentage rise in the value of these Kenyan sales to Japan exceeded the percentage rise in volume is in part explained by the 30-percent increase in Kenyan NIS farm prices (chapter 4).

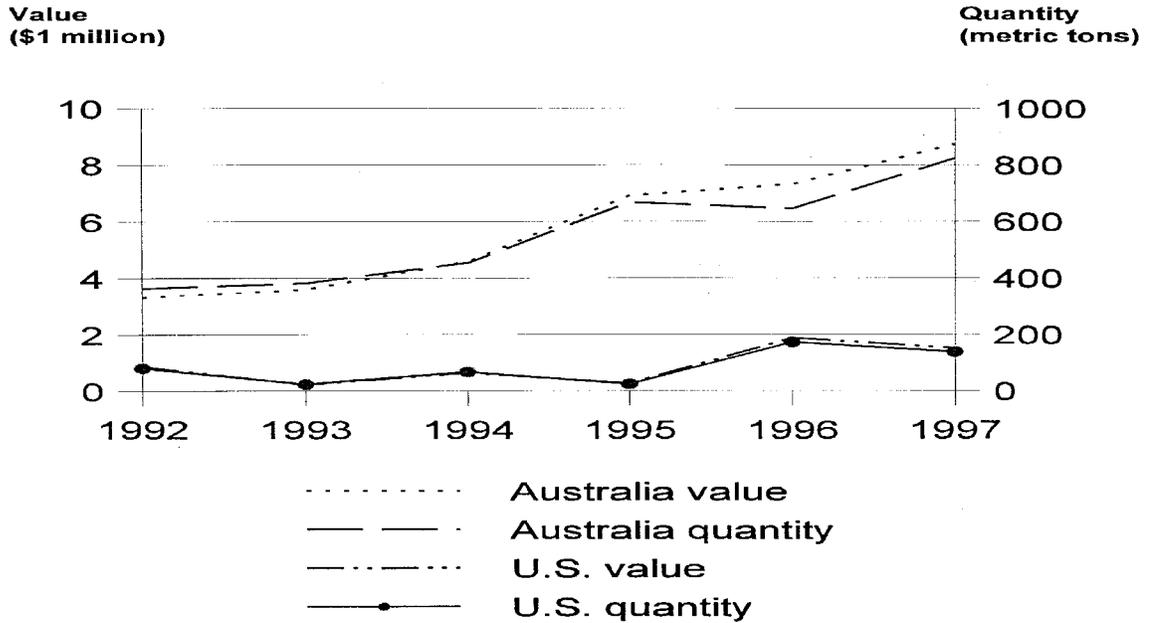
³⁶⁴ USITC staff telephone conversation with T. Pogson, industrial sales, MacFarms of Hawaii, Sacramento, CA, Aug. 25, 1998.

Figure 5-1
Japanese total imports of macadamia and kernel products, from the United States and Australia, by principal type, 1992-97



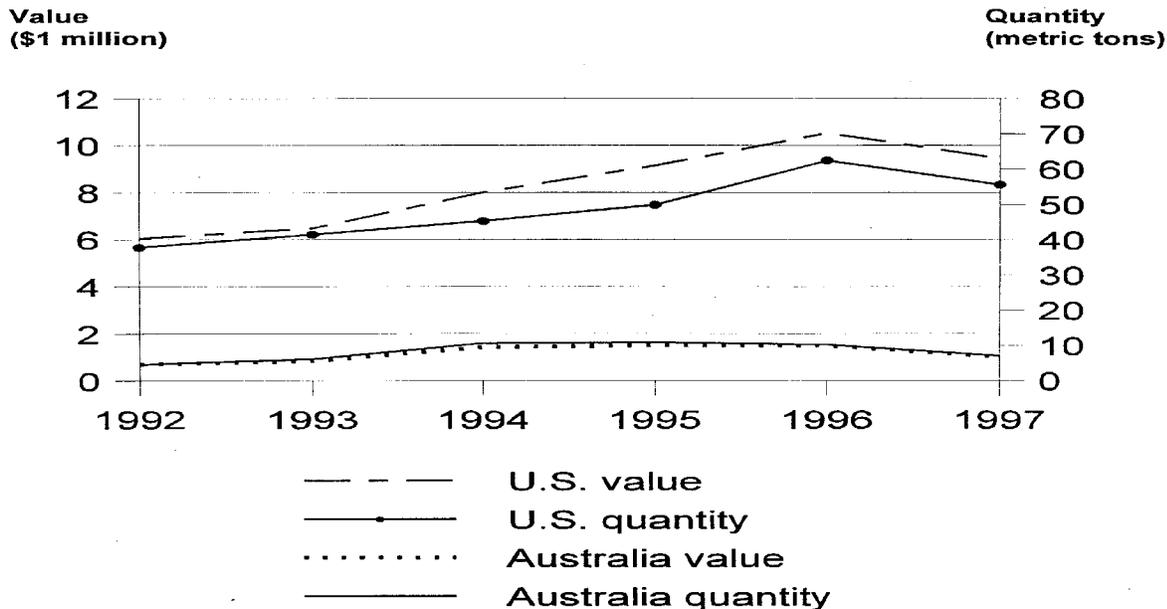
Source: Government of Japan, *Japan Exports and Imports, Commodity by Country*, and Board of Governors of the Federal Reserve System for Exchange Rates.

Figure 5-2
Japanese imports of macadamia nuts, fresh or dried, from the Australia and United States, by principal type, 1992-97



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

Figure 5-3
Japanese imports of macadamia nuts, roasted and prepared or preserved, from the United States and Australia, by principal type, 1992-97



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

Current Japanese Economic Conditions and the Outlook for Japan's Macadamia Imports

Luxury items such as macadamia products are typically highly income-elastic, suggesting that Japan's imports of these products will slow in growth or decline when incomes slow in growth or decline as the economy falls into recession.³⁶⁵ International Monetary Fund data published on final deflated GDP through the second quarter of 1997 and other more recent economic reports show that Japan is currently in a recession.³⁶⁶ The latest available data for the first quarter of 1998 reveal that output is contracting by 0.7 percent for the fiscal year ending March 31, 1998, the first such yearly GDP decline in two and a half decades.³⁶⁷

Prospects for the Japanese economy are unclear. The International Monetary Fund (IMF) projects

³⁶⁵ For income/demand relationships for luxury goods, see J. Gould and C. Ferguson, *Micronomic Theory* (Homewood, IL: Richard D. Irwin, Inc., 1980), pp. 45 and 101.

³⁶⁶ For availability of IMF economic data for Japan, see International Monetary Fund (IMF), *International Financial Statistics* (Washington, DC: IMF, July 1998), pp. 396-397. For insights about Japan's more current economic problems, see S. WuDunn, "Japan Has Slid Into Recession, New Data Confirm," *New York Times*, Business Section, found at <http://www.nytimes.com/library/financial/061398japan-econ.html>, retrieved on June 23, 1998.

³⁶⁷ Sheryl WuDunn, "Japan Has Slid Into Recession, New Data Confirm," *New York Times*, Business section, found at <http://www.nytimes.com/library/financial/061398japan-econ.html>, retrieved on June 23, 1998.

zero GDP growth in 1998.³⁶⁸ Some analysts foresee an extended period of deflation as credit, investment, consumer, and export demand continue to weaken due to depressed consumer and business confidence.^{369,370}

These Japanese economic problems may affect the U.S. and Australian macadamia industries in two ways. First, slowing income growth or income declines may lead to continued declines or slower growth in Japan's imports of macadamia products. And second, insofar as tourists comprise an important source of domestic Hawaiian and Australian purchases of retail macadamia products, Japan's economic problems may cause a decline in Japanese tourism in Hawaii and Australia, and a decline in macadamia purchases.³⁷¹ More specifically, Hawaii's number of Asian tourists, one-third of whom are from Japan, declined nearly 1 percent in 1997 from 1996 levels, and are expected to continue declining into 1998 (table 2-24). Numbers of Australia-bound Asian tourists during the first quarter of 1998 were 8 percent below previous-year levels.³⁷²

Channels of distribution

The food-processing industry is a leading consumer of macadamia nut kernels in Japan as ingredients for candies, cakes, and ice cream toppings. Japanese distribution channels for macadamia nuts are complex, and involve trading companies, nut roasters, food and confectionery manufacturers, food wholesalers, local secondary wholesalers, and consumer outlets such as candy stores, supermarkets, department stores, restaurants, and hotels.

³⁶⁸ International Monetary Fund, *IMF World Outlook*, May, 1998. p. 43.

³⁶⁹ MasterCard International conducts biannual surveys of consumer confidence in Asia. The latest report reveals consumer confidence at its lowest level since the survey was initiated. *Master Index of Consumer Confidence*, MasterCard International, found at <http://www.mastercard.com/press/980302a..html>, retrieved on June 23, 1998.

³⁷⁰ William Mallard, *Japan Business Confidence Slumps, Stocks Dip*, Reuters, Apr. 2, 1998, found at Yahoo News, http://204.71.177.72/headlines/980402/business/stories/japanecon_1.html, retrieved on June 23, 1998.

³⁷¹ That tourist purchases comprise an important demand component for macadamia products in Hawaii and Australia was information obtained in a number of USITC interviews: with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998; with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998. That 1997 counts of Hawaii-bound and Australian-bound tourists from Japan are down from 1996 levels was information obtained from the following sources: USITC staff telephone conversation with staff of the Hawaii Department of Economic and Development and Tourism, June 19, 1998; Hawaii Department of Economic Development and Tourism, *1996 State of Hawaii Databook*, found at <http://hawaii.gov/dbedt/stats.html>, June 19, 1998; and Australian Office of National Tourism, "Facts & Figures--Impact Fact Sheet," found at <http://www.tourism.gov.au/publications/impact.html>, June 19, 1998.

³⁷² Australian Office of National Tourism, "Facts & Figures--Impact Fact Sheet," found at <http://www.tourism.gov.au/publications/impact.html>, June 19, 1998.

Chocolate-covered macadamia nuts are also marketed extensively in Japan; Hawaiian macadamia chocolates reportedly enjoy strong market acceptance in Japan because of their perceived high quality.³⁷³ Data reported by U.S. processors in their response to Commission questionnaires on their exports of chocolate-covered kernels show exports to Japan ranging from a high of 225 metric tons, valued at \$12.4 million in 1994, to a low of 98 metric tons, valued at \$6.1 million, in 1997 (table 2-23). The Mauna Loa Macadamia Nut Corp. initially sold its retail products through a large trading company and manufacturer in Japan. This marketing arrangement resulted in repeated price markups through multiple levels of intermediate distributors, so as to raise the retail prices of the macadamia products to very high levels.³⁷⁴ However, since 1990, Mauna Loa has developed small distributors in an effort to keep the retail product price down for Japanese consumers, and negotiated further agreements with some of the larger trading companies in an effort to lower the final retail prices of its products.

Import suppliers

Kenya and Australia supply chiefly fresh or dried macadamia nuts to Japan, while the United States supplies chiefly processed nuts (tables 5-2 and 5-3). Kenya's importance in the Japanese market is explained in part by the low prices and by extensive Japanese ownership and investment in the Kenya industry.³⁷⁵ In addition, procurement of nuts in Japan is often handled by a trading company that shares the same parent firm as the users; these companies often prefer to continue traditional relationships with Kenyans.

Tariff treatment

Macadamia kernels from the United States, Australia, and South Africa enter Japan at a duty rate of 5 percent whether fresh, dried or processed; imports from Kenya, Costa Rica, and Guatemala enter at a preferential rate of 3 percent.³⁷⁶ The duty is waived for products from lesser developed developing countries, such as Malawi. Japan does not have significant nontariff measures affecting macadamia nuts.

Chinese/Hong Kong Imports of Macadamia Nuts and Nut Products

This section focuses chiefly on Hong Kong, which until July 1, 1997, was a British colony. Hong Kong has been a strong market for high-valued products like edible nuts for many years, given the local preference for nuts and relatively high consumer incomes. Many of the macadamia imported into Hong Kong are believed to be trans-shipped to neighboring provinces on the Chinese

³⁷³ "Hawaiian Candies and Nuts Mint Gold in Japan," *Candy Industry*, Nov. 1996, p. 45.

³⁷⁴ T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, transcript of hearing, Mar. 25, 1998, Kailua-Kona, Hawaii, p. 81.

³⁷⁵ USITC staff interview with K. Ainsbury, chief executive officer, Agrimac, Alstonville, New South Wales, Australia, and A. Beavis, international marketing manager, MPC, Alphadale, New South Wales, Australia, at the Peanut and Tree Nut Processors Annual Convention and Trade Show, Sanibel Island, FL, Jan. 11, 1998.

³⁷⁶ Fax from U.S. Department of Commerce, ITA (USDOC), Feb. 13, 1998.

mainland.

Trade data on macadamia nuts are not separately reported in Hong Kong trade statistics; reported imports of miscellaneous tree nuts (which include macadamia nuts) into Hong Kong declined from about 11,000 metric tons in 1992 to about 8,000 tons in 1996, based on trade data of the U.N. Food and Agriculture Organization. Australia has supplied most Hong Kong imports of macadamia nuts, both shelled and in-shell forms.³⁷⁷ Mainland China also imports a sizable amount of in-shell macadamia nuts that are processed into 2-pound packs for the food service industry, according to Australian industry sources.³⁷⁸

Demand for macadamia nuts grew strongly in China during the 1990s, fueled by sharply rising consumer incomes. Most of the macadamia nuts are used in cooking with poultry dishes, and to a lesser extent as packaged gift packs.³⁷⁹ The 1997 chicken flu crisis in Hong Kong indirectly reduced macadamia use since the liquidation of the chicken flocks in Hong Kong and adjacent areas lowered chicken consumption, with macadamias being a preferred nut condiment in chicken-based dishes.³⁸⁰

Recession and other economic problems may be eroding Hong Kong's import demand for macadamia nuts and nut products.³⁸¹ Hong Kong's chief executive reported that the territory was falling into a recession in the first half of 1998.³⁸² Hong Kong is experiencing declining tourist revenues, has an increasing unemployment rate, is experiencing declining real estate values, and has a banking system plagued by increasing volumes of nonperforming real estate loans.³⁸³

Hong Kong maintained no customs tariffs on agricultural goods, such as macadamia nuts, and agreed to bind these tariffs as free under the Uruguay Round.³⁸⁴ However, China has a 48 percent rate of duty on imports of other fresh or dried nuts, whether or not shelled, which includes macadamias. China also has a duty of 50 percent ad valorem on other prepared or preserved nuts including macadamias in air-tight containers and a 45 percent ad valorem rate on macadamias not in air-tight containers.

³⁷⁷ USITC staff interview with R. Fayle, president, and G. Hargreaves, a director, of AMS, at AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

³⁷⁸ USITC staff interview with K. Ainsbury, chief executive officer and marketing director, J. Wilkie, agricultural director, of Agrimac, and G. Hargreaves, an AMS director, at Agrimac offices, Alstonville, New South Wales, Australia, Apr. 6, 1998.

³⁷⁹ USITC staff interview with Australian macadamia industry officials, Apr. 7, 1998, Australia.

³⁸⁰ USITC staff interview with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australia MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

³⁸¹ Recent International Monetary Fund (IMF) data on real Hong Kong economic growth is not available after the third quarter of 1997. See IMF, *International Financial Statistics*, (Washington, DC: IMF; May 1998), pp. 202-203.

³⁸² K. Richburg, "Hong Kong Said to be Headed for Recession," *Washington Post*, business section, June 23, 1998, pp. C.1 and C.4.

³⁸³ *Ibid.*

³⁸⁴ "APEC Customs Guide - Hong Kong - 1997," <http://www.apectariff.org/hk>, Dec. 31, 1997.

European Union Imports of Macadamia Nuts and Nut Products

The European Union (EU) is the fifth-leading world market for macadamia nuts with imports primarily going to three countries, Germany, United Kingdom and the Netherlands. Within the EU, the leading market by far for macadamia nuts and other tree nuts is Germany.³⁸⁵

The EU is the world's second-leading market for all edible nuts, behind only the United States. European consumers tend to be price sensitive with regard to consumption of nuts. Macadamias are consumed mainly as a snack nut.³⁸⁶ Germany is the leading consumer of nuts (second only to the United States), although the United Kingdom, and the Netherlands are also important, and together purchased about 13,000 metric tons of miscellaneous tree nuts in 1996. Imports of all tree nuts into Germany totaled 2,500 metric tons in 1996, according to FAO data. The Netherlands has the highest per capita consumption of nuts in Europe, although some of the reported consumption may actually be re-exported to other countries in the form of chocolate-covered nuts.

The United Kingdom imported about 3,000 tons of tree nuts in 1996. In the early 1990s, the British market for macadamia nuts amounted to about 150 tons (shelled basis), two-thirds of which came from Malawi, and the balance from the United States and Australia.³⁸⁷ In 1991, the low prices stimulated demand for macadamia nuts. By 1993, however, rising prices reduced demand for macadamia nuts in the United Kingdom, according to an UNCTAD study. Reportedly, the taste of macadamia nuts as a snack nut does not appeal to British consumers as much as that of the other premium-priced nuts such as pistachios and cashews.³⁸⁸

Australia has been the leading supplier of macadamia nuts to Germany. Australian industry representatives indicate that the Australian industry developed the German market which mainly consists of packaged, retail sales through a large Hamburg supermarket/warehouse operation.³⁸⁹ German consumers tend to view the macadamia as a snack nut.³⁹⁰

The EU tariff rate of duty on macadamia nuts (under HS 0802.90.60) for MFN countries is 3 percent, effective January 1, 1998.³⁹¹ On processed macadamia nuts in immediate packages weighing less than 1 kilogram, the duty is 12 percent AVE (HS 2008.19.95) and in containers exceeding 1 kilogram, it is 12.6 percent AVE (HS 2008.19.19).

Retail Consumer Prices in Major Consuming

³⁸⁵ USITC staff interview with G. Brunton, manager, nuts and dried fruit, of Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

³⁸⁶ J. P. Coulter, Market Survey of Selected European Markets for Processed Groundnuts, Nut Butter and Macadamia Nuts, Dec. 13, 1989, Malawi Export Promotion Council, funded by the European Economic Community European Development Fund.

³⁸⁷ International Trade Centre UNCTAD, GATT, *Tropical Nuts: A Study of Market Opportunities in the United Kingdom*, 1994, p.25.

³⁸⁸ UNCTAD, p. 28.

³⁸⁹ B. Raphael, general manager, Macadamia Processing Company, Alphadale, New South Wales, Australia, transcript of the hearing, Apr. 30, 1998, Washington, DC pp. 22-23.

³⁹⁰ USITC staff with G. Brunton, manager, nuts and dried fruit, of Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

³⁹¹ Official Journal of the European Union, vol. 40, No. L312, Nov. 14, 1997, pp. 94 and 165.

Countries

Retail consumer prices of macadamia nuts in several leading markets are shown in table 5-5. The markets reported were Japan, Hong Kong, Taiwan, South Korea, and Canada. Commission staff gathered retail prices for selected macadamia products for purposes of comparison in Washington, DC-area stores.³⁹² This pricing information shows a wide variance in the equivalent price per kilogram within each country and between countries. The most common U.S. retail product found was a glass jar of roasted macadamia kernels, containing from 3.5 to 4.0 ounces (99 to 113 grams) of kernels, with prices ranging from \$2.99 to \$3.99 per jar in July 1998. This is equivalent to between \$26 and \$40 per kilogram.

In Japan, a 198 gram glass jar sold for between \$7.00 and \$9.30, depending on the type of retail outlet, in late February and early March 1998. This is equivalent to between \$39 and \$47 per kilogram. Another popular sized container in Japan, a gift box of six 128-gram cans, sold for \$37.20, or equivalent to \$48 per kilogram.

The only price reported in Canada was for bulk, roasted kernels at a warehouse type store selling for about \$26 per kilogram. In Hong Kong, a 98-gram can sold for \$4.00 (\$40.80 per kilogram), and a 128-gram can for \$3.10 (\$24.22 per kilogram). The lowest retail price reported was in Taiwan for *Mauna Loa* nuts, at a department store, for a 400-gram plastic box for \$1.75, equivalent to \$17.65 per kilogram.

Macadamia nuts and macadamia nut products are high-priced luxury products in Japan, insofar as there have been reports of cans of roasted kernel valued at \$2.99 in the U.S. market reportedly selling as high as \$10.00 in the Japanese market.³⁹³ Glass-jar type macadamia nuts are largely sold in the Japanese retail sector, where in 1997 *Mauna Loa* brand macadamia nuts had an estimated 80 to 90 percent share.³⁹⁴ The price of this product in Tokyo in March 1998 varied by the type of retail outlet: the 7-ounce glass jar sold in retail stores, for \$9.30;³⁹⁵ in discount stores for \$5.50 to \$6.20; and in supermarkets, for \$6.20 to \$7.75.

Canned macadamia nuts are sold in the Japanese tourist market, with Japanese tourists in Hawaii purchasing the item in Hawaii or ordering the item prior to departing Japan for Hawaii and having the product delivered to their door upon their return to Japan. Canned nuts in early 1998 were marketed in Japan at \$37.20 for a gift box of six 128-gram cans, and \$23.25 for a gift box of three 156-gram cans.³⁹⁶

³⁹² Comparisons of prices in the various markets and the effect that tariffs have on consumer prices were hampered by the vast array of products and the numerous ways macadamia kernels and kernel products are marketed throughout the world. Such comparisons were also hampered in that there were no published market prices in the United States or other major consuming markets.

³⁹³ T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, Hilo, HI, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 58-61.

³⁹⁴ Fax from Tokyo, Mar. 18, 1998.

³⁹⁵ Fax from Tokyo, Mar. 18, 1998; Yen prices were converted to U.S. dollars at a rate of 129 yen per U.S. dollar.

³⁹⁶ Fax from Tokyo, Mar. 18, 1998.

Table 5-5
Macadamia nuts: Retail prices in selected foreign markets and in the United States (Washington, DC-area), March 1998 and July 1998

Country/size/type	(Dollars per item shown)	(Dollars per kilogram)
Japan:		
Mauna Loa:		
198 grams, glass jar:		
Retail store	\$9.30	\$46.97
Warehouse store	5.80	29.29
Supermarket	7.00	35.35
Canned macadamias:		
Gift box of 6, 128-gram, cans	37.20	48.44
Gift box of 3, 156-gram, cans	23.25	49.68
Hong Kong:		
Sea Princess:		
Mixed nuts, 142 grams, can	2.40	16.90
Dry roasted, 128 grams, can	3.10	24.22
Mauna Loa:		
Nuts, 98 grams, can	4.00	40.82
Taiwan:		
MacFarms/Hawaii, 350 grams, plastic bottle	7.15	20.43
Mauna Loa (Market store), 340 grams, can	11.88	34.94
Mauna Loa (Dept. store), 400 grams, plastic box	7.16	17.90
South Korea:		
Australian roasted/salted, 140 grams, can	3.70	26.43
U.S. chocolate covered, 227 grams, box	12.00	52.86
Canada:		
Bulk, shelled, warehouse store, bulk, (1 kilogram)	25.92	25.92
United States (Washington, DC-area) ¹ :		
Supermarkets:		
Mauna Loa, roasted kernels, 3.5 ounce jar, (99 grams)	3.99	40.30
MacFarms, roasted, kernels, 4.0 ounce jar, (113 grams)	2.99	26.46
Mauna Loa, chocolate -covered kernels, 4.5 ounce jar (127 grams)	2.49	19.61
MacFarms, chocolate-covered kernels, 4.5 ounce jar (127 grams)	3.49	27.48
Department store/large retail chain:		
Mauna Loa, roasted kernels, 3.5 ounce jar, (99 grams)	2.99	30.20
Mauna Loa, roasted kernels, 7 ounce jar, (198 grams)	6.99	35.30
Mauna Loa, chocolate-covered kernels, 4 ounce jar, (113 grams)	2.99	26.46
Health food store:		
Hay Day, raw macadamia nuts, 8 ounce (226 grams) package	8.49	37.57

¹ Survey taken on July 21, 1998.

Note.—All foreign prices were surveyed during late Feb. and early Mar. 1998; U.S. prices were surveyed in July 1998.

Source: Foreign data compiled from U.S. Department of State telegrams, prepared by U.S. Embassy staff; U.S. data were compiled from Commission staff visits to selected Washington, D.C.-area supermarkets, in July 1998.

CHAPTER 6

ANALYSIS OF COMPETITIVE FACTORS

For many years prior to the 1990s, U.S. and world demand for macadamia nuts outpaced supply and prices rose steadily. Macadamia nuts were viewed as a high-value novelty product with demand being highly sensitive to price and income movements. During an extended period of economic expansion in the 1980s and mid-1990s, U.S. consumer spending rose,³⁹⁷ raising demand for income-elastic “luxury” goods, including specialty or gourmet foods such as macadamia nuts. Additionally, increased Hawaii-bound U.S. and Asian tourism, along with increases in U.S. marketing and promotional efforts, resulted in increased demand for macadamia nuts and nut products. Meanwhile, producers and prospective producers in other countries saw the potential for high returns from macadamia products, and became growers, processors, and marketers of such products. Moderately rising supplies of macadamia nuts in the 1980s were easily absorbed by the market, even at prices that were generally higher than other nuts and tropical fruits. Macadamia nut growers benefitted from these high prices, and increased net incomes stimulated investment in new orchards. Consequently, world supply of macadamia nuts began to grow substantially during the late 1980s and the 1990s.

In the late 1990s, however, macadamia nut supply has begun to overtake demand. Orchards planted in the early 1990s are beginning to bear nuts and harvests are rising. Inventories in major supplying countries and markets have been accumulating and world prices are falling. To move unsold 1997/98 kernel, processors of macadamia nut-based products are lowering prices for processed macadamias, which in turn has lowered the prices that processors pay growers for raw nuts.

This reversal of the historic relationship between macadamia nut supply and demand is likely to continue into the foreseeable future. The principal driving force behind rising nut supplies--the maturation of recently planted orchards--is firmly in place, and unless there is widespread abandonment of such orchards, it is likely that increases in nut supplies will continue for several years. On the demand side, as the effects of Asia’s current macroeconomic troubles demonstrate, the general economic conditions necessary to sustain long-term growth in demand may not continue uninterrupted. Traditional product forms and markets no longer appear sufficient to absorb production at the recent high price levels.

Although macadamia nut supplies are expanding in many areas around the world, including previously minor producing regions in Africa and Latin America, Hawaii and Australia will continue to be the principal suppliers. Producers and exporters in these two regions may find it necessary to make marketing adjustments to accommodate the new levels of world nut supply.

This chapter provides an analysis of the factors associated with the currently high levels of world supplies and softening prices, as well as an analysis of the competitive positions of the U.S. industry

³⁹⁷ Between 1982 and 1997, real (inflation-adjusted) personal consumption expenditures in the United States grew by 3 percent per year, from \$3.08 billion in 1982 to \$4.87 billion in 1997 (measured in 1992 dollars). *Economic Report of the President* (Washington, DC: U.S. Government Printing Office, Feb. 1998), table B-17.

and its primary competitor, the Australian industry. The chapter also examines the competitive, economic, and trade conditions facing the U.S. industry and other macadamia supplier countries that compete with the U.S. industry.

Factors Affecting Current Macadamia Market Conditions

Since 1995/96, there have been high levels of world supplies, accumulating kernel inventories, and softening prices in both the U.S. and Australian markets. Inventories of unsold 1997 Hawaiian crop are reported to be above normal,³⁹⁸ because Australian brokers are encountering higher than normal competition from major U.S. processors in the bulk market which U.S. firms generally supply only with excess kernel.³⁹⁹ For some Australian firms, increasing kernel inventory carryovers are reportedly a first-time occurrence. Australian industry representatives estimated that inventories of unsold 1997 Australian crop were above previous year levels, and these unsold inventories were inducing downward pressures on world prices.⁴⁰⁰

Causes of these accumulating inventories and downward pressures on price include: (1) escalating production from rapidly increasing orchard areas planted since the late 1980s, (2) the macroeconomic crisis and other events in Asia, and (3) a slowdown in European macadamia buying.

Increasing Production

While U.S. orchard area has remained largely unchanged since 1992/93, Australia's area planted with macadamias more than doubled during the same period (table 6-1). Further, the area planted with macadamias since 1992/93 has increased in Guatemala, Brazil, Kenya, and South Africa. Given that orchards generally require 6 to 8 years after planting to produce commercially, world production has only recently started growing as a result of the increased hectares planted in the

Table 6-1
Areas planted to macadamias in major producing countries

(Hectares)

³⁹⁸ Data on inventory carryover levels are considered confidential by major Hawaiian processors.

³⁹⁹ USITC staff interview with G. Brunton, manager, nuts and dried fruit for Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis Commodities Pty. Ltd. offices, Sydney, New South Wales, Australia, Apr. 8, 1998. That such major Hawaiian processors as Mauna Loa Macadamias prioritize their own branded retail product lines with available kernel was a point made by T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 58-61; and in a facsimile received by USITC staff from D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 22, 1998.

⁴⁰⁰ See Macadamia Processing Co., prehearing brief, Apr. 24, 1998, p. 20. The 20-25 percent carryover estimate of unsold Australian 1997 kernel was obtained from a USITC staff interview with R. O'Connor, export manager of Jorgenson Waring Foods, and G. Hargreaves, an AMS director, at Jorgenson Waring Foods offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

Year	United States	Australia	Guatemala	Costa Rica	Brazil	Kenya	South Africa
1992/93	8,300	6,020	2,800	6,500	4,500	5,314	(¹)
1993/94	8,138	8,900	2,800	6,500	5,350	5,414	3,830
1994/95	8,178	9,000	3,080	6,600	5,800	5,600	3,800
1995/96	8,219	11,900	3,200	6,000	6,000	5,750	4,300
1996/97	8,175	12,000	3,300	4,250	6,300	6,050	3,533
1997/98 ²	8,175	12,050	3,400	5,000	6,500	6,150	4,265
1998/99 ³	(^{1})	(^{1})	(^{1})	(^{1})	(¹)	6,155	(¹)

¹ Not available.

² Estimated.

³ Projected.

Notes.—U.S. and Australian data are reported on a marketing year beginning July 1 and ending June 30 of the following year, such that the “split” year 1997/98 represents the values for the July 1, 1997-June 30, 1998 marketing year for these two countries. Brazilian data are reported for a marketing year beginning Feb. 1 and ending Jan. 31 of the following year. Data for all other countries are reported on a calendar year denoted by the first of a “split” date’s years, such that 1997/98 reflects the 1997 calendar year value.

Sources: See table 1-1.

late 1980s and early 1990s. Such production growth, given the increased plantings reflected in table 6-1, is likely to become more pronounced as newer orchards planted in the 1990s start producing commercially.

Additionally, weather conditions favored the 1996/97 Hawaiian and Australian crops, which yielded record macadamia nut harvests, and this crop’s unsold inventories were reportedly driving down world kernel prices in late 1997 and early 1998.⁴⁰¹ In 1996/97, Hawaii’s production of 6,486 metric tons of kernel was nearly 25 percent higher than the previous year’s level and Australia’s production of 7,250 metric tons of kernel was 28 percent above the previous year.⁴⁰² These bumper Australian and Hawaiian crops have contributed to excess supplies and recent downward pressure on prices. As a result, farm NIS prices in Hawaii fell by 4 percent between the 1996/97 and 1997/98 crop-years. During the same time, farm NIS prices in Australia reportedly fell by 21 percent.⁴⁰³

Events in Asia

Throughout this investigation, tree nut brokers and U.S. and Australian macadamia industry representatives have reported that a number of Asian macroeconomic and macadamia market events are partly responsible for slackening world macadamia demand, accumulating world kernel inventories, and downward pressures on the prices of kernels and of macadamia products. Three

⁴⁰¹ USITC staff interviews: with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with G. Brunton, manager, nuts and dried fruit, Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

⁴⁰² Hawaiian production data were obtained from HASS, *Hawaii Macadamia Nuts, Final Season Estimates*, July 11, 1997. The Australian production information was obtained from USDA, FAS, telegram No. AGR AS8010, “Tree Nuts--Macadama Annual Report--Australia,” prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998.

⁴⁰³ The price data in Australian dollars were obtained from Agrimac, posthearing brief, May 1998, p. 23. USITC staff calculated the U.S. dollar equivalents of the Australian prices using a 0.653 U.S. dollar per Australian dollar exchange rate, from the IMF, *International Financial Statistics* (Washington, DC: IMF, July 1998), pp. 100-101.

events in Asia appear to have contributed to the sluggish conditions in world macadamia markets:

- Declining Hawaii-bound and Australia-bound tourism from Asia.
- Reduced demand in Asian countries for U.S. and Australian macadamia products because of declining or stagnating incomes associated with Asian macroeconomic problems.
- Decreased macadamia use in Chinese and Hong Kong food service, resulting from the area's "chicken flu scare" in late 1997 and early 1998.

Decreasing Tourism in Hawaii and Australia

In Hawaii, tourist purchases of retail macadamia products such as retail snacks, macadamia chocolate bars and candies, roasted kernels (salted and/or variously flavored), and various containers of chocolate-covered macadamias have long constituted a strong source of demand for macadamia products.⁴⁰⁴ After having expanded by as much as 11 percent annually, there has been a slowdown in the growth in the numbers of Hawaii-bound Asian tourists during 1995-1996; such counts actually declined 0.8 percent during 1996-1997. For Japan in particular, Hawaii-bound tourism grew only slightly in 1997 over previous year levels, and declined by 2.8 percent through June 1998 compared to June 1997. In addition, dollars spent by Asian tourists in Hawaii have started to fall (chapter 2).

Asian tourism to Australia is also apparently in decline. Between the first quarter of 1997 and the same period of 1998, tourist visits to Australia from Japan fell by 8 percent; visits from other Northeast Asian countries fell by 39 percent; and visits from Southeast Asian countries fell by 26 percent.⁴⁰⁵ Such slowdowns in Hawaiian and Australian tourism have depressed tourist

⁴⁰⁴ The importance of tourist purchases as a demand component for macadamia products in Hawaii and Australia was emphasized by a number of industry representatives in interviews: K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998; R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

⁴⁰⁵ Australian Office of National Tourism, "Facts & Figures -- Impact Fact Sheet," found at <http://www.tourism.gov.au/publications/impact.html>, June 19, 1998.

purchases of retail macadamia products in both countries.⁴⁰⁶ The decline in tourism has had particularly adverse revenue implications for Hawaii,⁴⁰⁷ because more than 85 percent of Hawaii's Asian tourists are Japanese tourists, who spend twice the daily average spent by U.S. mainland tourists. The number of Hawaii-bound tourists from other Asian countries such as South Korea and Hong Kong also declined in 1997 (table 2-24).

Decreased imports of macadamia products by economically troubled Asian nations

Recessionary Asian economies, with contracting real GDP and real income, adversely influence Asian import demand for macadamia products. As noted earlier, macadamia nuts are considered a luxury good, and such goods are characterized by import demand levels that are sensitive to changing real incomes; that is, demand is highly income-elastic. Many Asian nations are facing severe recession-induced problems including stagnating incomes and economic growth,^{408,409} which may likely contribute to reduced import purchases of luxury items, including macadamia nut products.⁴¹⁰

One U.S. firm reports an escalating degree of competition for U.S. macadamia product sales in all markets, including Asian markets.⁴¹¹ A major Hawaiian processor has noted a general drop in 1998 sales of macadamia retail products to Asia,⁴¹² while another has reported a short-term 1998 decline in macadamia products sales in South Korea.⁴¹³ Australian tree nut brokers suggest that the Asian economic problems are affecting Australia's exports of kernels to Asia, and one broker estimated that because of Japan's recession and financial problems, Australia's 1998 kernel exports to Japan

⁴⁰⁶ D. Quitquit, director, Hawaii County Department of Research and Development, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, pp. 30-31; and USITC staff interviews: with R. Schnitzler, president, and D. Petrill, treasurer, Hamakua Macadamia Nut Company, Kailua-Kona, HI, Mar. 24, 1998; with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 24, 1998; with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

⁴⁰⁷ W. Claiborne, "Hawaii: Paradise at a Loss," *Washington Post*, June 23, 1998, p. A.3.

⁴⁰⁸ Final data from the International Monetary Fund (IMF) on recent trends in national accounts (such as macroeconomic growth) and selected aspects of national finances are not available to reflect current macroeconomic problems of some relevant Asian economies.

⁴⁰⁹ K. Richburg, "Hong Kong Said to be Headed for Recession," *Washington Post*, Business Section, June 23, 1998, pp. C.1 and C.4; Survey of East Asian Economics, "On the rocks," *The Economist*, London, Mar. 7, 1998, p. S 5-7, and "Asia: The hopes for recovery fade." *The Economist*, London, June 6, 1998, p. 38.

⁴¹⁰ USITC staff interviews: with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 1998; with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998; with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; and with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

⁴¹¹ USITC staff interview: with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

⁴¹² USITC staff interview with D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, Mar. 26, 1998.

⁴¹³ MacFarms of Hawaii expects these sales to recover in 1999. USITC staff interview with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998.

will fall by more than 40 percent from 1997 levels.⁴¹⁴ Another broker estimated that Asia's economic and financial problems will result in Australia's 1998 kernel exports to Asia being only 60 percent of year-previous levels.⁴¹⁵ While the above reports suggest that declines in 1998 Asian imports of U.S. and Australian macadamia products are occurring, trade statistics showing declines are not yet available.

The Asian chicken flu scare in late-1997/early-1998

The third event affecting macadamia nut purchases in Asian countries is the reduced macadamia use precipitated by the scare over influenza carried by chicken and poultry in China and Hong Kong during late-1997 and early-1998.⁴¹⁶ In Chinese cuisine, macadamias are used in many chicken and poultry dishes.⁴¹⁷ During the late 1997 and early 1998 holiday seasons, many Chinese and Hong Kong holiday revelers, who traditionally celebrate by patronizing restaurants, reportedly stopped going out to eat at restaurants. Of those revelers who did eat out, many refrained from ordering chicken and poultry dishes because of the chicken flu scare. As a result of this drop in patronage, macadamia use in the region's restaurants, which number 4,000 in Hong Kong alone, declined and led to the rise in kernel inventories in calendar year 1998.⁴¹⁸ With poultry flocks liquidated, the flu-induced reduction in macadamia kernel consumption may have continued into 1998.

Slowdown in European Macadamia Kernel Purchases

The European macadamia market is centered in Germany, and recently Australia has been the primary supplier to this market.⁴¹⁹ German buyers are reportedly more price-sensitive tree nut buyers than tree nut buyers in other areas outside Europe.⁴²⁰ German buyers tend to withdraw from the buying market when rising inventories induce price declines, in order to take advantage of later price declines and to purchase at lower prices.⁴²¹ As of early 1998, German macadamia purchases

⁴¹⁴ USITC staff interview with R. O'Connor, export manager of Jorgenson Waring Foods, and G. Hargreaves, an AMS director, at Jorgenson Waring offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

⁴¹⁵ USITC staff interview with G. Brunton, manager, nuts and dried fruit, for Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

⁴¹⁶ USITC staff interview with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

⁴¹⁷ *Ibid.*

⁴¹⁸ *Ibid.*

⁴¹⁹ R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, transcript of the hearing, Apr. 30, 1998, Washington DC, p. 64.

⁴²⁰ R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, transcript of the hearing, Apr. 30, 1998, Washington DC, p. 64; and a USITC staff interview with G. Brunton, manager, nuts and dried fruit, for Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

⁴²¹ USITC staff interview with G. Brunton, manager, nuts and dried fruit, for Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

had declined, such that European inventories of 1997 Australian kernels were rising.⁴²² Slackening European demand caused by high prices in earlier years contributed to these recent inventory accumulations, which resulted in downward pressures on price quotes for Hawaiian and Australian kernels. One such quote was recently reported at US\$8.80 per kilogram, noticeably below the price of US\$11.00 per kilogram reported earlier in 1998.⁴²³

Comparison of the World's Two Largest Industries: United States and Australia

The U.S. and Australian industries established and developed the world industry, and still comprise the majority of it. In 1997/98, both countries produced most (73 percent) of the world's production (table 1-1). The majority of the world's macadamia-processing activities are centered in the United States and Australia, with significantly smaller shares of world processing in Latin America and Africa (chapter 4). The U.S. and Australian industries have developed virtually all macadamia products and markets.

The U.S. and Australian Growing Operations: A Comparative Profile

A comparative profile of the world's two dominant macadamia growing operations is provided in table 6-2. The U.S. industry is centered on Hawaii Island, along with a major orchard on Maui,⁴²⁴ with minor production in California. The Australian industry is focused on the eastern Australian coast in northern New South Wales and southern Queensland, with minor production in Western Australia.⁴²⁵ Both industries are reported to have from 650 to 700 commercial growers, although Hawaii's average orchard size of 12 hectares is lower than Australia's average orchard size of 19 hectares.

Hawaii's growing operations are smaller than Australia's, with just under 8,200 hectares planted, an area that has contracted by 1.5 percent since 1992. In contrast, Australian orchard acreage has rapidly increased by over 100 percent, to more than 12,000 hectares, during the same period.

⁴²² USITC staff interviews: with G. Brunton, manager, nuts and dried fruit, for Orbis Commodities Pty. Ltd., and G. Hargreaves, an AMS director, at Orbis offices, Sydney, New South Wales, Australia, Apr. 8, 1998; and with R. O'Connor, export manager of Jorgenson Waring Foods, and G. Hargreaves, an AMS director, at Jorgenson Waring Foods offices, Sydney, New South Wales, Australia, Apr. 8, 1998.

⁴²³ USITC telephone communication with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, June 6, 1998.

⁴²⁴ This orchard is farmed by C. Brewer's Wailuku Agribusiness Company. USITC interview with A. Yamaguchi, horticulturist and president, Ka'u Agribusiness Company, Hilo, HI, Mar. 26, 1998.

⁴²⁵ AMS, prehearing brief, Apr. 20, 1998.

Table 6-2
U.S. and Australian macadamia growing operations at a glance: 1997/98

Item	U.S. (Hawaiian) Industry	Australian Industry
Number of growers	700	650
Location	Hawaii and Maui Islands	Southern Queensland Northern New South Wales
Average farm size (<i>hectares</i>)	12	18.5
Hectares planted	8,178	12,050
Change since 1992/93, hectares planted (<i>percent</i>)	(1.5)	100
Hectares bearing	7,770	9,200
Yield (<i>metric tons/hectare, 20%</i> <i>moisture</i>)	3.4	3.0
Net production (<i>metric tons</i>)	26,309	30,938 ¹
Net farm value of production (<i>million U.S. dollars</i>)	\$43.5	\$49.0 ²
Farm price, U.S. dollars/kilogram	\$1.65	\$1.58

¹ Australian NIS production was reported in terms of a 10 percent moisture content at 27,500 metric tons, which was converted to 30,938 metric tons with a 20 percent moisture content common to the Hawaiian market. The “10-percent quantity” was multiplied by a conversion factor of 1.125, which is the ratio of (100-10) or 90 over (100-20) or 80. The conversion was made under advice in an email to USITC staff from J. Twentyman, general manager, Suncoast Gold, Gympie, Queensland, Australia, May 20, 1998.

² Net farm value of Australian net production was A\$75 million, which was converted to \$US49 million. The conversion was made using an exchange rate of 0.653 U.S. dollars to an Australian dollar.

Sources: Information on the U.S. industry was obtained from three HASS publications: *Hawaiian Macadamia Nuts, Preliminary Season Estimates*, Jan. 22, 1998; *Hawaiian Macadamia Nuts, Final Season Estimates*, July 7, 1998; and *Hawaii Macadamia Nuts, Preliminary Season Estimates*, July 11, 1997. Information on the Australian industry was obtained from 3 sources: AMS, prehearing brief, Apr. 20, 1998; USDA, FAS, telegram No. AGR AS8010, “Tree Nuts--Macadamia Annual Report--Australia,” prepared by U.S. Embassy staff, Canberra, Feb. 1, 1998; and USDA, FAS, *World Horticultural Trade and U.S. Export Opportunities*, May 1995. The Apr. 1998 exchange rate of 0.653 was published by the International Monetary Fund (IMF), *International Financial Statistics* (Washington, DC: IMF, July 1998), pp. 100-101.

Australia now surpasses the Hawaiian industry by nearly 18 percent in NIS volume terms and by 13 percent on a net farm value basis. Less than 5 percent of Hawaii’s planted hectares are immature and non-bearing, compared with about 25 percent of Australia’s planted area. Over the next several years, Australia’s production will probably increase as nearly one-quarter of its orchards mature and enter commercial production, although not without some production offset from that industry’s earlier-planted orchards as they mature and develop canopies and other age-related and yield-reducing problems.⁴²⁶

One advantage for the Hawaiian industry is shown in table 6-2: 1997 Hawaiian yields are about 13 percent greater than Australian yields, despite the more advanced age profile of Hawaiian orchards. Reasons for the higher U.S. yields reportedly include Hawaii’s optimal climatic and agronomic conditions, as well as Hawaii’s physical isolation by the Pacific Ocean, which reduces the incidence

⁴²⁶ These opinions were expressed in two sources: G. Hargreaves, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 47-49; and USITC staff interview with D. Macrae, managing director, Pacific Plantations, Bangalow, New South Wales, Australia, Apr. 7, 1998.

of yield-reducing pests.⁴²⁷ Australian scientific and horticultural research, especially research related to orchard selection of the newer macadamia varieties tailored to Australian conditions, is said to be successfully increasing Australian yields and closing the U.S.-Australian yield gap.⁴²⁸

U.S. and Australian Processors and Grower/Processors

The macadamia industries in both the United States and Australia are centered around processors and grower/processors (hereafter processors). There is a high degree of vertical integration; often, the processors are either major growers, or are owned and operated by groups of grower shareholders or grower trustees that collectively represent substantial portions of the industry's orchards. Processors are the primary buyer of farmers' NIS crop in both countries. Additionally, processors also have developed bulk and/or retail product lines, as well as domestic and export markets for these product lines. Marketing efforts of processors in both countries have generated domestic and export demand for macadamia nuts as a snack food, bulk commodities, industrial food ingredients, and as the primary input for macadamia-based candy and confectionary products.

Vertical integration

Vertical integration in Australia is the reverse of that in the United States. In Australia, growers own much of the country's processing facilities. Four of the six major processors are owned and managed by growers: MPC, Suncoast Gold, Agrimac, and Australian MacFarms (table 3-1).⁴²⁹ In contrast, U.S. processors own or are linked to investors in much of Hawaii's macadamia cultivation. Five of the six major macadamia processors are either orchard-owning growers or belong to a corporate group that has substantial macadamia growing interests. For example, Mauna Loa Macadamias, which does not own significant acreage itself, is a subsidiary of C. Brewer which along with its parent, Buyco, is party to several real estate investment relationships involving nearly one-half of Hawaii's commercial macadamia orchards (see chapter 2). MacFarms of Hawaii and two smaller processors, the Hawaiian Macadamia Co. and Kamagaki enterprises, each own commercial orchards. The Kona Pacific Farmers' Cooperative, itself not

⁴²⁷ USITC staff interview with A. Yamaguchi, horticulturalist and president, Ka'u Agribusiness Co., Hilo, HI, Mar. 26, 1998.

⁴²⁸ USITC staff interview with Dr. C. McConchie, research scientist, CSIRO, University of Queensland's, Division of Horticulture, and T. Davenport, an AMS director, at the University of Queensland campus, Brisbane, Queensland, Australia, Apr. 3, 1998.

⁴²⁹ Although Australian MacFarms is a private company, the Peninsular/MacFarms group owned orchards, and has been involved in macadamia growing, prior to the purchase of what was formerly MacFarms of Australia in November 1996. Peninsular/MacFarms, prehearing brief, Apr. 3, 1998; and USITC staff interview with A. Burnside, general manager, Australian MacFarms, Woombye, Queensland, Australia, Apr. 3, 1998.

an orchard owner, is a cooperative of macadamia and coffee growers. Hawaiian Host is the only U.S. macadamia processor without substantial orchard holdings.⁴³⁰

Processor size

Throughout this section, processor size is based on recent (1997 or 1998) volumes of NIS crop processed and/or volume of processed kernel.⁴³¹ U.S. processors' processed volumes of kernel ranged from 113 metric tons to 3,722 metric tons, compared with a range of 683 metric tons to 1,000 metric tons for the Australian processors (tables 2-2 and 3-1).⁴³² These data demonstrate that output from the largest U.S. processor, Mauna Loa Macadamias, far surpasses recent processed volumes of all other U.S. and Australian processors. Also, the smaller Australian firms far exceed the three smaller U.S. processors in terms of processed NIS or kernel volumes. Finally, processor size is more diverse among the U.S. processors, and more uniform for Australian processors. That is, U.S. processors tend to be very big or very small, while Australian processors are more uniformly sized. In fact, the three smallest Australian firms are only marginally different in size, such that those firms are "tied" for the country's rank of the four-largest macadamia processor (see chapter 3).

Processor employment

The larger U.S. processors are brand-oriented retailers and employ the larger workforces, while in Australia, the smaller and midsized, and not the largest, processors are brand-oriented marketers that employ the larger workforces (tables 2-2, 3-1). In the United States, the three largest employers are the brand-oriented processors, Mauna Loa Macadamias, MacFarms of Hawaii, and Hawaiian Host, while one of Australia's smaller processors, Macadamia Plantations of Australia, has the largest Australian processor workforce (table 3-1).

The U.S. branded retailers are larger peak season employers than the Australian branded retailers. At peak season, the three brand-oriented U.S. processors (Mauna Loa Macadamias, MacFarms of Hawaii, and Hawaiian Host) each have from 200 to 500 workers, and employ up to 950 workers collectively, while the brand-oriented Australian firms (MacFarms, Macadamia Plantations of Australia, and Suncoast Gold) each have from 70 to 250 workers, with about 450 collectively (tables 2-2 and 3-1).

The physical productivity of the U.S. labor force in macadamia processing, at 6.7 metric tons of kernel per peak-season employee in 1996/97, is somewhat lower than the corresponding level of Australian labor productivity of 7.8 metric tons of kernel per peak-season worker (derived from tables 2-2 and 3-1). However, these are industry wide averages, which hide wide variations by

⁴³⁰ Hawaiian Host owns about six hectares of orchards, which the firm does not consider substantial orchard interests. USITC staff interview with K. Sakamoto, senior vice president for marketing, finance, and administration, Hawaiian Host, Honolulu, HI, Mar. 31, 1998.

⁴³¹ Some firms provided 1997 volumes, while others provided more nebulously defined "current" or "recent" volumes. These data were collected primarily verbally during USITC staff interviews with U.S. and Australian processors. Generally, the 1997-1998 data on processed NIS and/or kernel volumes are intended as approximations in order to roughly rank the 6 U.S. and 6 Australian processors by size. These data are referred to throughout as "current" or "recent" processings.

⁴³² This range does not include MPC's processings which are considered business confidential.

company, particularly in Australia. On a firm-by-firm basis, labor productivity in Australia in 1996/97 ranged from 2.5 metric tons per worker for Australian MacFarms to 19.8 metric tons per worker for Macadamia Processing Company. Among U.S. processors, the variation is lower, ranging from 2.1 metric tons for Kona Pacific Farmer's Cooperative to 8 metric tons for Kamigaki Enterprises. Factors such as organizational structure and the product mix of the firms (e.g., a corporate subsidiary versus a farm cooperative) can also influence labor productivity.

Breakeven farm price estimates

Contrary to testimony suggesting similarity of U.S. and Australian macadamia production costs,⁴³³ U.S. breakeven prices are reportedly higher than breakeven levels in Australia. Hawaii processor estimated ranges for breakeven farm prices for NIS are \$1.21-\$2.03 per kilogram in table 2-2 as compared with the lower levels of \$0.58-\$1.28 per kilogram in Australia (table 3-1).⁴³⁴

There are a number of possible explanations for this reported production cost advantage of Australian processor/growers over U.S. processor/growers. The first is the relative age of the orchards. Hawaiian orchards are older than Australian orchards, and have developed canopies, which tend to reduce yields by harboring pests and insects, and promoting diseases.

Second, Hawaii's macadamia orchards have terrain configurations that are less advantageous than those in Australia. Specifically, the planting of trees in holes bored into hardened Hawaiian lava flows incurs added input and labor costs not experienced in Australia, where orchards are planted in soil.⁴³⁵ Further, the mountainous terrain interferes with Hawaiian growers' ability to mechanize production, particularly harvesting activities, and precludes Hawaiian farmers from taking advantage of cost savings from mechanization available to Australian farmers.⁴³⁶ Third, the Australian industry has developed new higher yielding macadamia varieties that thrive better in Australia, and these varieties are starting to realize returns in the form of increased yields and revenues.⁴³⁷

In addition, the Australian macadamia production sector has reportedly raised capital more easily than the Hawaiian sector. The Australian industry was started by nonfarming investors (attorneys, physicians, etc.) who have capital and are willing to invest it, while many of the small Hawaiian farmers, especially those who are hobbyists or have part-time macadamia operations, have small operations without adequate size or scale of operations needed to either raise loans or to realize cost reductions from mechanization and production economies of scale.⁴³⁸ And finally, certain Australian

⁴³³ Representatives of both industries suggested that generally, macadamia production costs in Hawaii and Australia are similar: R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 25, 1998, p. 62; and USITC staff interview with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, of Agrimac, in Alstonville, New South Wales, Australia, Apr. 6, 1998.

⁴³⁴ This range does not include the breakeven cost estimates of MPA and Pacific Plantations, which considered such estimates as business confidential.

⁴³⁵ USITC staff interview with A. Burnside, general manager, Australian MacFarms, Woombye, Queensland, Australia, Apr. 3, 1998.

⁴³⁶ *Ibid.*

⁴³⁷ USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, director of marketing, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998.

⁴³⁸ USITC staff interviews; with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS manager, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998; with I. Mulligan, owner, Honey and Nut Management Pty. Ltd., Dunoon, New South Wales,

industry representatives contend that the long run profitability of the Australian growing industry exceeds that of the Hawaiian industry because of the Australian industry's financial investments in horticultural and scientific research related to macadamias. For example, in Hawaii, the HMNA is spending US\$92,000 on horticultural research, compared with US\$538,725 (A\$825,000) raised in 1998 from the increased levy assessment for such research through Australia's HRDC (see chapters 2 and 3).⁴³⁹

Bulk vs. Retail marketing

One of the key determinants of relative competitiveness between the U.S. and foreign macadamia nut processors is the marketing emphasis on bulk (generic) versus retail (branded) products. The generic marketing approach taken by much of the Australian industry differs from the brand-name-oriented approach taken by the major U.S. processors, and this difference has significant implications for the relative competitiveness of the two countries' producers in major markets in the United States, Asia, and Europe.

Generic promotion, such as that undertaken by the Australian industry, boosts consumer awareness and acceptance of macadamia nuts from all sources. Especially when accompanied by strong price competition, the Australians have found it effective in gaining market share in hotels, restaurants, and the food processing industry where brand names are less important to the final consumer than price and quality. In such market channels, imports—particularly from low-cost sources—can be expected to be competitive with production from domestic sources.

Retail (branded) promotions by the U.S. industry, although requiring significant investment in marketing as well as added processing/packaging costs, creates consumer awareness of, and loyalty to, a particular brand. A strong brand name can offset a price disadvantage when promoting new product lines since the consumer is already familiar with the product. For example, newly introduced macadamia cookies have benefitted from ready acceptance by consumers already accustomed to other macadamia products marketed under the same brand name. In the large U.S. retail macadamia market, the U.S. industry's brand-name approach has provided it with a distinct advantage over foreign rivals, which lack well-known brand names.

Four of the six U.S. processors in table 2-2, process kernels to manufacture and market their own retail product lines: Mauna Loa Macadamias; MacFarms of Hawaii; Hawaiian Host; and Kamigaki enterprises. The two largest U.S. processors have supplied both retail and bulk products since the early 1990s. Mauna Loa Macadamias has consistently placed a greater importance on the marketing of its *Mauna Loa* retail product line over bulk products, as has MacFarms of Hawaii. As stated earlier, MacFarms of Hawaii has increasingly evolved from a bulk-oriented to retail marketer.⁴⁴⁰

Australia, Apr. 7, 1998; with K. Wilson, manager, Gray Plantations, and an AMS director, and G. Hargreaves, an AMS director, at Gray Plantations offices, Eureka, New South Wales, Australia, Apr. 4, 1998; and with R. Fayle, president of AMS, and G. Hargreaves, an AMS director, at AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

⁴³⁹ The Hawaiian research expenditures were obtained by USITC staff in a facsimile from the HMNA, June 9, 1998. The Australian investment information was received from: the AMS, prehearing brief, Apr. 20, 1998, p. 4; and from a USITC staff interview with R. Fayle, president of AMS, and G. Hargreaves, an AMS director, at AMS headquarters, Lismore, New South Wales, Australia, Apr. 4, 1998.

⁴⁴⁰ Information was obtained from 3 sources: a USITC staff interview with R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, Mar. 24, 1998; a USITC staff telephone communication with R. Vidgen, May 6, 1998; and a facsimile to USITC staff from R. Vidgen, June 5, 1998.

Australian firms have concentrated their marketing efforts in the U.S. and European markets in the bulk, institutional, and industrial ingredient trade.⁴⁴¹ All six Australian processors listed in table 3-1 market bulk products. There have been substantial investment and marketing initiatives by some Australian processors, however, in recent years to develop retail macadamia product lines and markets for these lines. Suncoast Gold, manufacturer and marketer of the *Suncoast Gold* line, has evolved from a position in the early 1990s where 95 percent of revenue was based on bulk sales, and only 5 percent on retail sales, to its current position where 75 percent of revenues are from bulk sales and 25 percent from retail sales.⁴⁴² Two other Australian processors, Australian MacFarms and Macadamia Plantations of Australia, have also established lines of retail macadamia products (table 3-1).⁴⁴³

Some Australian retailer/processors were established some time after the Hawaiian counterparts. Certain U.S. representatives, who have been involved in both countries' industries, suggest that the Australian processors that manufacture and market retail products are currently making similar transitions to increasingly retail suppliers from primarily bulk suppliers, and are currently where today's U.S. macadamia processors and retail marketers were a number of years back.⁴⁴⁴ Representatives of Macadamia Plantations of Australia and Suncoast Gold expect both firms to become increasingly retail-oriented in terms of macadamia product supply.⁴⁴⁵

⁴⁴¹ G. Hargreaves, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 13-15.

⁴⁴² USITC staff interview with J. Twentyman, general manager, I. McConachie, chairman and managing director, P. Zummo, marketing director, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998; and a facsimile sent to USITC staff by J. Twentyman, July 17, 1998.

⁴⁴³ Pacific Plantations is a supplier of bulk and industrial macadamia products, but does market one retail product, a bottle of macadamia cooking oil. Yet the firm considers itself primarily a bulk, and not a retail, supplier. USITC staff interview with D. Macrae, managing director, Pacific Plantations, Banagalow, New South Wales, Australia, Apr. 7, 1998.

⁴⁴⁴ See the cross examination responses of various U.S. industry representatives, who have spent time working in both the industries in Hawaii and Australia: transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 105-117.

⁴⁴⁵ Information was obtained in USITC staff interviews: with J. Twentyman, general manager, I. McConachie, chairman and managing director, and P. Zummo, marketing director, of Suncoast Gold, and T. Davenport, an AMS director, at Suncoast Gold offices, Gympie, Queensland, Australia, Apr. 2, 1998; and with A. Scott, financial controller, J. Briggs, factory manager, and J. Underhill, factory and quality manager, of Macadamia Plantations of Australia, and G. Hargreaves, an AMS director, at the Macadamia Plantations of Australia offices, Lismore, New South Wales, Australia, Apr. 7, 1998.

Major markets of processors

Domestic marketing, retail

The three largest U.S. processors market in both Hawaii and the U.S. mainland. The *Hawaiian Host*, *Mauna Loa*, and *MacFarms of Hawaii* product lines are marketed in the Hawaiian market, with a focus on souvenir sales to Hawaii-bound tourists. Of the smaller U.S. processors, only Kamigaki enterprises markets retail macadamia products, primarily in the Hawaiian market.⁴⁴⁶ The *Hawaiian Host*, *Mauna Loa*, and *MacFarms of Hawaii* product lines that are marketed in the U.S. mainland are aimed at the repeat buyer who most likely was first introduced to macadamia products while visiting Hawaii.

Three of the Australian processors in table 3-1 market lines of retail products in Australia's domestic market: Australian MacFarms, with the *MacFarms of Australia* and *Australian MacFarms* product lines; Macadamia Plantations of Australia with its *Pacific Gold* product line; and Suncoast Gold with its product line of the same name. Given the size of the Australian domestic market relative to the U.S. domestic market, Australian retail domestic marketing is proportionally less important in volume terms than U.S. efforts in the U.S. market.

Domestic marketing, bulk

Domestically, the larger U.S. processors tend to emphasize less the marketing of bulk kernel products compared to retail sales of macadamia product lines.⁴⁴⁷ The smaller U.S. processors tend to market their production as bulk kernel sales.⁴⁴⁸ A number of Australian processors supply bulk macadamia products to the domestic Australian market.

Export markets: Bulk and retail

Generally, U.S. processors export finished and bulk macadamia products to Europe and Asia, with an emphasis on finished product sales.⁴⁴⁹ Australians export both finished and bulk products, with an emphasis on bulk products, to Asia and Europe.⁴⁵⁰

In Asia, U.S. and Australian firms have marketed in Japan. U.S. processors have reportedly focused on marketing in Taiwan and Korea, while Australian processors have placed much emphasis on the

⁴⁴⁶ USITC interview with R. Kamigaki, owner, Kamigaki enterprises, Kailua-Kona, HI, Mar. 27, 1998.

⁴⁴⁷ See transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI: testimony of R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, pp. 39-40; and testimony of T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, pp. 58-61.

⁴⁴⁸ USITC staff interview with D. Macrae, managing director, Pacific Plantations, Bangalow, New South Wales, Australia, Apr. 7, 1998.

⁴⁴⁹ See transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI: testimony of R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, pp. 39-40; and testimony of T. Inglett, president, Hawaii Division, Mauna Loa Macadamias, Hilo, HI, pp. 58-61. See also a facsimile sent to USITC staff by D. Simonis, senior vice president and chief financial officer, Mauna Loa Macadamias, Hilo, HI, June 22, 1998.

⁴⁵⁰ See transcript of the hearing, Apr. 30, 1998, Washington, DC: testimony of G. Hargreaves, an AMS director, pp. 13-18; and testimony of B. Raphael, general manager, Macadamia Processing Company, Alphadale, New South Wales, Australia, pp. 22-26.

food service market for bulk kernels in China and Hong Kong.⁴⁵¹

Competitive Conditions Facing Other Supplier Countries

Other foreign macadamia producers competing with the U.S. industry are in Latin America and Africa. Latin American industries are in Guatemala, Costa Rica, and Brazil, while African industries are in Kenya, South Africa, and Malawi.

Kenya, South Africa, and Malawi

Kenya, South Africa, and Malawi are the major macadamia nut producers in Africa, and the combined Kenyan and South African production⁴⁵² accounted for about 17 percent of world production in 1997 (table 1-1). African kernel quality is considered inferior to the quality of Hawaiian and Australian kernels. However, South African kernels are reportedly the world's highest quality product after U.S. and Australian kernels and can achieve standards appropriate for use in candy and snack products.⁴⁵³ African kernels are generally suited for use as industrial food product ingredients in cookies, cake mixes, and ice cream.⁴⁵⁴

Kenyan and South African growing operations are expanding.⁴⁵⁵ During the 1993-1997 period, combined Kenyan and South African planted area expanded 13 percent to 10,415 hectares, an area exceeding 1997 U.S. planted area by 27 percent (table 1-1, 4-1, and 4-2).⁴⁵⁶ Combined Kenyan and South African production (NIS) increased during the 1992-1997 period by 133 percent.⁴⁵⁷ In 1997, production in Kenya, South Africa, and Malawi totaled 14,884 metric tons (in-shell basis),⁴⁵⁸ a level equal to 57 percent of 1997 U.S. production (table 1-1). African production is expected to continue increasing as nonbearing acreage matures into bearing orchards, and as planted acreage expands.⁴⁵⁹

⁴⁵¹ The Peninsular Group/Australian MacFarms, prehearing brief, Apr. 2, 1998. See also transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 111-116.

⁴⁵² Production data in 1997 were not available for Malawi.

⁴⁵³ USITC staff interviews: with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998; and with G. Martin and T. Slomski, NYM Marketing Corporation, Schaumburg, IL, at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 12, 1998.

⁴⁵⁴ USITC staff interview with G. Martin and T. Slomski, NYM Marketing Corp., Schaumburg, IL, at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 12, 1998.

⁴⁵⁵ Complete data on Malawi growing operations were not available.

⁴⁵⁶ Data on Malawi's planted hectareage were not available.

⁴⁵⁷ Data on Malawi production from 1992 to 1997 were not available, so that the 133 percent change excludes Malawi.

⁴⁵⁸ Data on Malawi's production were generally not available. This estimate includes a 1996/97 production estimate of 2,624 metric tons (in-shell basis) for Malawi, and was obtained from the International Nut Council, "World Production Estimates," *The Cracker*, vol. No. 3, Ed. 25, Sept. 1997, p. 31.

⁴⁵⁹ USITC staff interviews: with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998.

Domestic consumption and imports are not significant in the three African producer countries; the largest domestic consumer is South Africa, which consumed about 10 percent of production in 1998 (table 4-2). All three African countries export most of their production, primarily to the United States, Hong Kong, and Europe. During 1992-1997, combined Kenyan and South African exports⁴⁶⁰ rose 187 percent to 11,734 metric tons (in-shell basis) (tables 4-1 and 4-2).

Costa Rica, Guatemala, and Brazil

Costa Rica, Guatemala, and Brazil are the major macadamia producers in Latin America, and accounted for about 9 percent of world production in 1997 (table 1-1). Compared with the high Hawaiian and Australian standard, Latin American kernel quality is inferior. Costa Rican kernels are considered the region's top quality product, followed by Guatemalan and Brazilian kernels.⁴⁶¹ When produced under proper horticultural conditions and processed properly, Costa Rican kernels can achieve adequate quality for use in candy and snack products.⁴⁶² Generally, Latin American kernels are suited for use as industrial food product ingredients in cookies, cake mixes, and ice cream.⁴⁶³

Latin American planted area expanded 19 percent during the 1991/92-1997/98 period, with just over one-half constituting nut-bearing orchards. Latin American planted area exceeded U.S. planted area by 82 percent in 1997/98 (tables 1-1, 4-3, 4-4, and 4-5). Latin American production during the 1991/92 -1997/98 period increased by 76 percent, and equaled about 26 percent of the U.S. in-shell level during 1997/98. The region's production is expected to continue increasing as nonbearing hectareage matures into bearing orchards. Costa Rica is the one Latin American producer with production operations that contracted during 1991/92-1997/98: planted acreage declined by 23 percent, yields declined by 43 percent, and production stagnated (table 4-4). Reasons for this contraction include investor dissatisfaction with returns to orchard and processor investments, poor management and horticultural practices, and a suboptimal climate.⁴⁶⁴

Domestic consumption and imports are not significant for the three Latin American producers, and all three export most of their production, primarily to the United States. During the 1991/92-1997/98 period, Latin American macadamia exports rose 159 percent (in-shell basis) (table 4-3, 4-4, and 4-5). Of Latin America's 1997/98 exports of 6,835 metric tons (NIS), about 5,100 metric

⁴⁶⁰ Total export data were not available for Malawi over this period.

⁴⁶¹ USITC staff interviews at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL: with B. Wright and J. Wagaman, Blue Diamond, Sacramento, CA, Jan. 12, 1998; and with B. Tankersley, Young Pecan Company, Florence, SC, Jan. 11, 1998.

⁴⁶² USITC staff interview with B. Tankersley, Young Pecan Company, Florence, SC, at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 11, 1998.

⁴⁶³ USITC staff interview with G. Martin and T. Slomski, NYM Marketing Corporation at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 12, 1998.

⁴⁶⁴ USITC staff interviews: with K. Ainsbury, chief executive officer and marketing director, and J. Wilkie, agricultural director, Agrimac, Alstonville, New South Wales, Australia, Apr. 6, 1998; and with B. Tankersley, Young Pecan Company, Florence, SC, at the Peanut and Tree Nut Processors' Association Annual Convention and Trade Show, Sanibel Island, FL, Jan. 11, 1998.

tons⁴⁶⁵ were sent to the United States, accounting for about 37 percent of U.S. macadamia product imports (tables 1-1, 2-15, 4-3, 4-4, and 4-5). All three countries have processing facilities, with a capacity generally in excess of local production.

Competitive Conditions in Major Consumption Markets

Major markets for macadamia nuts outside of the United States and Australia are believed to be Japan, China/Hong Kong, and the EU. All of these markets rely on imports as their primary or sole supply source.

Japan

From 1992 through 1997, demand in Japan for macadamia kernels and kernel products grew from 1,477 metric tons, valued at \$15.5 million, to 2,190 metric tons, valued at \$26.1 million.⁴⁶⁶ Australia, the United States, and Kenya were the principal sources for imports of macadamia kernels and kernel products into Japan. It is believed that a substantial portion of the Japanese market for macadamias (in value terms) consists of finished retail products that are not specifically provided for in official Japanese import data.

Japanese import data through 1997 on macadamias and U.S. data on processor exports of chocolate-covered kernels to Japan suggest that the Japanese market has recently begun to decline or slow in growth. Japanese growth in demand for macadamia nut products has been slowing as consumer income growth slows because of the recessionary Japanese economy. The escalating Japanese macroeconomic problems adversely affect macadamia sales by the U.S. and Australian industries in two ways: through lower direct imports and indirectly through lower numbers of Japanese tourists who constitute strong sources of macadamia product sales. Further, Japanese purchases of Australian and Kenyan products have increased since 1996, while purchases of U.S. products have declined (chapter 3).⁴⁶⁷ One of the reasons for this change in import mix is that Japanese firms have entered the macadamia retail product market. Because of the increased competitive pressures generated by such new entrants, Japan has begun importing less finished products from the United States and begun importing more raw kernels for further processing particularly from Australia.

China/Hong Kong

Data are not available on the size of the Chinese macadamia market. It is believed that Australia has been the principal supplier of macadamias to China and Hong Kong and a sizeable share of

⁴⁶⁵ USITC staff estimated this from the 1996/97 proportion of Latin American exports that were marketed in the United States. Data for Latin American exports to the United States in 1997/98 were not available.

⁴⁶⁶ Official Japanese import statistics do not breakout bakery and confectionary products containing macadamia nuts.

⁴⁶⁷ USITC staff telephone conversation with T. Pogson, industrial sales, MacFarms of Hawaii, Sacramento, CA, Aug. 25, 1998.

Hong Kong's imports may be re-exported to Chinese provinces on the mainland. Australia exported about 3,000 metric tons (in-shell basis) to Hong Kong in 1996. China also imports a sizeable amount of in-shell kernels that are handcracked and sold in 1 kilogram packs to the food processing industry.

European Union

U.S., Kenyan, and Australian export statistics provide some guidance on the size of the EU market. In 1996, imports from the world into the EU (Germany and Belgium/Luxembourg) totaled 2,982 metric tons (in-shell basis) and shipments from Kenya to Germany totaled 250 metric tons of kernels or about 1,560 metric tons on an in-shell basis. U.S. exports to the EU were negligible in 1996.

Trade Effects of Tariffs and Trade Barriers on Macadamia Products

United States and Australia

Importers and foreign kernel producers reported that the 21.3 percent U.S. general ad valorem duty on prepared or preserved macadamia nuts limits foreign competition with U.S. firms for certain finished macadamia products, primarily roasted kernels.⁴⁶⁸ Tariffs on prepared or preserved macadamia products reportedly limit most of the marketing potential in the United States to sales of bulk fresh or dried shelled kernels, confectionary products, and bakery products.⁴⁶⁹ Aside from a phytosanitary ban on most in-shell kernel imports, there are no known nontariff barriers on U.S. imports of macadamia products.

Australian duties are considered low on imports of macadamias and macadamia nut products (chapter 3). These duties likely do not interfere or impede the ability of the United States or other foreign producers to market kernels or kernel products in Australia. However, Australian production far surpasses domestic consumption, such that domestic macadamia needs are serviced with Australian-grown product, thereby precluding any need for imports. There are no known nontariff barriers on Australian imports of macadamia products.

African and Latin American countries

Three of the six African and Latin American macadamia producers examined in chapter 4 had some limited domestic macadamia consumption that ranged from about 10 to 20 percent of their 1997/98 domestic production: South Africa, Costa Rica, and Brazil (tables 4-2, 4-4, and 4-5). These three countries are currently the only African or Latin American macadamia production markets with any

⁴⁶⁸ This point was made by G. Hargreaves, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 14-15; and in a USITC staff interview with A. Burnside, general manager of Australian MacFarms, and T. Davenport, an AMS director, at Australian MacFarms offices, Woombye, Queensland, Australia, Apr. 3, 1998.

⁴⁶⁹ G. Hargreaves, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, pp. 14-15.

marketing potential for U.S. or other foreign macadamia products. South African and Brazilian tariffs on macadamia products are relatively low, and Costa Rican tariffs are relatively higher (chapter 4). Yet these tariffs likely have little impact on U.S. or other foreign marketings of macadamia products for two reasons. First, domestic consumption is limited in each country. And second, each country's 1997/98 production far exceeded consumption, such that domestic macadamia needs are likely serviced with domestic production, thereby precluding the need for imports. There were no reported nontariff barriers imposed on macadamia-related imports by these African and Latin American countries.

Important Asian and European Consumption Markets

Japan was reported to have no significant nontariff barriers on macadamia product imports, and Japanese tariffs on such imports were shown to be low for all foreign suppliers (chapter 5). Japan charges a 5-percent ad valorem tariff on imports of U.S., Australian, and South African macadamia kernels, compared with a 3-percent ad valorem duty on Kenyan, Costa Rican, and Guatemalan kernels, and a zero duty on Malawi kernels. Japanese duties may place U.S., Australian, and South African macadamia products at some minimal price disadvantage in Japan relative to other exporters just mentioned. However, the duties are so low, and the duty differences so small, that the tariffs may not be impeding the ability of the U.S., Australian, and South African macadamia exporters to market in Japan. Two factors may be more important than existing Japanese tariffs in influencing Japanese import patterns of macadamia products: Japan's recent switch away from U.S.-produced finished products towards bulk kernel imports supplied by Australia and Kenya; and Japanese importers' long standing macadamia trade relationship with Kenyan suppliers (chapters 4 and 5).

While Hong Kong maintains no customs tariffs, or other known nontariff barriers, on agricultural goods such as macadamia nuts, China has a 48 percent ad valorem rate of duty on shelled imports of other fresh or dried nuts, whether shelled or not shelled, which includes macadamias. Additionally, China imposes a 50 percent ad valorem tariff on other prepared or preserved nuts including macadamias in air-tight containers and a 45 percent ad valorem rate on macadamias not in air-tight containers. There are no known Chinese nontariff barriers placed on macadamia products. While there are no trade-influencing tariffs or other barriers confronting U.S. and other macadamia exporters to Hong Kong, duties imposed on Chinese imports of macadamia products are substantial and may inhibit the ability of U.S. and other macadamia exporters to market macadamia products in China.

With no known nontariff barriers on macadamia-related imports, the European Union (EU) charges a 3-percent tariff on macadamia nuts and higher ad valorem duties of from 12 to 12.6 percent on processed products (chapter 5). However, the EU generally imports bulk kernels. Insofar as the U.S. exports retail macadamia products, and Australia exports primarily bulk products, the EU tariff structure likely encourages EU imports of Australian over U.S. macadamia products.

Prices of Macadamia Products: Trends in U.S. Macadamia Prices and a U.S./Foreign Retail Comparison

Price is an important indicator of competitiveness. The forces that influence the U.S. market prices

received by domestic versus foreign suppliers include relative costs of production and marketing as well as product quality. In the long term, differences in costs of growing, processing, and/or marketing will drive out inefficient suppliers, foreign or domestic, who cannot compete at prevailing prices.⁴⁷⁰ During periods of declining prices, such as the present time, the first suppliers likely to leave the industry will be those with the highest costs. Such costs include the opportunity costs of land, labor, and capital, so that producers in areas where alternative uses for land and other inputs are readily available will reduce production and leave the industry more quickly as prices fall.⁴⁷¹

Quality differences between the United States and Australia do not seem to be significant.⁴⁷² Product quality for bulk kernels is similar for United States and Australian suppliers, and at the wholesale and retail levels, quality differences are more a matter of consumer perception than physical differences in products. Macadamias identified as from Hawaii, for example, are viewed by some consumers as preferable to generic macadamias of uncertain origin, and this perception is reflected in a higher price for Hawaiian-sourced product.⁴⁷³ As a result, as noted earlier, Australian and other foreign suppliers to the U.S. market place relatively greater emphasis on segments of the institutional market and other market channels where price and physical attributes are more important than region of origin as a competitive factor.⁴⁷⁴

As was described in chapter 2, NIS farm prices in the U.S. generally rose during much of the 1990s, although there is evidence that prices have begun to decline during the 1998/99 crop-year. Along with the NIS price, the wholesale price of kernels also rose during much of the 1990s; however, kernel prices have risen at a slower rate than NIS prices, causing a squeeze on processor margins that will eventually put further downward pressure on NIS prices (chapter 2). This pressure on kernel and NIS prices is reported by U.S. and Australian industry sources to be directly attributable to a general increase in world supplies of nuts, which combined with sluggish global demand is causing inventories to grow.⁴⁷⁵ This phenomenon--a direct relationship between

⁴⁷⁰ J. Gould and C. Ferguson, *Microeconomic Theory* (Homewood, IL: Richard D. Irwin, Inc., 1980), part 3.

⁴⁷¹ *Ibid.*, ch. 8.

⁴⁷² R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, transcript of the hearing, Mar. 25, 1998, Kailua-Kona, HI, p. 66.

⁴⁷³ USITC staff interview with N. Arakaki, president, Hawaiian Candies and Nuts, Ltd., Honolulu, HI, Mar. 31, 1998.

⁴⁷⁴ G. Hargreaves, an AMS director, transcript of the hearing, Apr. 30, 1998, Washington, DC, p. 13.

⁴⁷⁵ These observations were noted during USITC staff fieldwork interviews in Hawaii and Australia during Mar. 23-Apr. 8, 1998.

local (Hawaiian) price trends and global price trends -- is characteristic of a bulk commodity such as unprocessed macadamia kernels.

Further down the marketing line, price trends and relationships between imported and domestic products are more complex, as are producers' responses to such trends. Wholesale prices for domestic processed macadamia nut products in the U.S. market generally increased during much of the 1990s, (table 2-9). Roasted kernel and chocolate macadamia products at the wholesale level are generally marketed under processors' brand names and therefore are not viewed by many consumers as closely competitive with similar imported products as would be the case with bulk kernels.

Exchange Rates

Real, and not necessarily nominal, exchange rates of foreign currency per U.S. dollar influence agricultural trade flows.⁴⁷⁶ Industry representatives believe that exchange rate movements during the 1990s may have altered relative U.S. and non-U.S. (particularly Australian) prices of macadamia products, and trade flows.⁴⁷⁷ However, the analysis below demonstrates that real exchange rates of foreign macadamia consuming and producing country currencies relative to the U.S. dollar have not changed substantially, or for protracted periods, during the 1990s, such that observed changes in such relative prices or trade flows of macadamia products were probably not induced by exchange rates.

⁴⁷⁶ The real exchange rate of a foreign country's currency ("currency-K") per U.S. dollar is equivalent to: (currency K/U.S. dollar) * (deflUS/deflK). The asterisk is a multiplication operator. The real rate's first term in parentheses is the nominal exchange rate. The real rate's second term in parentheses is the "relative inflation factor" or the ratio of the general price indices of the foreign country and United States (deflK and deflUS). These nominal and real exchange rates for country K would be similar if the foreign country K and the United States have similar inflation patterns. Further, movements in these real exchange rates are relevant to less aggregate sectors such as macadamia markets in the United States and foreign country K insofar as the chosen aggregate price deflators (deflUS, deflK) reflect aggregate national price movements that resemble price movements confronting the macadamia markets.

A change (rise or fall) in the nominal rate is accompanied by an offsetting and oppositely-directed change (fall or rise) in the real rate's relative inflation factor, such that the real rate's percentage movements are often less than the percentage change in the nominal rate. Proponents of the purchasing power parity theory would believe that the change in the nominal rate induced by a change in the foreign money supply is exactly offset by an oppositely-directed change in the relative inflation factor such that the real rate would not change. For a summary of the purchasing power parity theory, and for a literature review reflecting issues and debates relevant to real and nominal exchange rate movements, see R. Babula, F. Ruppel, and D. Bessler, "U.S. Corn Exports: The Role of the Exchange Rate," *Agricultural Economics*, vol. 13 (1995), p. 75.

⁴⁷⁷ See the transcript of the hearing, Apr. 30 1998, Washington, DC: testimony of R. Vidgen, president, MacFarms of Hawaii, Captain Cook, HI, pp. 46-47; and testimony of B. Raphael, general manager, Macadamia Processing Company, Alphadale, New South Wales, Australia, pp. 24-25.

Role of Real Exchange Rates

A real depreciation of a macadamia producer's currency relative to the U.S. dollar, reflected by a rise in a relevant real rate, would have two conflicting effects on the foreign macadamia industry—one beneficial and the other adverse. The real depreciation would render the foreign macadamia products more price-competitive than U.S. macadamia products, and would likely result in importers switching from U.S.-produced products to the less expensive products of the producer with the devalued currency. On the other hand, the depreciation would work to the foreign producer's disadvantage if the country's macadamia industry imports substantial volumes of the now more costly U.S.-produced farm inputs (fertilizer, machinery, etc.). Likewise, a real appreciation of the foreign macadamia producer's currency relative to the U.S. dollar, reflected by a decline in the relevant real rate, would have effects opposite to those just attributed to a real depreciation. Therefore, net impacts on a foreign macadamia producing industry of a real exchange rate movement's offsetting demand and supply effects are not always evident, when the macadamia industry competing with the U.S. industry also purchases substantial farm inputs from the United States.

A real depreciation of a foreign macadamia consumer's currency relative to the U.S. dollar would render U.S. macadamia products more expensive than those of foreign producers, and may result in the consuming nation switching to now more competitively priced non-U.S. macadamia products. A real appreciation of the macadamia consumer's currency relative to the U.S. dollar would enhance the price competitiveness of U.S. macadamia products relative to other foreign producer's products, and would likely lead to the consuming country switching to U.S.-made macadamia products.

Real exchange rates of macadamia producer currencies relative to the U.S. dollar

Data on the real Australian exchange rate suggest that the rate fluctuated in both upward and downward directions within a narrow band of 1.25 to 1.45 Australian dollars per U.S. dollar without any sustained trend in the Australian dollar's appreciation or depreciation relative to the U.S. dollar (table 6-3). Consequently, any changes in U.S. and Australian real macadamia product prices, and in turn world macadamia trade volumes and market shares since 1992, were likely not exchange-rate-induced. The Australian macadamia price advantage relative to the United States reported by the U.S. representative may be generated by other factors such as differences in U.S. and Australian production costs, and not generated by exchange rates movements. Likewise, the real exchange rates of the three other macadamia producer nations' currencies relative to the U.S. dollar likely had little or no effect on the competitive advantage of their macadamia product prices relative to U.S. product prices because there was little change, and/or no protracted subperiods of change, in real exchange rates since 1992. The real South African exchange rate fluctuated (in both upward and downward directions) within a band of from 2.3 to 3.0 deflated rands per deflated U.S. dollar. The real Costa Rican exchange rate fluctuated within a band of 110 to 119 deflated colones per deflated U.S. dollar for all quarters except the first quarter of 1998 (table 6-3).

Table 6-3

Quarterly real exchange rates relevant to macadamia nut markets: Deflated foreign currency units per deflated U.S. dollar for 1992-1997

Year and quarter	Australia	South Africa	Costa Rica	Kenya	Japan	Hong Kong
	<i>Australian dollar</i>	<i>Rand</i>	<i>Colone</i>	<i>Kenyan shilling</i>	<i>Yen</i>	<i>Hong Kong dollar</i>
1992:						
Jan.-Mar.	1.300	2.420	117.69	21.863	129.34	(¹)
Apr.-June	1.298	2.399	111.20	20.711	132.67	(¹)
July-Sept.	1.337	2.288	114.50	20.107	127.92	(¹)
Oct.-Dec.	1.394	2.432	114.73	21.203	127.64	(¹)
1993:						
Jan.-Mar.	1.417	2.531	115.51	21.180	127.66	(¹)
Apr.-June	1.413	2.568	115.84	28.230	118.85	(¹)
July-Sept.	1.449	2.659	116.85	27.650	114.53	(¹)
Oct.-Dec.	1.449	2.642	119.07	28.842	117.94	(¹)
1994:						
Jan.-Mar.	1.383	2.637	119.08	23.756	118.08	7.410
Apr.-June	1.349	2.723	117.27	20.234	114.77	7.391
July-Sept.	1.327	2.644	114.37	19.291	110.88	7.400
Oct.-Dec.	1.293	2.577	112.03	16.100	111.30	7.392
1995:						
Jan.-Mar.	1.286	2.557	110.5	16.210	110.40	7.415
Apr.-June	1.339	2.575	111.02	18.280	99.63	7.451
July-Sept.	1.318	2.565	110.73	21.820	110.03	7.475
Oct.-Dec.	1.307	2.526	110.57	20.150	118.22	7.504
1996:						
Jan.-Mar.	1.296	2.595	111.02	20.528	124.05	7.538
Apr.-June	1.257	2.954	113.15	20.336	128.36	7.639
July-Sept.	1.265	3.000	113.11	19.068	130.51	7.686
Oct.-Dec.	1.251	3.022	113.34	18.487	134.79	7.698
1997:						
Jan.-Mar.	1.273	2.893	113.18	17.358	143.41	7.716
Apr.-June	1.275	2.807	112.14	15.985	138.86	7.606
July-Sept.	1.326	2.900	112.97	19.223	137.98	7.666
Oct.-Dec.	1.401	2.980	113.60	19.345	146.65	7.680
1998:						
Jan.-Mar.	1.451	3.008	86.69	16.902	148.0	(¹)

¹ Data needed for calculations were not available.

Note.—The real exchange rates depict deflated foreign currency units per deflated U.S. dollar for the Australian dollar, the South African rand, Costa Rican colone, Kenyan shilling, Japanese yen, and the Hong Kong dollar.

Source: Calculated by USITC staff using data published by the International Monetary Fund, *International Financial Statistics*, issues for April 1996, April 1997, January 1998, and July 1998. The "rf" nominal exchange rates showing the quarterly average exchange rates of foreign currency units per U.S. dollar were used from the country pages for Kenya, Japan, South Africa (after 1993) and Hong Kong. The "rf" nominal exchange rates were not published for South Africa before 1994 and are not published for Australia. USITC staff calculated the "rf" rates from inverting the "rh" rates which are the quarterly average nominal exchange rates in U.S. dollar(s) per foreign currency unit for Australia for 1992-1997 and for South Africa before 1994. USITC staff sought to use wholesale or producer price indexes as the country deflators, with the following indexes having been available (1990=1.00) from the respective country pages in the relevant source issues: the producer price indexes for the United States, Hong Kong, and Costa Rica; the price index for manufacturing output for Australia; the price index for home and imported goods for South Africa; and the wholesale price index for Japan. The consumer price index was the only quarterly price index available for Kenya and was used as the real rates' Kenyan price deflator.

Kenya's deflated shilling has fluctuated substantially within the range of 16-29 to the U.S. dollar since 1992 (table 6-3). Yet aside from the period of the fourth quarter of 1993 through the first quarter of 1995, when Kenya's shilling appreciated in real terms relative to the U.S. dollar, as demonstrated by the real rate's decline of over 40 percent, the real Kenya/U.S. exchange rate has fluctuated much more mildly (table 6-3). This real appreciation of the Kenyan shilling likely did not substantially influence Kenyan export patterns through changes in export prices of its macadamia nuts relative to other nations' prices. This is because a substantial portion of Kenya's production is captive to Japanese interests, and also because the period of the Kenyan shilling appreciation was short-lived, with the shilling having quickly weakened relative to the U.S. dollar after the first quarter of 1995 (table 6-3). Hence, for most of the time since 1992, the real rate's mild fluctuation and lack of protracted movement in either direction has likely had little effect on relative U.S. and Kenyan prices of macadamia products or on Kenyan macadamia export volumes.⁴⁷⁸

Real exchange rates of macadamia consumer currencies relative to the U.S. dollar

The real Japanese exchange rate has remained within the range from 100 to 148 deflated yen per dollar since 1992 (table 6-3). The real yen noticeably appreciated relative to the dollar from the first quarter of 1993 through the second quarter of 1995, and Japanese demands for U.S. macadamia products may have been temporarily enhanced (table 6-3). However, the real appreciation probably had little sustained effect on imports of U.S. macadamia products because the appreciation was not sustained, and the yen soon weakened, as reflected by the increase in the real yen/dollar exchange rate after 1995.

Limited Hong Kong exchange rate data shown in table 6-3 suggest that the real Hong Kong dollar/U.S. dollar exchange rate was stable within a band of 7.4 to 7.7 deflated Hong Kong dollars per U.S. dollar. Consequently, movements in this real rate have likely had little or no effect on Hong Kong's demand for U.S.-produced macadamia products.

And while analyses in previous chapters and in preceding sections of this chapter suggest that demands by Japan and Hong Kong for U.S. macadamia products increased during 1992-1996, and have declined during all or part of the past 2 years, import demand changes are probably not caused by changes in exchange rates per se (table 6-3). This is because real exchange rates have probably not changed sufficiently, or for protracted enough time periods, to result in altered trade flows. Import demand increases through 1996, and the more recent declines in such import demands, may have arisen from changes in these Asian nations' incomes, which increased through 1996, and started stagnating, and even declining thereafter, with the onset of macroeconomic problems.

At this writing, International Monetary Fund data needed to calculate real exchange rates are available through the final quarter of 1997 for Hong Kong, and through the first quarter of 1998 for the remaining macadamia producing and consuming countries. Consequently, analysis of the price and trade effects of real exchange rate movements during much of 1998, including analysis of the most recent impact of real rate movements on imports of U.S. macadamia products in Japan and Hong Kong, is precluded.

⁴⁷⁸ The Kenyan real exchange rate has begun to decline during the first quarter of 1998. Data are not available to discern if this recent real appreciation will continue and ultimately alter trade in macadamia products.

Econometric Relationships Between U.S. Farm Prices and Planted Area

There is a statistically significant positive relationship between NIS prices received by Hawaiian farmers (farm prices) and area planted to macadamias (area planted). This is to be expected, for if prices have been rising for an extended period of time, it seems likely that more area will be planted with macadamias. Conversely, following periods of constant or falling prices, one would expect that little or no new area would be planted; in fact, acreage might even fall as old or damaged trees are not replaced.

The connection between farm prices and planted area was statistically tested with an econometric model which used average NIS prices received by farmers and area planted in Hawaii during 1947-1997 (model, estimations, diagnostics, and data sources are provided in appendix D). Results suggest that planted area is influenced not only by current farm prices, but also by farm prices in past years, with effects of past prices decreasing over time.

The price in the current year has the greatest effect: a 1 cent rise in farm price has, on average historically, coincided with a current 6.3-hectare increase in Hawaiian area planted with macadamias (or an 0.8 percent increase in 1997 planted area). This current effect is in turn followed by several effects of rapidly decaying magnitudes in the following years (see appendix D). So rising (falling) prices have induced statistically valid increases (decreases) in Hawaiian area planted with macadamias over the last five decades.

APPENDIX A

LETTER OF REQUEST FROM THE U.S. SENATE COMMITTEE ON FINANCE

(This appendix is not included in the electronic version)

APPENDIX B

U.S. INTERNATIONAL TRADE COMMISSION'S NOTICE OF INSTITUTION OF INVESTIGATION

(This appendix is not included in the electronic version)

APPENDIX C

LIST OF WITNESSES APPEARING AT THE HEARINGS

(This appendix is not included in the electronic version)

APPENDIX D

ECONOMETRIC MODEL OF FARM PRICES AND MACADAMIA AREA

This appendix examines how the area planted with macadamia trees (planted area) might be influenced by trends in farm-level NIS prices (farm prices). Suppose, for example, that past farm prices are seen by growers as a useful predictor of future prices and, therefore, of probable gross returns from added planted area. Then, one might expect that, other things being equal, if prices have been rising for an extended period of time, new areas would be planted with macadamias. Conversely, following periods of constant or falling prices, little or no new area would be planted; acreage might even fall as old or damaged trees are not replaced.

This hypothesized connection was tested statistically using data on annual average nut prices received by farmers in Hawaii and macadamia acreage planted annually in Hawaii during 1947-97. Farm prices and data on macadamia acreage are published by the U.S. Department of Agriculture.⁴⁷⁹ A Koyck scheme was used in which the acreage planted is regressed on current and past nut prices to determine the extent to which past prices influence current plantings.⁴⁸⁰

The following equation describes the hypothesized connection to be tested:

$$(1) \quad A_t = a + bP_t + bcP_{t-1} + bc^2P_{t-2} + bc^3P_{t-3} + \dots + u_t$$

where A_t is the number of acres (new and existing) planted in year t ; P_t is the average annual price received by growers in year t ; $a > 0$, $b > 0$, and $0 < c < 1$ are parameters to be estimated; and u_t is an error term whose elements are assumed to be independent and identically distributed (i.i.d.) with zero mean. The constraint that $c < 1$ means that there will be a steadily declining effect of each more-distant year's price.⁴⁸¹

Equation (1) is algebraically equivalent to the computationally easier equation

$$(2) \quad A_t = a(1-c) + bP_t + cA_{t-1} + v_t$$

where the notation is as before and v_t replaces u_t as an error term. Because the independent variables now contain lagged values of the dependent variable, the elements of v_t cannot be assumed to be i.i.d. with zero mean. Rather, the errors are possibly autocorrelated:

$$(3) \quad v_t = \rho v_{t-1} + u_t$$

where $|\rho| < 1$ is a parameter to be estimated and u_t is assumed i.i.d. with zero mean.

Equation (2) was estimated with ordinary least squares (OLS) over the 1948-1997 period (accounting for a lagged dependent variable) with the following results (t statistics in parentheses):

$$(4) \quad A_t = 178.3 + 15.56P_t + 0.879A_{t-1} \quad \text{Adj. } R^2 = 0.99$$

(0.94) (3.32) (23.03)

The coefficients for both the price and the acreage variables are statistically significant at the 0.01 percent confidence level. Because equation (4) has a lagged dependent variable as a regressor, the

⁴⁷⁹ USDA, Hawaii Agricultural Statistical Service, *Hawaii Macadamia Nuts, Final Season Estimates*, July 8, 1998.

⁴⁸⁰ See, e.g., J. Johnston, *Econometric Methods*, 3rd edition (New York: McGraw Hill, 1984), ch. 9.

⁴⁸¹ The Koyck lag is a string of exponentially declining weights; thus, the influence of past prices on current plantings declines as the years grow more distant. J. Johnston, *Econometric Methods*, pp. 346-47.

Durbin-Watson statistic is invalid; as an alternative test for autocorrelation, Durbin's h statistic is used.⁴⁸² In the present case, Durbin's h of 1.642 permits acceptance of the null hypothesis of zero autocorrelation.

Equation (4)'s estimation by ordinary least squares suggests that the equation is adequately specified for two reasons. First, the adjusted R² value of 0.99 is adequately high. And second, the Ljung-Box portmanteau value of 14.3 suggests adequacy of model specification. Since the portmanteau value of 14.3 is less than the critical chi-square values of 21.0 (5-percent significance level) and 26.2 (1-percent significance level) with 12 degrees of freedom, then evidence at both the 1-percent and 5-percent significance levels is insufficient to reject the null hypothesis that equation 4 is adequately specified.⁴⁸³ Consequently, equation 4 appears adequately specified.

The U.S. industry has undergone rapid change which may have induced "structural change" or "time-variance" of parameters, whereby regression estimates are not constant, and hence not valid, over the 1948-1997 sample period. Existence of such structural change requires division of the samples at the junctures of the change's occurrence, and re-estimation of the model separately for the subperiods.⁴⁸⁴ If observed changes are not adequately strong to have induced structural change and time-variance of the regression estimates, then it is appropriate and valid to estimate over the entire 1948-1997 sample and proceed as if estimates are time-invariant. Following literature-established procedures,⁴⁸⁵ equation 4 was estimated, the recursive residuals calculated, and the data-analytic CUSUM and the CUSUM-squared plot tests for structural change described in Harvey⁴⁸⁶ were implemented. Evidence at both the 5-percent and 1-percent significance levels was insufficient to suggest that structural change has occurred over the 1948-1997 sample period. Therefore, evidence suggests that equation 4's regression parameter estimates are time-invariant, and may be validly used over the entire sample period.

Thus, the coefficient a is 178.3; b is 15.56; and c is 0.879. Using these results, we can re-express the original equation (1) as follows:

$$(5) \quad \begin{aligned} A_t &= a(1-c) + bP_t + bcP_{t-1} + bc^2P_{t-2} + bc^3P_{t-3} + \dots \\ &= 21.57 + 15.56P_t + 13.67P_{t-1} + 12.02P_{t-2} + 10.57P_{t-3} + \dots \end{aligned}$$

which clearly illustrates the declining effect on current acreage of the prices prevailing in years past. The price in the current year has the greatest effect, with a coefficient of 15.56, followed by the smaller coefficient (13.67) of the previous year's price, followed by increasingly smaller effects in more distant years. The mean lag for the Koyck process is $c/(1-c)$, which in this case is approximately 7.26, meaning that one half of the lagged price effect takes place within the first 7.26 years.

⁴⁸² Durbin's h statistic is defined as $h = r[\frac{n}{(1-n \text{ var}(b))}]^{1/2}$, where r is approximated as $1 - DW/2$. If the statistic $h > 1.645$, the null hypothesis (of zero autocorrelation) at the 5% level of significance is rejected in favor of the hypothesis of positive first-order autocorrelation. J. Johnston, *Econometric Methods*, p. 318

⁴⁸³ For details on the Ljung-Box portmanteau test, see C. Granger and P. Newbold, *Forecasting Economic Time Series* (New York: Academic Press, 1986), pp. 99-101.

⁴⁸⁴ See A. Harvey, *The Econometric Analysis of Time Series* (Cambridge, MA: MIT Press, 1990), pp. 212-213; and B. Larue and R. Babula, "Evolving Dynamic Relationships between Money Supply and Food-Based Prices in Canada and the United States," *Canadian Journal of Agricultural Economics*, vol. 42 (1994), pp. 163-164.

⁴⁸⁵ Ibid.

⁴⁸⁶ For detailed test procedures, see Harvey, *Econometric Analysis*, pp. 163-164.

Another interpretation of these results is that a change in the current price will influence planted area (and hence future potential production) for several years following the change. Using equation (5), with a base acreage level of 20,000 acres and a price of \$1.70 per kilogram, an increase in this year's price by \$0.01 would increase this year's plantings by 15.56 acres, or about 0.08 percent of 1997/98 planted area. Plantings in the first year following would increase by 13.67 acres, also about 0.07 percent, and plantings in the second year following would increase by 12.02 acres, or about 0.06 percent.

APPENDIX E

HAWAII COUNTY CODE PERTAINING TO LAND DEDICATION

(This appendix is not included in the electronic version)