# IMPORTED FOOD FATS AND OILS: GROWING COMPETITION FOR U.S. AGRICULTURE



United States International Trade Commission / Washington, D.C. 20436

# UNITED STATES INTERNATIONAL TRADE COMMISSION

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Office of Industries Norris A. Lynch, Director

This report was prepared principally by

John G. Reeder and Louis DeToro Agriculture, Fisheries, and Forest Products Division

Address all communications to Office of the Secretary United States International Trade Commission Washington, D.C. 20436 UNITED STATES INTERNATIONAL TRADE COMMISSION • Office of the Secretary • Washington, D.C. 20436

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CONTACT: JOHN REEDER (202) 523-0037

USITC 78-016

(202) 523-0161

#### USITC STUDY PREDICTS STABLE SITUATION FOR IMPORTED VEGETABLE OILS

The United States International Trade Commission has completed a study of U.S. imported food fats and oils (palm oil, palm-kernel oil, coconut oil, and cocoa butter) which indicates that imports should continue at present to slightly increasing levels through 1980, while their overall prices should decline.

The study was undertaken as a followup to the 1976 Commission report on palm oil which at that time was entering the United States in record levels.

Imported food fats and oils generally amounted to less than \$150 million (or about 10 percent of U.S. annual consumption of food fats and oils) prior to 1974. In 1974 and 1975, imports rose to \$380 million and \$480 million, respectively (or to 13 percent and 17 percent of domestic consumption). In 1976, imports declined to \$338 million (14 percent of domestic consumption).

Imported vegetable oils and fats were used in the early 1960's mainly for nonfood uses (i.e., soap). Now, however, these oils and fats are used predominantly in such food products as shortening, cooking oils, and confectionery products, and, thus, compete more directly with domestically-grown vegetable oils.

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Forecasts (based upon an economic model of the period 1960-76) for palm oil, palm-kernel oil, and coconut oil indicate slight increases in U.S. consumption and imports of palm oil in the period 1977-79 as compared to 1976. Indications for palm-kernel oil and coconut oil are that U.S. consumption and imports should fall short of the 1976 level through 1979. The prices of the three imported oils should continue to fall through 1979, partially reflecting the projected decline in the price of the dominant domestic oil, soybean oil.

The effect of U.S. tariff policy on the imported food fats and oils is found to have a varying impact on U.S. imports of palm oil, the lauric oils (coconut oil palm-kernel oil), and cocoa butter. Imports of palm oil are the most responsive of the fats and oils to changes in U.S. tariff rates, with the lauric oils and cocoa products (including cocoa butter) being much less responsive.

The study presents detailed statistical information on the imported fats and oils during the period 1960-76, highlighting trends in foreign suppliers, technology changes in the vegetable oils industry, description and uses of the fats and oils, consumption, imports, and prices of the palm oil, palmkernel oil, coconut oil, and cocoa butter.

Copies of the Commission's report <u>Imported Food Fats and Oils: Growing</u> <u>Competition for U.S. Agriculture</u> (USITC Publication 856), may be obtained from the Office of the Secretary, 701 E Street NW., Washington, D.C. 20436 or by calling (202)523-0161.

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#### Executive Summary

During 1951-73, imported fats and oils generally amounted to less than \$150 million or less than 10 percent of U.S. consumption of food fats and oils (by volume). In 1974, however, the import share rose to about \$380 million or about 13 percent of the market, and in 1975 climbed to about \$440 million or 17 percent of domestic consumption. Imports dropped to \$338 million or 14 percent of domestic consumption in 1976. Since palm oil, palm-kernel oil, coconut oil, and cocoa butter constitute more than 95 percent of U.S. imported food fats and oils, this report concentrates on these products.

A dominant trade influence in the billion-dollar fats and oils market in the United States during the 1960's and 1970's has been the development of more sophisticated refining techniques. These technological advances have spurred increasing substitution among the various animal fats and vegetable fats and oils. This substitution is documented in several ways in this report, and the likely impact of these substitution patterns in the future is discussed.

Results of U.S. demand for imported food fats and oils indicate the responsiveness of imports to the U.S. national income, to prices of domestic vegetable oils, and to the price of the import itself. Palm oil is found to be the most price-responsive oil, and, thus, most responsive to tariff rate increases. Cocoa butter is the least price-responsive oil studied. The effect of rising U.S. gross national income is found to be strongly positive for vegetable oil imports, but relatively weak for cocoa butter.

Forecasts for palm oil, based partly upon assumed levels of the U.S. gross national product, the domestic price of soybean oil, and world production of palm oil, indicate continued slight increases in U.S. consumption and imports of palm oil in 1977-79 compared with 1976 data. 1/ However, U.S. palm oil consumption and imports could remain below 1975 peak levels through 1979, and the price of palm oil should decline through 1979. For the lauric oils (coconut oil and palm-kernel oil), the indications are that U.S. consumption and imports could fall short of the 1976 peak levels through 1979. The weighted average price of the lauric oils should fall, following the lead of palm oil and the assumed decline of domestic soybean oil prices.

These forecasts are based upon an econometric model in which the supply trends of foreign exporters interact with U.S. demand for imported vegetable oils to jointly determine levels of U.S. imports, consumption, and prices. The statistical data used in making projections and in formulating import-demand equations, the more technical information on the two-stage least-squares (2SLS) models used in forecasting imports, prices, and so forth, and the tariff treatment for the various vegetable oils and for cocoa products are contained in appendixes to this report.

#### Introduction

The United States is the principal world producer and exporter of agricultural products as well as one of the leading importers, particularly of certain primary tropical products. Many of these tropical products (such as coffee and tea) are not competitive with domestic products, but rather complementary. However, imports of other agricultural products into the United States compete with domestic agricultural goods and, in certain cases, displace them. Vegetable fats and oils fall into this category.

The United States is both the largest producer and exporter of oilseeds and vegetable oils, and a substantial importer of certain kinds of vegetable fats and oils. In 1974 and 1975, partly as a result of the domestic agricultural situation, the United States began to import significant quantities of vegetable oils (particularly palm oil), attracting the serious attention of U.S. farmers and producers of vegetable fats and oils. Consequently in 1976, the House of Representatives held hearings on the palm oil situation; bills were introduced to place a duty on this oil; and several studies (including one undertaken by the U.S. International Trade Commission as a result of congressional interest) were completed on the palm oil situation.  $\underline{1}/$ 

Partly as a followup to its earlier 1976 report on palm oil, the Commission decided to study the entire area of vegetable fats and oils and particularly with regard to the U.S. import situation. Palm oil, palm-kernel oil, coconut oil, and cocoa butter were examined in an effort to determine--

--the patterns in recent U.S. and world trade, --the economic factors which have influenced U.S. imports, consumption, and prices of imported food fats and oils, and --short-term prospects for U.S. imports of these four primary commodities. The less significant edible imported oils such as olive oil and sesame oil

and the inedible vegetable oils such as castor oil and tung oil were not considered in this report.

1/ The Committee on Agriculture of the House of Representatives held hearings on Mar. 18 and May 15, 1976, on the palm oil situation. H.R. 12952, introduced in 1976, would have placed a 3-cent-per-pound duty on palm oil imports, and six other bills concerning palm oil were either introduced or passed in Congress during 1976. See U.S. International Trade Commission, U.S. Palm Oil Imports and the Domestic Vegetable Oil and Fats Situation: A Summary Report, August 1976.

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#### Imported Fats and Oils

Palm oil, palm-kernel oil and coconut oil (the lauric oils) and cocoa butter are derived from products from the tropical regions of the world. The increasing versatility (along with competitive pricing) of palm oil and the lauric oils has been the hallmark of their success in the domestic market. The competitive success of cocoa butter, on the other hand, has resulted from its primary use as a confectionery fat and from the comparative lack of viable synthetic or natural substitutes. 1/ The interdependency of the imported vegetable oils in the U.S. market will become increasingly apparent throughout this report, and the uniqueness of cocoa butter as a vegetable fat will emerge more strongly in the sections on prices and substitution, and economic analysis. 2/

#### Palm Oil

Derived from the fruit of the palm tree, palm oil is comercially most important to countries of the tropical regions, especially West Africa, Indonesia, and Malaysia. The absence of lauric acid in palm oil and the fact that it is liquid at room temperature make it more suitable than the lauric oils in the producition of edible products such as shortening, cooking oil, salad oil, and margarine. Since 1960, the domestic market for imported palm oil has shifted almost entirely away from use in inedible products to use in edible products: whereas about 67 percent of the palm oil consumed in the United States went to industrial uses in 1960, more than 95 percent was used in shortening, cooking and salad oils, margarine, and other edible products in 1976 (see fig. 1 on the following page).

U.S. consumption and imports.--Annual U.S. consumption of palm oil remained below 200 million pounds until as recently as 1971 (table 1, app. A), when the market began to take a new shape. In 1971, both imports and consumption began a growth path which peaked in 1975, when imports of 960 million pounds and domestic consumption of 899 million pounds served as tangible evidence of palm oil's importance in the U.S. market. Although both imports and consumption fell off in 1976 (to 776 million pounds and 748 million pounds, respectively), there is little evidence that this decline is a signal for commensurate drops in palm oil imports and consumption. Indonesia and Malaysia were the principal suppliers of U.S. palm oil imports during 1960-76 (see table 2).

1/ The synthetic substitutes for cocoa butter are the so-called hard butters, which are confectionery vegetable fats composed mostly of fractionated palm-kernel oil, palm oil, coconut oil, hydrogenated soybean oil, or cottonseed oil.

2/ The terms "fats" and "oils" are used interchangeably in this report. An animal or vegetable oil liquid at room temperature is generally termed an "oil"; an animal or vegetable oil solid at room temperature a "fat".

Percentage 62 --Edible end-use 612 دى 내임 20 --Inedible end-use 2 1976 1960 1976 1960 1960 1976 Palm Oil Palm-kernel Oil Coconut Oil

### Figure 1.--Palm oil, palm-kernel oil, and coconut oil: Distribution by end-use, 1960 and 1976

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

Foreign production and trade.--Four principal palm oil producing-exporting countries accounted for 70 percent of world production and 98 percent of world exports in 1976 (table 3). They were, in order of importance, Malaysia, Indonesia, the Ivory Coast, and Zaire. The most remarkable characteristic of the palm oil situation abroad has been the surge in Malaysian and Indonesian production and exports. Malaysia, in particular, has devoted considerable resources to expanding its palm tree acreage since about 1965.

Projections of world palm oil production and exports by the U.S. Department of Agriculture show world production growing at about 10 percent annually through 1980; world export growth is estimated at 14 percent annually on the basis of supply availability. 1/

Beyond 1980, world demand for palm oil should be limited by two factors: the generation of sufficient quantities of foreign exchange in the developing countries and the impact of increasing dietary concern about high cholesterol fats and oils in the developed countries (including the United States). Since palm oil is a highly saturated vegetable oil, the concern with dietary problems in the developed countries may lead to a reversal of consumption trends later in the century. <u>2</u>/ However, this reversal is unlikely to become important in the next several years, at least in the U.S. market.

#### Palm-kernel oil

Palm-kernel oil is derived from the kernel of the palm fruit and contains about 50 percent lauric acid. Its primary uses are in the production of confectionery, bakery goods, and shortening. Since 1960, the use of palm-kernel oil in the U.S. market has shifted entirely away from inedible products. Whereas'one-third of the palm-kernel oil imported into the United States in 1960 was used in inedible end products (including soap), by 1976 no significant amounts of palm-kernel oil were used in these products (fig. 1). Among edible product end uses, palm-kernel oil has captured a substantial share of the U.S. shortening market. In 1960, there was no reported use of palm-kernel oil in shortening; by 1976, 50 percent of the oil went to the shortening market.

1/ U.S. Department of Agriculture, Palm Oil Historical Perspective and Future Prospects, Foreign Agricultural Service, (FAS), January 1976. 2/ For example, the U.S. Senate Select Committee on Nutrition and Human Needs in Dietary Goals for the United States (Feb. 1977) has, advised Americans to reduce their present intake of saturated fats from 16 percent to 10 percent of their total caloric intake. U.S. consumption and imports.--U.S. imports and consumption of palm-kernel oil did not experience the spectacular fifteenfold increase that palm oil did in the period 1960-76. Imports rose from 88 million pounds in 1960 to 140 million pounds in 1976 (table 4). The 3-percent annual growth rate 1/ of imports was closely paralleled by growth in domestic consumption. Malaysia is the principal U.S. supplier of palm-kernel oil (table 5).

Consumption and import growth was aided by relatively stable unit value of imports which ranged from 11 to 16 cents per pound (on an annual basis) between 1960 and 1973. This fostered a strong U.S. demand for palm-kernel oil, which appears to be slowly but steadily increasing.

Foreign production and trade.--Total world production and exports of palm kernels and palm-kernel oil increased very little during most of the 1960-76 period. While Malaysian and Indonesian output increased, there was a simultaneous reduction of roughly the same magnitude in West African production.

World production rose from 970 million pounds in 1960 to an estimated 1.2 billion pounds in 1976 or by 1.4 percent annually (table 6). Meanwhile, total world exports remained virtually unchanged. Nigeria, Zaire, and Sierra Leone experienced decreases in production and exports of palm-kernel oil during the period.

Processing of palm kernels into oil during 1960-76 shifted from the importing countries to the producing countries. In 1960, for example, about 660 million pounds of kernels were exported from the principal producing countries; by 1976 the export total was less than 270 million pounds. This important shift in the processing of the palm kernels should continue in the near future.

#### Coconut oil

Coconut oil is obtained by extraction from copra, the dried "meat" kernel of the coconut. Like palm-kernel oil, about 50 percent of coconut oil is lauric acid; therefore, the term "lauric oil" is applied to both products. Coconut oil is used widely in the United States in both edible products (confectionery, baked goods, shortening, margarine, ice-cream-bar coatings, and as a butterfat substitute) and nonedible products (principally soap). Like the previously discussed imported vegetable oils, domestic consumption of coconut oil has shifted toward edible end uses since 1960. Seventy percent of the oil was used in inedible products in 1960; by 1976,

1/ Growth rates given in this report are compound annual growth rates, unless otherwise specified.

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the use of coconut oil for food produts slightly predominated (fig. 1). As for the other imported vegetable oils, the changing end-use patterns in coconut are likely to lead to an increasing price-responsiveness in the imported fats and oils economy. This projected price phenomenon is discussed further in the section on substitution patterns.

U.S. consumption, imports, and production.--U.S. coconut oil consumption experienced an annual growth rate of about 3.7 percent during the period 1960-76 (table 7). The growth rate of imports in the period was nearly the same. In 1974, consumption and imports were at their lowest levels in the 17-year period, but recovered strongly in 1975 and 1976. Like that for palm-kernel oil, the domestic base demand for coconut oil appears to be increasing. The Philippines supplied most of the U.S. imports of coconut oil during the period (table 8).

U.S. production of coconut oil from imported copra gradually diminished in importance during the period studied and ceased entirely in 1974; the Philippine Government's fiscal incentives encouraging the processing of copra into coconut oil within its own borders were major factors in the cessation of production. However, the combined demand for copra and coconut oil in the United States has continued at the same rate after the cessation of U.S. production. Furthermore, there is little likelihood that the increasing trends in imports and consumption will abate markedly in the next several years.

Foreign production and trade.--Four countries in Southeast Asia--the Philippines, Indonesia, Sri Lanka, and Papua New Guinea--are the dominant forces in world production of copra and coconut oil. The Philippines alone was responsible for more than 50 percent of world production ln 1976 (table 9). Increased planting of coconut trees in the Philippines and Indonesia are the principal reasons for the 2.7 percent annual growth rate in world production since 1960.

The growth in world exports was irregular during 1960-76, reflecting the fluctuation in production caused by diminished rainfall in certain years. From 1960 to 1976, world exports (as oil) rose 1.2 billion pounds (an annual growth rate of 2.3 percent). The Philippines remains the dominant exporter of copra and coconut oil, exporting copra almost entirely to the European Community and approximately two-thirds of its coconut oil exports to the United States.

#### Cocoa butter and cocoa beans

The most valuable (per unit volume) vegetable oil or fat imported into the United States is cocoa butter, which is obtained by pressing chocolate liquor (ground, roasted cocoa beans). Because of its high melting point (about  $90^{\circ}$  F.), cocoa butter is of particular value in confectionery products, especially as a necessary ingredient in the making of chocolate. Since the price of cocoa butter is quite high compared with that of most other vegetable oils and fats, there has been a continuing effort to produce vegetable fat substitutes. In particular, the development of, and the shift to "confectioner's coatings" is evidence of this effort (see the section on hard butters substitution). 1/ Another effort at developing a cocoa butter substitute was spearheaded by the Departmet of Agriculture. 2/ As yet, however, no domestic commercial production has resulted.

U.S. consumption, imports, and production.--U.S. production and consumption of cocoa butter have both risen in recent years. U.S. production grew from 56 million pounds in 1960 to 75 million pounds in 1976. U.S. consumption grew from 70 million pounds to more than 125 million pounds during the same period (table 10). The Ivory Coast, Brazil, Mexico, and Ecuador together supplied more than four-fifths of U.S. imports in 1976 (table 11). The five leading suppliers of cocoa beans to the United States--Brazil, Ghana, Nigeria, the Dominican Republic, and the Ivory Coast--also provided more than four-fifths of U.S. imports in 1976 (tables 12 and 13).

Most of the growth in U.S. consumption is the result of increasing imports. They in turn are the result of increased industrial capacity and the decision of exporting countries (all of which are also developing countries) to add value to cocoa beans by processing them prior to export. It is likely that the trend toward a greater import share (and a smaller processing share) of domestic consumption will continue.

Growth in U.S. cocoa butter consumption, however, is limited by its high price and the development of vegetable fat substitutes. To a great extent, these two factors are inseparable. The search for synthetic substitutes and the substitution of other vegetable oils for cocoa butter, spurred on by high cocoa butter prices, should tend to depress consumption growth. 3/

<u>Foreign production and trade.</u>—The leading producers of cocoa beans are Ghana, Brazil, the Ivory Coast, Nigeria, Cameroon, and Ecuador. In 1976, these countries accounted for 83 percent of all cocoa bean production and 86 percent of world cocoa bean exports (table 14). Grindings (industrial consumption) of cocoa beans among producing countries increased from 0.3 billion pounds in 1960 to 0.8 billion pounds in 1976 (table 15). While

1/ Confectioners coatings are composed of a vegetable fat (a hard butter) and cocoa powder, and tend to closely resemble the chocolate coatings of many candy products. See Peter Kalustrian, "Research Bringing Compatibility of Vegetable Fat With Chocolate Liquor Closer," <u>Candy and Snack Industry</u>, (March, 1976).

2/ A product derived from domestic beef tallow was developed with characteristics similar to those of cocoa butter. Interested readers may consult F.E. Luddy et. al., "Development of Edible Tallow Fractions for Specialty Fat Uses," Journal of the American Oil Chemists Society, July 1973.

3/ See J.R. Behrman, "Monopolistic Cocoa Pricing," <u>American Journal of</u> <u>Agricultural Economics</u>, August 1968, for an in-depth discussion of pricing effects. production and exports grew considerably, their growth rate has not matched that of processing in the developing countries. World production and exports amounted to 2.3 billion pounds and 1.9 billion pounds, respectively, in 1960. By 1976, world production had grown to 3.3 billion pounds, while world exports had grown less significantly (to about 2.5 billion pounds).

Brazil and the Ivory Coast have been particularly active recently in developing their domestic grinding capacities; other countries as well have made such efforts. Placing higher export taxes on cocca beans than on the semiprocessed cocca products has been an often-used economic incentive to encourage domestic grinding.

On the import side, cocoa products continue to be consumed primarily in the developed countries. Leading importers are the United States, the Federal Republic of Germany, the U.S.S.R., the Netherlands, the United Kingdom, France, Spain, Poland, Italy, and Japan. Together, these importers accounted for nearly 75 percent of world grindings and imports in 1976 (table 15).

The world cocoa market has been characterized by high levels of price instability in the past, partly brought about by the relatively inelastic demand of importing countries and supply problems (weather-induced shortfalls and bumper crops). The current International Cocoa Agreement, in effect since June 1973, has been ineffective for various reasons; e.g., buffer stocks have been largely insufficient, and, as a result, prices have exceeded the maximum set by the agreement. 1/

#### U.S. Industry

#### Competitive U.S.-produced vegetable fats and oils

Palm oil and the lauric oils are processed but not grown in the United States. U.S.-grown vegetable fats and oils, including soybean oil, butter, lard, edible tallow, corn oil, cottonseed oil, and peanut oil, are much more important than imported palm oil and lauric oils in supplying U.S. consumption. The imported food fats and oils (excluding cocoa butter) averaged about 10 percent of U.S. consumption during 1960-76; thus, U.S.-produced fats and oils accounted for about 90 percent of consumption during the period (table 16).

Soybean oil is the dominant U.S.-produced fat or oil, representing about 57 percent of U.S. consumption in 1976. Three animal fats (butter, lard, and edible tallow) were the next three most important domestic food fats and oils, together meeting about 18 percent of U.S. consumption in the same year. Cottonseed oil, corn oil, and peanut oil followed these animal fats in descending importance and together totaled nearly 11 percent of 1976 consumption.

<sup>1/</sup> For a full description of the cocoa agreement, see <u>International</u> <u>Commodity Agreements:</u> <u>A Report of the U.S. International Trade Commission</u> to the Subcommittee on International Trade of the Committee on Finance, <u>United States Senate</u>, November 1975.

U.S. consumption of domestic food fats and oils increased from 9.0 billion pounds in 1960 to about 11.3 billion pounds in 1976, or by about 25 percent. On a per capita basis, consumption was 50.0 pounds in 1960 and rose to about 52.6 pounds in 1976 or by 5 percent.

Of the domestic fats and oils, soybean oil has shown the greatest increase in consumption, largely at the expense of two animal fats (butter and lard) and one vegetable oil (cottonseed oil) (table 16). Soybean oil, which held about a third of U.S. consumption in 1960, rose to provide slightly more than half the 1976 total. Meanwhile, butter, lard, and cottonseed oil supplied about half of U.S. consumption in 1960, but less than a fifth in 1976.

#### Structure of the U.S. fats and oils industry

The U.S. fats and oils industry can be separated into three distinct levels: farmer-producers of oilseeds and animals; crushers of oilseeds or renderers of animal byproducts; and refiners or producers of the consumer-level products (shortening, cooking oil, and so forth). The first group is composed of millions of U.S. farmers who raise either oilseed crops (e.g., soybeans, cottonseed, 1/ and peanuts) or animals from which fats are derived (e.g., beef tallow and hog lard). The latter two industry groups are of more immediate interest to this study. The U.S. crushing industry is composed of vegetable oil mills or animal renderers who extract the oil or fat from the oilseed material or from animal tissue. According to the latest Department of Commerce data (1972), there are 792 establishments in the United States which produce vegetable oils or animal fats:

Type of oilseed-crushing or rendering industry	Number of establish- ments	::	Total shipments <u>1</u> /	Share of the shipments accounted for by the 8 largest companies
:		:	Million	
		:	dollars	Percent
: Sovbean oil mills:	94	:	3.357.2	68
Cottonseed oil mills:	115	:	458.7	55
Corn (oil) wet mills:	41	:	331.2	: 85
Other vegetable oil :		:	:	:
mills:	31	:	252.2	: 70
Animal and marine :		:		:
animal renderers:	511	:	764.6	:26
Total:	792	:	5,163.9	<u>2/ 62</u>
:		:		

1/ Includes other byproducts such as oilseed cake and meal and cotton linters

2/Weighted average. Actual concentration may be greater owing to ownership of several different types of mills by the same company.

1/ Cottonseed is not produced for itself, but rather is a byproduct in ginning cotton.

These nearly 800 plants had shipments in 1972 of about \$5.2 billion, which included not only edible fats and oils, but also oilseed cake and meal, inedible oils, and miscellaneous products such as cotton linters. The largest crushing industry group in terms of the value of shipments was the soybean oil mills, while the animal and marine animal renderers were the largest in individual number of establishments. In terms of economic concentration, the corn oil producers were the most heavily concentrated with 85 percent of their shipments accounted for by the 8 largest companies.

The third level of the U.S. fats and oils industry, the U.S. refining industry, was composed in 1972 of about 50 companies manufacturing consumer-level products such as shortening, cooking oil, and margarine in 109 plants whose shipments were valued at \$2.1 billion. 1/ The eight largest refining companies accounted for 61 percent of these shipments in 1972.

A 1974 survey of the U.S. refining industry recorded the existence of only 97 plants. 2/ According to this survey, these plants devoted 40 percent of their production to salad oil and cooking oil, 34 percent to shortening, and 18 percent to margarine. About 4 percent of their produciton was inedible soap stocks and industrial oils, while the remaining 4 percent of their output was confectionery fats, hard butters, and other miscellaneous edible products.

1/ Bureau of the Census, U.S. Department of Commerce, <u>1972 Census of</u> Manufactures.

<sup>2/</sup> George Kromer and Stanley Gazelle, "U.S. Edible Fats and Oils Refining Capacities, 1975," <u>Fats and Oils Situation</u> (Economic Research Service, U.S. Department of Agriculture), February 1976.

### Structure of the U.S. cocoa-bean-processing industry

Compared with the U.S. vegetable fats and oils industry, the U.S. cocca-bean-grinding and chocolate industry, in 1972, was small both in the number of establishments (48) and in the total value of shipments (\$724 million) as measured by the Commerce Department (Census Bureau):

Type of cocoa-bean grinding and chocolate industry	Number of establish- ments	: : Total : shipments :	Share of the value of shipments accounted for by the 8 largest companies
		: Million	:
:		: <u>dollars</u>	: <u>Percent</u>
Chocolate coatings Confectionery-type chocolate and cocoa products made from cocoa beans ground	<u>1</u> /	: 167 : : :	84 84
in the same plant Other chocolate and cocoa products made from cocoa beans or nibs ground in the	<u>2</u> /	: 290 : : :	: 98 : :
same plant Chocolate and cocoa	<u>2</u> /	: 262 :	: 93 :
fied by kind	3/	: 5	3/
Total chocolate		:	:
and cocoa products	48	: : 724	: : 86

1/48 or less.

 $\overline{2}$ / 20 or less.

3/ Not available.

Cocoa butter shipments are not separately reported, but are included among the "other chocolate and cocoa products" category. Such shipments in 1972 were valued at \$262 million and were produced in 20 or fewer plants.

Economic concentration in the cocoa bean and chocolate industry is considerably higher than in the vegetable oil industry. For the industry as a whole, the eight largest companies accounted for 86 percent of reported shipments. Prices and Substitution of Imported Vegetable Oils

Increasing world availability, donestic income growth, and technological (refining) improvements have contributed to a growing U.S. market for imported food fats and oils. The results of these factors have already been discussed in a descriptive way by individual commodity. The remainder of this report is devoted to an analytical picture of the growing competitiveness of imported fats and oils from 1960 through the 1970's.

The increasing market share of imported food fats and oils since 1974 is the most obvious evidence of growing competitiveness with domestic fats and oils. Imported fats and oils before that year supplied generally less than 10 percent of total consumption of food fats and oils. In 1974, however, the import share rose to about 13 percent of the market (table 16). Imports then further increased their share to about 17 percent in 1975 before declining to about 14 percent in 1976.

The principal U.S.-produced fats and oils are competitive to one degree or another with palm oil and the lauric oils. Palm oil, which is used mostly in shortening, is the most directly competitive oil since nearly all domestically produced fats and oils are used in the manufacture of shortening. Coconut oil is less directly competitive since it is used in certain confectionery products for which no domestic oil is suitable. As a result of this substitution process, the prices of domestic oils and imported oils tend to move in a parallel direction over time.

An examination of the prices of domestic oils and imported oils (fig. 2) shows, for example, that with the exception of premium quality cocoa butter, prices since 1960 have remained close to one another during 1960-72. Prices of the three imported vegetable oils rose in 1973 and peaked in 1974, a year in which world supplies of food oils were in especially tight supply. 1/ Lard prices peaked in 1975, one year later. By 1976, price differences among the fats and oils (except for cocoa butter) narrowed considerably, returning to the 1960-72 pattern. Cocoa butter prices since about 1967 have generally increased exponentially, with frequent interruption. The price of cocoa butter followed that of other fats and oils by peaking in 1974 and dipping in 1975. Unlike the other product prices however, the price of cocoa butter increased to an alltime high in 1976.

1/ For a description of the vegetable oil and oilseed meal shortages during 1973 and 1974 and their effect on the U.S. economy, see "A Study of Shortages in the U.S. Livestock-Feed Grains Economy during 1971-74," in <u>The</u> <u>Commodity Shortages of 1973-74 Case Studies</u>, National Commission on Supplies and Shortages, Washington, D.C., August 1976.



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

#### Price movements

The parallel price movements of certain food fats and oils depicted in figure 2 are often an indication that two or more products, known to have similar properties, are indeed close substitutes in the market place. Price correlation was used by Albert Nyberg to test for substitution among fats and oils from 1952 through 1967. 1/ Nyberg found that among seven major fats and oils studied, only the two lauric oils (coconut oil and palm-kernel oil) exhibited highly parallel price movement (table 17).

Since the Nyberg study, however, advanced refining techniques have led to an increased substitutability among food fats and oils. The various vegetable fats and oils and certain animal fats have come to be virtually indistinguishable in an end-product such as shortening. Although increasing substitution is not easily documented, one indication would be a higher set of price correlations than those found in earlier years.

To test the increased substitutions hypothesis, two correlation matrices were calcualted. First, a correlation using actual domestic prices and unit values was calculated (table 18) and second, the prices were adjusted by employing the Wholesale Price Index, resulting in a second correlation matrix free of the inflationary influence (table 19).

Both matrices suggest a high degree of substitution when compared with the Nyberg data. Even after adjusting prices for inflation, on the whole, the hypothesis of increased substitution among food fats and oils is supported by the updated price correlations.

Increasing substitution will cause price to become a more important factor in the U.S. market. It is virtually axiomatic that stronger substitution leads to increasing price elasticity for any one of the several substitutes. Recent end use patterns and price correlations suggest therefore that price consciousness will be a dominant factor in the future of the U.S. food fats and oils market.

#### The substitution of hard butter for cocoa butter

On the average, cocoa butter prices have maintained the lowest price correlations among food fats and oils. However, because of the high price (and volatile price movements) of cocoa butter, vulnerability to natural and synthetic substitutes is increasing. It is not clear, however, upon examination of raw data or the price correlations given earlier, whether or not cocoa butter markets have as yet experienced inroads by classic substitutes to any great degree.

1/ Albert Nyberg, "The Demand for Lauric Oils in the United States," American Journal of Agricultural Economics (February 1976).

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To test for substitution in the key confectionery market, and because no direct statistical information is available on the hard butters, a test was developed using market share as a standard of measurement. The question to be answered was, "has cocoa butter lost a significant part of the confectionery market to the hard butters?" The market-share test was given two forms, a "fats basis" form and a "coatings basis" form. 1/ Data from 1960 through 1976 was split between 1960-68 and 1969-76, and market share was calculated using both forms. At the 95-percent significance level (fats basis) and the 99-percent significance level (coatings basis), results indicate that since 1969 there has been a significant displacement of cocoa butter by the hard butters.

Using ordinary least squares regression, market shares were regressed against relative prices (hard butters/cocoa butter) and a time trend in an attempt to ferret out the reasons behind increasing substitution. The price variable in both the fats basis and the coatings basis market-share equations proved insignificant. Therefore, it is unlikely that substitution has been caused by purely economic factors. The time trend proved a much better explainer of market-share fluctuations. Since economists often relate time trends to technological advance, the suggestion is that substitution of hard butters for cocoa butter may be attributed primarily to refining progress and other technological advances. There is little doubt, however, that the marked price difference between cocoa butter and the hard butters serves as an incentive for a technological approach to substitution.

Determinants of Supply, Demand, and Prices, 1960-80

#### Import demand

Import demand is determined by the price of the imported goods, the price of the same goods domestically produced, and some indicator of domestic purchasing power or economic activity. With the vegetable oils and fats studied in this report, there are no domestically produced goods, only close substitutes. Since the use of substitutes goods' prices in agricultural demand formulations is well established, the prices of domestic and foreign substitutes were used in the import-demand equations developed for this report. Using ordinary least squares (OLS) statistical procedures, the determining forces of U.S. import demand for food fats and oils were measured in several different formats.

1/ The formula for the two	forms is as follows:
Fats basis = Total fats and	nd oils used in confectionery industry (in pounds)
Total fats and	nd oils + cocoa butter used in confectionery
industry (in p	pounds).
Coatings = Total U.S. consu	sumption of confectioners' coatings (in pounds)
basis Total U.S. consu coatings (in pou	sumption of confectioners' coatings + chocolate punds).

Equations were attempted, generally with satisfactory results, for (1) all imported vegetable oils, (2) the lauric oils, (3) palm oil, (4) cocoa beans, (5) the principal crude cocoa products 1/, and (6) cocoa butter. All but one set of equations, that for cocoa butter, were run in the log-linear format, so that coefficiencents represent measurement of import-demand elasticities. 2/ The cocoa butter equations gave best results in the linear format. 3/

<u>All vegetable oil imports.</u>--"All vegetable oil imports" is really a misnomer, since several minor imported oils such as olive oil were not included. However, the products included in this category, palm oil and the lauric oils, represent over 95 percent of U.S. imports of vegetable oils. Imports of these products are reasonably well explained by economic determinants ( $R^2 = 0.82$ ). The following equation was chosen as the best (in both statistical properties and expected (a priori) results) among several equations tried:

 $M = 2.13 - 0.48P + 0.41P_{S} + 1.36Y$  (1.21)(-1.99)\* (2.12)\* (5.17)\*  $R^{2} = 0.82$  DW = 1.29 4/

The equation indicates that demand for "all vegetable oil imports" (M) is dependent upon the (weighted average) price of imported vegetable oils (P), real gross national product in 1972 constant dollars (Y), and the price of the dominant domestic substitute, soybean oil ( $P_S$ ). The influence of purchasing power on vegetable oil imports is rather strong when compared with that on all U.S. crude food imports. 5/ This situation may have resulted because of improvements in vegetable oil refinery technology. Results also indicate that a parallel price rise in soybean oil and imported vegetable oils should have an equal, offsetting effect on imports, since the price coefficients of domestic soybean oil ( $P_S$ ) and the imported vegetable oils (P) are about equal in magnitude but opposite in sign. 6/

1/ The "principle crude cocoa products" are herein defined to be cocoa beans, chocolate liquor, and cocoa butter.

2/ The full results obtained from these equations are given in tables 20-21. Elasticity is defined as the percentage change induced in a dependent variable by a 1 percent change in an independent variable.

3/ The log-linear format is given by:  $Y = a_1 x^b 2 \dots x^b n$ .

The linear format is:  $Y = a_1 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_n X_n$ .

4/ In this equation, as in all of the following equations, figures in parentheses are t-statistics--one asterisk indicates significance at the 95-percent level' two asterisks indicate significance at the 90-percent level--R<sup>2</sup> is the coefficient of determination, and DW is the Durbin-Watson statistic.

5/ See H.S. Houthakker and Stephen Magee, "Income and Price Elasticities in World Trade," <u>Review of Economics and Statistics</u> (May, 1969) for a discussion of price and income elasticities for U.S. crude food imports demand. They found a GNP coefficient of + 0.30.

6/ See table 20 for other demand specifications.

The lauric oils.--U.S. lauric oil (coconut oil and palm-kernel oil) demand determinants were interpreted from the following equation:

$$M = 1.24 - 0.41P - 0.19P - 1 + 0.27P_{S} + 1.13Y$$

$$(1.08)(-3.98)* (-2.03)** (2.05)* (6.55)*$$

$$R^{2} = 0.80$$

$$DW = 1.65$$

Lauric oil imports (M) are dependent upon the current price of the lauric oils (P), last year's lauric oil prices (P-1), the price of a substitute (palm oil) ( $P_S$ ), and real GNP (Y).

Again, the purchasing power (U.S. GNP) effect on lauric oil imports is slightly higher than it has been in the past for crude food imports into the United States. Lauric oil prices are found to affect U.S. import demand over an extended period (2 years). There may be several reasons for this lagged effect: information about new prices is not always known to buyers and sellers immediately and a delivery lag often arises because of the time it takes for newly ordered goods to arrive at the borders of a country. Several other lag effects may be responsible in part for this delayed reaction to prices. 1/

Finally, it is interesting to note that the prices of soybean oil does not appear to affect lauric oil imports as significantly as does the price of palm oil. One explanation for this is that palm oil and the lauric oils are closer to each other both in chemical characteristics and in their geographic origin (Southeast Asia).

<u>Palm oil.--Palm oil import demand was somewhat more elusive than import</u> demand for all vegetable oils and the lauric oils. The following equation among those tested was found to exhibit the most satisfactory coefficients:  $M = -22.9 + 0.50 M - 1 - 1.42 \Delta P + 0.92P_{S} + 3.32Y$ 

(-2.13)\*(2.62)\*(-1.56)\*\*(1.33)(1.97)\*\*R<sup>2</sup> = 0.80 DW = 1.73

Imports of palm oil (M) are dependent to some extent on past prices and income (M-1). 2/ Also, the rate of change ( $\triangle P$ ) and not the level of palm oil prices, has the most noticeable effect on imports. That is, as price increases speed up or slow down, imports are decreased or increased, respectively. Finally, higher domestic soybean oil prices (P<sub>S</sub>) and greater domestic purchasing power (Y) have a positive effect on palm oil imports.

1/ See H. Junz and R. Romberg, "Price Competitiveness in Export Trade Among Industrial Countries," <u>American Economic Review</u> (May 1973), for a full discussion of lag effects.

2/ M-1, actually last period's imports, is a reflection of the so-called dynamic adjustment toward equilibrium. For a better understanding of the economics involved in this process, see L.M. Koyck, <u>Distributed Lags and</u> <u>Investment Analysis</u>, Amsterdam: North-Holland Publishing Co., 1954, and Marc Nerlove, "Distributed Lags and Estimation of Long-Run Supply and Demand Elasticities: Theoretical Considerations," <u>Journal of Farm Economics</u>, vol. 40 (May 1958), pp. 301-311. One further aspect of the palm oil equation deserves mention. There has been an intermittant interest in the Congress concerning the possible imposition of a 3-cent-per-pound duty on palm oil imports. 1/ The importdemand equation does not directly indicate a tariff effect since imports during 1960-76 entered duty free. In the short run (1 year, approximately), a rise in price will have a definite depressing effect on imports; but the rate of change in price (the determining price factor in this format) will not be greatly affected by import tariffs over a longer period. Graphically, an illustration of the tariff effect on the rate of change in price is shown in the following figure, in which the tariff imposition comes in period 1:



The equation does not say that a longer term effect will not occur, only that the methodology is incapable of determining more than a short-run effect.

<u>Cocoa products</u>.--Import-demand determinants were found for three cocoa product classes: (1) Cocoa beans, (2) the principal crude cocoa products, and (3) cocoa butter. Interested readers should consult table 21 for detailed equation results.

Several findings emerged from these import-demand investigations. The tendency toward foreign processing (grinding) of the cocca bean and greater U.S. imports of semiprocessed cocca products was confirmed to some degree by price and income coefficients. U.S. stocks (inventories) of cocca beans were found to be a strong factor influencing import demand in all three categories. As might be expected, high levels of stock tend to weaken the demand for imports. Finally, cocca butter imports seem to exhibit different behavior patterns under different market conditions, and no simple

<sup>1/</sup> H. R. 12952 introduced in the U.S. House of Representatives in 1976 would have placed a 3-cent-per-pound duty on palm oil imports which now enter duty free.

statistical explanation of the demand for cocoa butter imports was found. Undoubtedly, part of the difficulty lies in the complex nature of U.S. cocoa butter consumption patterns and inaccurate cocoa butter statistics. It is evident, however, that both stocks and purchasing power (U.S. GNP) have had a measurable historical effect on cocoa butter imports. 1/

#### Internal supply, demand, prices and stocks

The preceding approach to analyzing U.S. imports of the vegetable oils, while entirely appropriate for isolating the influence on domestic demand for imports, does not allow for a full consideration of import supply, domestic vegetable oil inventories, and fluctuations in the prices of the imported oils, owing to methodological limitations in the import demand approach. 2/ For this reason, and also to allow some estimation of future levels of U.S. vegetable oil imports, prices, and stocks, a more complete approach employing simultaneous equations? use (app. B). Results obtained from these equations depict the internal lauric oils and palm oil economies from 1960 through 1976. Several attempts to capture the cocoa butter economy failed to produce statistically reliable results.

Two sets of findings emerged from the simultaneous equation model of the U.S. lauric oils and palm oil markets. First, a set of impact multipliers were calculated. The impact multipliers show the immediate (one-time) effect of a change in various prices and other economic variables on imports, inventories, U.S. consumption, and prices of the lauric oils and palm oil. The second set of results consist of forecasts, through 1979 for the palm oil and lauric oils markets, based upon certain assumptions. 3/

1/ The cocoa product demand results are presented in table 21.

2/ The supply of imported vegetable oils and cocoa butter to the internal U.S. market is consumed within the domestic economy, re-exports being negligible. Domestic consumption fluctuates with prices and income. Prices are determined by domestic inventories and broader trade patterns. Inventories are accumulated or depleted as imports exceed or fall short of domestic consumption. All of these processes constitute interdependent domestic forces reacting upon importing vegetable oils and cocoa butter, which cannot be captured in a simple import demand model.

3/ The full results of this model are presented in appendix B.

The impact multiplier results may be found in table 22. Forecasts for 1977, 1978, and 1979 imports, consumption, prices, and inventories of both the lauric oils and palm oil are predicated upon the following assumptions, 1/

Item	1977	1978	1979
: Soybean oil price <u>1</u> /cents per pound:	23	22	21
World production of lauric oils <u>2</u> / : million pounds:	6,400	: : 6,600	: 6,900
Annual increase in world palm oil : production 2/million pounds	650	: : 675 :	: 700
Real U.S. GNP <u>3</u> / : billions of 1972 constant dollars:	1,328	: : 1,381	: : 1,436

1/ Crude, tank cars, f.o.b. Decatur.

2/ Production of major exporting countries.

3/ Assuming a 5-percent growth over 1976, and a 4-percent growth in 1978 and 1979.

The underlying assumptions are of critical importance in the ultimate accuracy of the forecasts. The U.S. import-supply, for example, is based on the assumption of continuation of past marketing trends of exporting countries; in other words, the opening of new export markets (say in non-market countries) cannot be predicted by this model, but would markedly affect U.S. imports.

Soybean oil prices, a key explanatory variable, were assumed to be declining moderately from 1977 through 1979. This moderate decline (1 cent per pound per year) in the U.S. price of soybean oil was based upon several factors: the 1977 U.S. soybean harvest was the largest in history, and the January prospective U.S. plantings of soybeans for 1978 were 8 percent above the 1977 planted acreage. 2/ Hence, abundant supplies of soybeans would appear to be the case during 1978-79, and thus tend to pull down soybean oil prices (other factors being the same).

Changes in some of these assumptions can be partially evaluated by use of the impact multipliers found in table 22. A one cent decline in the assumed soybean oil price would, for example, tend to depress U.S. imports of palm oil by about 9 million pounds.

<u>The lauric oils.</u>--The U.S. lauric oils market appears to be headed for a relatively stable period, at least through 1979. If the assumptions made above hold and no domestic structual changes occur in the market, imports should remain essentially unchanged from the 1976 level through 1979 (fig. 3).

<sup>1/</sup> Forecasts for 1977 were made because data for the full year were unavailable at the time of writing.

<sup>2/</sup> U.S. Department of Agriculture (Crop Reporting Board), Prospective Plantings, Jan. 20, 1978.





Figure 4.--Lauric oils and palm oil U.S. imports and consumption, 1975, and 1976, with forecasts for 1977-79.



Note.--(e) indicates forecasted values.

Domestic consumption, through 1979, should nearly match imports, and might outstrip import growth slightly. Preliminary data for 1977 tend to justify the predicted trends.

The weighted average price of palm-kernel oil and coconut oil (f.o.b., port of export) is likely to fall slightly, if world production does not take a sudden downturn. Projected high inventories contribute to the likelihood of this decline, which is expected to progress from present prices to an average weighted price of 22.4 cents per pound in 1978 and on down to a price of 20-21 cents per pound in 1979.  $\underline{1}/$ 

<u>Palm oil.</u>—The palm oil model indicates that, based on its past performance, the U.S. palm oil market is subject to a greater degree of instability than the U.S. lauric oils market. Indications are that import supply and demand are sufficient to allow for continued rapid import growth, although the growth rate could moderate somewhat from current trends. From a 1976 decline, imports are projected to grow steadily through 1978 and may reach 890 million pounds by 1979. Preliminary results using partial data for 1977 indicate that this projected growth rate may moderate earlier than was originally expected. Current estimates are for imports of 797 million pounds in 1977 and 837 million pounds in 1978 (fig. 2).

U.S. consumption of palm oil should likewise increase from 1976 to 1979 by about 4.2 percent (compounded). Growth should peak between 1976 and 1977, but then ease somewhat in 1978 and 1979. Domestic palm oil prices (bulk, U.S. ports) are projected to decline to a low of 13.9 cents per pound in 1979. The palm oil prices should decline throughout 1977 (17.5 cents per pound) and 1978 (16.2 cents per pound). The importance of the assumptions mentioned earlier in this and other forecasts is paramount. The relative importance of the separate assumptions may be discussed by examining the impact multipliers or the model equations in appendix B.

1/ Because of the importance of the domestic soybean oil price, it should be reiterated that lower soybean oil prices will have a depressing effect both on the lauric oils price and imports. Appendix A

Statistical Tables

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# Table 1.--Palm oil: U.S. imports for consumption, Jan. 1 stocks, and apparent consumption, 1960-76.

(Quantity	in	millions	of	pounds;	value	in n	millions	of	dollars;
		unit	valu	e in ce	nts per	r pou	und)		

:		: Ion 1	:	Apparent
Year :	Imports	: Jan. I	:	con-
		: SLOCKS	::	sumption 1/
:		Quanti	<b></b>	
:		Quanti		
:		:	:	
1960:	47	:	48 :	32
1961:	56	:	61 :	58
1962:	36	:	57:	58
1963:	24	:	35 :	56
1964:	6	:	37 :	22
1965:	7	:	19 :	15
1966:	76	:	9:	50
1967:	64	:	33 :	79
1968:	103	:	16 :	89
1969:	160	:	28 :	151
1970:	141	:	35 :	131
1971:	227	: 4	43 :	228
1972:	431	: 4	40 :	375
1973:	387	: 9	94 :	421
1974:	442	:	58 :	395
1975:	960	: 10	)3 :	899
1976:	776	: 10	52 :	748
:		Valua		
:		vatue		
:		:	:	
1960:	5	: 2/	:	<u>2</u> /
1961:	5	: 2/	:	2/
1962:	3	$: \overline{2}/$	:	2/
1963:	2	: 2/	:	2/
1964:	1	: 2/	:	2/
1965:	1	: 2/	:	$\overline{2}/$
1966:	8	: 2/	. :	$\overline{2}'$
1967:	6	: 2/	:	$\overline{2}/$
1968:	7	: 2/	:	2/
1969:	-10	: 2/	:	$\overline{2}$
1970:	15	: 2/	:	$\overline{2}/$
1971:	23	: 2/	:	$\overline{2}/$
1972:	39	: 2/	:	$\overline{2}/$
1973:	44	: 2/	:	2/
1974:	96	: 2/	:	2/
1975:	202	: 2/	:	2/
1976:	128	: 2/	:	$\overline{2}$
:		TT- 4 A 1		
:		Unit, val	ue	
:		:	:	
1960:	11	: <u>2</u> /	:	2/
1961:	9	: <u>2</u> /	:	2/
1962:	8	: <u>2</u> /	:	2/
1963:	8	: 2/	:	$\overline{2}/$
1964:	14	: 2/	:	2/
1965:	11	: 2/	:	2/
1966:	9	: 2/	:	2/
1967:	17	: 2/	:	2/
1968:	7	: 2/	:	2/
1969:	7	: 2/	:	2/
1970:	10	: 2/	:	$\overline{2}$
1971:	10	: 2/	:	$\overline{2}$
1972:		: 2/	:	2/
1973	11	: 21	:	$\overline{\overline{2}}'$
1974	22	5		51
1975	24 91	·	:	.51
1976	16		•	51
	10	· ±'	:	21
•			-	

1/ Allowance is made for exports which amounted to 2 million pounds annually.

2/ Not available.

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

Note.--U.S. production is nil.

source :	1960 :	1961 :	1962	1963	1964	1965	1966	1967	1968	1969	1 <b>9</b> 70	1971	1972	1973	1974	1975	1976
:									Quantity	(1,000 pour	nds)						
: Malaysia:	0 :	0	0	: : : 0:	: 0;	: 0 :	: 19.357 :	17,127	56,935	69.360	45.919	100.260	252,563	246.002	299.138	811.533	: : 715.660
Singapore:	0:	. Ō:	Ō	: 0:	Ō :	Ō:	0:	0	: 0:	2,605 :	0	: 0	21,772	4,395	: 26,941 :	: 45,318	: 27,926
Indonesia:	4,227 :	30,017 :	16,112	: 5,035 :	1,456 :	4,015 :	41,517::	40,826	: 43,387 :	83,545 :	78,648	: 122,962	: 149.761	133.762	: 108.349	: 66,485	: 29.828
Philippine :	:	:	:	: :	:		:		: :			:					
Republic:	0	0:	0	: 0:	0:	0:	0 :	0	: 0:	1.132 :	2.229	. 0	3.467	1.121	0	7.844	2.235
Liberia:	ŏ:	ŏ:	0	: .	0:		0.1	0	. 0.	0:	0	. ů	0	20	. 0	. 0	: 106
Nigeria:	674 :	0:	4,231	: 5.282 :	ŏ:	Ő:	3.588 :	2.584	: 0:	Ő:	0	1.740	0	0	. Ö	11.078	: 11
All other:	41,917 :	25,990 :	15,186	: 10,124 :	4.801 :	2.542 :	1.295 :	3.724	2.966	2.618 :	14.070	1.918	3.546	1.842	7,273	: 18,152	: 1
Total:	46,218 ;	56.007 :	35,529	: 20,441 :	6.257 :	6.557 :	65.757 :	64,261	: 103.288	159.620 :	140,866	226,880	431,109	387,142	441.701	960.410	: 775.768
:	Value (1.000																
Natawata i							-1 0/1			7 705	7. 902	11 027	77 100	37 8/1	27. 210	170 200	110 0/7
Maraysia:	- :	- :			- :	- :	1,901 ;	1,/11	4,023	4,005	4,700	, 11,037	23,199	27,041	E 162	170,350	: 118,047
Singapore:	- :	- :	1 (02				/ 200	4 112	2 1 1 0	E 2/0	7 000	11 0(7	1,004 :	15 207	2,122	10,403	: 4,730
Indonesia:	372 :	2,0/0 :	1,402	422 :	129 :	424 :	4,200 :	4,112	: 3,110 :	5,549 :	7,000	1,003	13,030	15,207	24,471	14,909	: 4,544
Philippine :	_									70	0.77		250	120		1 605	. 205
Republic:			-			- :		-	-	70 :	237	-	339	120	-	. I,095	. 17
Liberia;							- :				-		-	4			. 1/
Algeria;	1 5 6 7 .	- :	421	. 404 ;	- :	- :	349 :	239			1 505	1/4				1,328	. 1/
All other	4,567	2,6/3	1,430	902	499 ;	296 -	113 ;	- 308	293	208 -	1/ 595	241	439	298	2,300	3,047	$\frac{1}{107}$
10ta1:	5,011 :	2,323 :	3,279	1,600 :	020 :	720 :	0,023 :	0,450	/ 420 :	10,478 :	14,500	23,313	30,739	44,230	90,294	201./32	141,140
								. 1	)nit value	(cents per	pound)						
Malaysia:	- :	- :	-	: - :	- :	- :	10 :	10	; 7;		. 10	: 11	9 :	11	21	. 21	: 16
Singapore:	- :	- :	- :	: -:	- :	- :	- :	-	: - :	7 :	-	: - :	: 8:	17 :	: 19:	: 23	: 17
Indonesia:	9 :	9:	9	: 8:	9:	11 :	10 :	. 10	: 7:	6 :	10	: 10 :	: 9:	: 11 :	. 23 :	: 22	: 15
Philippine :	:	:		: :	:	:	:		: :	:	: :	:	: :	: :	: .1	<b>1</b>	:
Republic:	- :	: - :	-	: -:	- :	- :	- :	-	: - :	6 :	11 :	: - :	: 10 :	. 11 :	: - :	: 22	: 18
Liberia:	- :	- :	- :	: -:	- :	- :	- ;	-	: - :	- :		: - :		20 :	: - :	- :	: 16
Nigeria:	11 :	- :	10	: . 9 :	- :	- :	10 :	9	: - :	- :		: .10 :	: - :	- :		: 12	: 55
All other :	11 :	10 :	10	: 9:	10 :	.12 :	9 :	10	: 10 :	10 :	11	: 13	13 :	16 :	32 :	. 17	: 23
Average:	. 11	10 :	. 9	: 9:	10 :	11 :	.10 :	10	: 7:	.7:	10	: 10	9:	11 :	: 22 :	: 21	: 16
		:		: <u>:</u>	:	:			:				::				<u> </u>
1/ Less that	n \$500.								•								

Table 2.--Palm oil: U.S. imports for consumption, by principal sources, 1960-76

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

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

1-3

### Table 3. --Palm oil: World production and exports, by major producing and exporting countries, 1960-76

		(1.1		1	pounda	51							
Ltem and year	Malaysia	::	Indonesia	: .	Lvory Coast	::	Zaire	: : :	Sub- total	::	All other	:	World total
		:		:		:		:		;		:	
Production: :		:		:		:		:		:		:	
1960:	203	:	311	:	40	:	511	:	1,064	:	1,681	:	2,745
1961:	209	:	322	:	44	:	500	:	1,076	:	1,669	:	2,745
1962:	234	:	313	:	53	:	498	:	1,098	:	1,669	:	2,767
1963:	278	:	326	:	53	:	432	:	1,089	:	1,689	:	2,778
1964:	271	:	355	:	62	:	364	:	1,052	:	1,715	:	2,767
1965:	333	:	364	:	62	:	276	:	1,034	:	1,737	:	2,771
1966:	417	:	385	:	62	:	287	:	1,151	:	1,715	:	2,866
1967:	498	:	384	:	66	:	328	:	1,276	:	1,336	:	2,612
1968:	624	:	414	:	68	:	448	:	1,554	:	1,479	:	3,034
1969:	776	:	417	:	84	:	432	:	1,709	:	1,656	:	3,364
1970:	948	:	476	:	115	:	443	:	1,982	:	1,836	:	3,818
1.971:	1,299	:	547	:	121	:	419	:	2,385	:	1,858	:	4,244
1972:	1,612	:	593	:	179	:	419	:	2,802	:	1,896	:	4,698
1973:	1,792	:	639	:	205	:	408	:	3,045	:	1,889	:	4,934
1974:	2,271	:	774	:	320	:	384	:	3,748	:	2,044	:	5,791
1975:	2,778	:	901	:	364	:	359	:	4,403	:	2,083	:	6,486
1976 1/:	3,082	:	992	:	388	:	375	:	4,837	:	3,110	:	6,947
Exports: 2/ :		:		:		:		:	-	:	-	:	
1960:	2.03	:	238	:	<u>3</u> /	:	373	:	812	:	482	:	1,294
1961:	194	:	260	:	3/	:	340	:	783	:	463	:	1,246
1962:	· 225	:	220	:	3/	:	333	:	769	:	351	:	1,120
1963:	254	:	243	:	3/	:	315	:	805	:	361	:	1,166
1964:	276	:	293	:	3/	:	273	:	847	:	412	:	1,259
1965:	315	:	278	:	3/	:	170	:	763	:	450	:	1,212
1966:	406	:	390	:	<u>3/</u>	:	172	:	968	:	428	:	1,396
1967:	417	:	293	:	<u>3</u> /	:	238	:	948	:	145	:	1,093
1968:	631	:	335	:	3/	:	311	:	1,276	:	1.08	:	1,384
1969:	787	:	395	:	2	:	276	:	1,459	:	99	:	1,559
1970:	884	:	350	:	29	:	262	:	1,526	:	110	:	1,636
1971:	1,254	;	412	:	62	:	247	:	1,975	:	148	:	2,123
1972:	1,537	:	511	:	106	:	192	:	2,346	:	66	:	2,412
1973:	1,759	:	635	:	121	:	154	:	2,670	:	48	:	2,718
1974:	2,114	:	622	:	225	:	146	:	3,106	:	95	:	3,201
1975:	2,555	:	851	:	251	:	117	:	3,774	:	134	:	3,909
1976 1/:	3,053	:	882	:	287	:	88	:	4,310	:	110	:	4,420
		;		:		:		:		:		:	

(In million of pounds)

1/ Estimated.

 $\overline{2}$ / Includes unofficial estimates of data on refined and semirefined palm oil. 3/Net imports.

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

Note .--- Because of rounding, figures may not add to the totals shown.
Table 4	-Palm-kernel	oil:	U.S.	imports	for	consumption,	Jan.	1
stocks.	and apparent	t cons	umptic	on, 1960-	-76.			

(quantity in thousands of pounds; value in thousand of dollars; unit value in cents per pound)

V	1	Jan. 1	Apparent
leat	: imports	stocks	sumption
		Quantity	
	·	:	•
1960	: 72	: 8:	62
1961	: 70	: 18 :	: 72
1962	: 82	: 16 :	: 82
1963	: 83	: 16 :	: 79
1964	: 85	: 20 :	: 84
1965	: 83	: 21 :	: 87
1966	: 109	: 17 :	: 96
1967	: 104	: 30	: 118
L968	: 120	: 16	: 112
1969	: 99	: 24	: 101
1970	: 82	: 22	: 85
1971	: 95	: 19	: 89
1972	: 97	: 25	99
Ly/3	: 91	: 23	103
Ly/4	: 141	: 11	: 114
1076	: 154	: 38	
LA\0	: 140	: 20 Value	: 130
	:	Value	
	. 13	: 1/	• •
	: 13	$: \frac{1}{1}$	$\frac{1}{1}$
	: 10	÷ ‡/	÷ ‡/
1962	. 9	: <u>1</u> /	· <u>1/</u>
1963	: 10	· <u>-</u> //	: <u>1/</u> ,
1964	: 10	: <u>1/</u>	· <u>1</u> /,
1965		$\frac{1}{1}$	. <u>∔</u> /`
1966	: 15	: #/	$\frac{1}{2}$
1967	: 13	: 1/	· <u>1</u> /,
1968	: 19	· <u>+</u> /	$\frac{1}{1}$
1969	: 13	: <u>1</u> /	<u>+</u> /,
Ly/U	: 12	: <del>!</del> /	: 분
Ly/1	: 12	· +/	· +/,
19/2	. 15	÷ ‡/	÷ ÷/
107/	: 15	: <del>!</del> /	· +/
	: 52	$\frac{1}{1}$	· +/,
1975	: 39	$\frac{1}{1}$	$\frac{1}{1}$
19/6	: 28	<u>: 1/.</u> Red trolu	: <u>1</u> /
	:		.e
1960	:	• 1/	• 1/ .
1961	: 12	· +/	$\frac{1}{1}$
1962	11	$\frac{1}{1}$	÷ †/
1963	: 12	÷ ÷/	· †/
1964	12	· †/,	· 計
1965	: 14	$\frac{1}{1}$	: ··· = = //
1966	: 14	÷ †∕	: †/
1967	: 12	÷ †∕	÷ †/
1968	16	- <del>1</del> /	· †/
1060	: 13	- <del>1</del> /	- <del>1</del> /
4D4	- <b>-</b> J	$\frac{1}{1}$	· 书
1970	. 15	• ±/	± 1/
1909 1970 1971	: 15	· 17/ 1	· • •/ ·
1909 1970 1971	: 15 : 16 : 12	$\frac{1}{1}$	: 1/
1909 1970 1971 1972	: 15 : 16 : 12 : 16	$\begin{array}{c} \vdots  \underline{1}/\\ \vdots  \underline{1}/\\ \vdots  \underline{1}/\\ \vdots  1/ \end{array}$	$\frac{1}{1}$
1909 1970 1971 1972 1973	: 15 : 16 : 12 : 16 . 37	$\begin{array}{c} \vdots  \underline{1}\\ \vdots  \underline{1}\\ \vdots  \underline{1}\\ \vdots  \underline{1}\\ \vdots  \underline{1}\\ \end{array}$	$\begin{array}{c} :  \overline{1}/\\ :  \overline{1}/\\ \cdot  \overline{1}/\\ \cdot  \overline{1}/\end{array}$
1909 1970 1971 1972 1973 1974	: 15 : 16 : 12 : 16 : 37	$ \begin{array}{c} \cdot & \underline{1} \\ \cdot &$	$\begin{array}{c} :  \underline{1}/\\ :  \underline{1}/\\ :  \underline{1}/\\ :  \underline{1}/\\ \cdot  \underline{1}/ \end{array}$
1909 1970 1971 1972 1973 1974 1975	: 15 : 16 : 12 : 16 : 37 : 25 : 20	$\begin{array}{c} : & \underline{1}/\\ \end{array}$	$\begin{array}{ccc} : & \underline{1} \\ \end{array}$
1969 1970 1971 1972 1973 1974 1975 1976	: 15 : 16 : 12 : 16 : 37 : 25 : 20	$\begin{array}{c} : & \underline{1}/\\ \end{array}$	$\begin{array}{cccc} : & 1/\\ : & 1/\\ : & 1/\\ : & 1/\\ : & 1/\\ : & 1/\\ : & T/ \end{array}$

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

Note.--U.S. production and exports are nil.

Source	: 1960	1961		1962	1963	1964	: 1965	1966	1967	1968	1969	1970	: : 1971	1972	: 1973	1974	1975	: 1	.976
	:								Quantity	/ (1,000 j	ounds)								
	:	:	:		:	:	:	:	:	:	:	:	:	:	:	;	:	:	
Malaysia	. 0	:	0:	0 :	: 0	: 0	: 0	; 0	: 0	;0	: 2,202	: 0	: 1,585	:23,612	;37,865	: 61,785	: 93,971	: 88	.853
Notherlands	:13,938	:10,63	9:13	5,273 :	:21,391	:23,861	:36,535	: 32,692	: 28,078	: 26,798	:17,874	:23,730	:29,334	:14,018	:16,372	: 19,106	: 15,356	: 17	.147
Indonesia	•: 0	:	0:	0	: 0	: 0	: 0	: 2,194	: 0	; 0	: 0	: 0	: 0	: 1,102	: 6,478	: 22,380	: 24,544	: 23	3.147
Liberia	.; 0	:	0 :	0 :	: 0	: 0	: 0	: 0	: 0	: 0	: 0	: 0	: 0	: 7,121	:10.457	: 8,205	: 6.377	: 3	3.331
Singapore	•: 0	:	0 :	0 :	: 0	: 0	: 0	: 0	: 0	: 0	; 0	: 0	: 0	: 1,102	: 0	: 0	: 1.646	: 3	3.332
Philippine Republic	. 0	:	0:	0	: 0	: 0	: 0	: 0	: 0	: 0	: 0	: 1,102	: 0	: 1,128	: 0	: 0	: 3,058	: 1	123
All other	: 58,414	:59,73	2 :6	6,802	:61,923	:60,725	:46,562	: 74,466	: 84,104	: 92,738	:78,556	:57,615	:63,674	:48,472	:19,461	: 29,882	: 8,568	: 2	894
Toi 11	: 72,352	:70,37	1 :8	2,075	:83,314	:84,586	:83,097	:109,352	:112,182	:119,536	:98,632	:82,447	:94,593	:96,555	:90,633	:141,358	:153,520	:130	1,827
	:								Value	(1,000 d	ollars)		<u> </u>						<u> </u>
	·	<u>-</u>	<u>-</u> -			•	<u> </u>	- <u>.</u>	·				•			· · · · · · · · · · · · · · · · · · ·	<u> </u>		<b></b>
Malauria	•	:			•	•		•	•	•	. 109	•	. 100	. 2 703		. 20 624	. 21 021	·	4 469
Nother Inc.	. 2 256	• 1 67	5	2 050	. 2 902	. 3 089		· / 877	· 3 072	. 5 18/	· 3 101		. 5 720	· 2,703	· / 17/	. 0,024	• 7 750		5 907
Induction and second se	. 2,250	. 1,0/		2,033	. 2,502	• 5,005		. ,027	• 5,572	. 5,104	. 5,101		. 5,720	. 105	• 1 1/8	· 9,470	. 5 907		766
T there are a second seco		:	_ :	_		: _	: _		: _			: _	: _	· 741	· 1,140	. 3,445	· 1 135		1.636
Sincerore	·. 	:			•	:					· _	: _	: _	· 116	. 1,00/		. 1,133		668
Philippine Republic	·· _	•	_ :	_		• -	: _				•	169	: _	· 105	•		· 855		160
All a hore-	. 9 464	· 6 75	3.	6 638	• 7 1/2	. 7 384	· 6 740	. 0 687	. 8 805	• 14 063	· 9 645	. 7 097	· 8 666	· · · · · · · · · · · · · · · · · · ·	· 2 854	. 10 515	· 7 236		571
Tutal	10 720	· 8 42	8.	8 697	· 10 044	· 10 473	12 381	· 14 749	· 12 777	· 19 247	12 9/4	12 123	14 585	· <u>), 1)</u>	•1/ 80/	· 52 235	• 28 572		1 654
.00.11	. 10,720	. 0, 42	<u> </u>	0,007	.10,044	.10,475	.12,501	. 14,745	. 12,771	. 17,247	.12, 944	.12,125	.14,505	.11,0/1	.14,094	. 52,2.35			,0.14
	:								Unit valu	e (cents	per poun	d)							
	:	:	:		:	:	:	:	:	:	:	:	:	:	:	:	:	:	
Malaysta	-: -	:	- :	-	: -	: -	: -	: -	-	: -	: 9	: -	: 13	: 11	: 13	: 33	: 22	:	16
Netherlands	-: 16	: 1	6 :	°. 13	: 14	: 13	: 15	: 15	: 14	: 19	: 17	: 17	: 19	: 20	: 25	: 50	: 47	:	40
Indon sia	-: -	:	- :	_	: -	: -	: -	: 10	: -	: -	: -	: -	: -	: 10	: 18	: 38	: 24	:	16
Liberia	-: -	:	- :	-	: -	: -	: -	: -	: -	: -	: -	: -	: -	: 10	: 15	: 38	: 18	:	42
Siptapore	-: -	:	- :	-	: -	: -	: -	: -	: -	: -	: -	: -	: -	: 11	: -	: -	: 17	:	14
Philippine Republic		:	- :	-	: -	: -	: -	: -	: -	: -	: -	: 15	: -	: 9	: -	: -	: 28	:	14
All other	-: 14	: 1	1:	10	: 12	12	: 14	: 13	: 10	: 15	: 12	: 14	: 14	: 11	: 15	: 35	: 26	:	20
Average	-: 15	: 1	2 :	11	: 12	: .12	: 15	: 13	: 11	: 16	: 13	: 15	: 15	: 12	: 17	: 37	: 25	:	20
-	:	:	:		:	:	:	:	:	:	:	:	:	:	:	:	:	:	

Table5. --Palm-kernel oil: U.S. imports for consumption, by principal sources, 1960-76

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

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Table 6 .-- Palm kernels and palm-kernel oil: World production and exports, by major producing and exporting countries, 1960-76

ltem and :	Nigeri	.a	: Zai	re	: Bent	n	Malays	ia	Indone	sia	Sierra	Leone	Ivory C	oast	Subtotal	: X11 Cother	World total
year : ;	Kernels	011	: Kerne	: ls:0i1 :	: : Kernels :	: s:0i1 :	: : Kernels :	: :0i1 :	: : Kernels :	: :0i1 :	: : Kernel: :	: s:011 :	: :Kërnels :	: :0il :	palm kernel oil	:(palm :kernel : oil)	palm k <u>er</u> nel : oil
Production: :		:	:	:	•	:	:	:	:	:	:	:	:	•	:	:	•
1960:	945	.445	• • • • • •	•	• 143	• 68	• • 53	• 26	. 77	• 25	• 121	. 57	. 27	:	: 800	:	. 070
1961:	963	• 452	. 300	141	• 115	. 53	· 53	· 24	· //	. 35	130	. 57	· 57	• 13	. 002	. 170	. 970
1962	811	• 381	· 28	1 .134	• 104	• 40	• 62	• 24	· //	. 35	. 136	. 6/	• 27	. 12	. 700	100	. 959
1963:	926	• 4 3 4	· 207	•101	. 112	. 49	• 66	. 29	. 73	. 35	. 110	. 55	• 31	. 15	. 705	. 100	. 095
1964	899	• 4 2 3	• 24		• 130	· 62	• 66	. 31	. 73	. 35	• 117		• • • • • •	. 15	. 725	. 190	. 915
1704	077	. 425	•		. 150	. 02			• 75			• • • •	• 55		. 730	. 190	. 920
1965	1 018		•	· · 77	• 117	• 55	. 77	• 35	• 75	• 25	• 110	. 52	• 25	. 15	. 750	. 200	. 041
1966	930	• 436	· 18	2 · 86	. 03	• 44	. 07	• 46	· 75	. 35	· 123	. 57	• 46		· 700	. 290	. 901
1967;	551	.450	. 221	5 . 106		• 44	· 108	. 40	. 77		. 125		. 40	. 22	. 720	: 214	· 941
1968	696	.200	. 22.	5 •106	· • • • • •	. 57	· 100	. 62	. /9		· 120	. 60	• / 9		· 59/	. 2/2	. 022 . 927
1969	582	.273	. 275	2 .130	• 112	. 52	. 165	. 02	. 03	• 44	. 106	. 51	. 40		. 504	. 242	. 02/
	502	. 275	. 2/(		• 112		. 105		• • • • • •		. 100			: 51	: 052	: 251	. 004
1970	505	.280	• • 20'	•	• 126	. 60	. 102	. 00	• 108	. 51	. 129			. 26	. 701	. 267	. 0.59
1071	677	.200	· 25.	5 .122	. 120	. 6/	· 192	. 20	. 100	. 57	. 117			. 10	. 701	20/	. 1 010
1972	650	• 306	. 20.	1 108	. 137	. 64	. 202	.150	. 120	. 67	. 106	. 55		: 13	. 756	: 202	: 1,018
1973	551	• 260	10	1 . 00	• 1/3	. 69	· 340	.150	· 141	. 66	. 100	• /0	. 40	. 22	. 734	. 247	. 1,001
1975	672	.200	• 17	1.70	. 1/9	. 68	• 430	.103	• 162	. 00	. 101	. 49	· 55	. 20	. /10	: 242	. 1 000
1)/4	. 072		. 1/1		. 140	. 00	• 450	.205	. 105		. 101	. 40	. /9		. 029	. 251	. 1,080
1075	650	. 206	•		. 154	•	. 51/	•	. 192	. 02	. 109	;	. 94	:	. 073		. 1 120
1976 1/	650	. 306	. 10	<b>9</b> • 9/	. 154	. 73	· 514	·243	. 105	. 00	. 100	. 52	. 04	: 40	. 0/3	: 200	. 1,129
1970 <u>1</u> /	. 0.0		• 1/:	. 04	. 104	. /5	. 000	.204	. 190		. 112		. 00	. 42		. 202	. 1,197
Exportes 2/		:	•	:	•	:	•	•	•	:	•	:	•	:	•		•
1960	. 440	· •	• • •	·	. 64	• •	· 24	· •	. 35	. n	. 57	: 0	• 18	· •	. 776	. 121	
1961	432	· .	· 1	3 •110	. 51	· ~	. 20	· .	. 33	· 0	. 62	· .	• 13		· 734	. 122	• 862
1962	386	· ñ	. 2	n • 93	• 46		· 18		. 33	· .	• 64	· õ	• 11	· õ	· 670	• 130	· 800
1963	419	7		2 2 71			· 18		• 33		. 55	· ñ	• 11	· .	. 668	• 141	. 800
1964	· 414	. ,		2 • 97	. 57		· 20	• ñ	· 35	· 0			• 13		· 607	• 125	· 822
1704		: -	• •	,	: 27		: 20	: .	: 55				• •	: `	. 0,7	• • • • •	. 022
1965	437	. 2	: 1	D: 68	: 18	. 37	· 20	: 0	. 33	. 0	. 53	: 0	: 15	· : 0	. 683	. 126	. 809
1966	414	. 73		0 : 71		: 26	. 24		• 33		. 57		• 9		• 714	: 118	. 831
1967	172	: 84		4 : 82	. 4	: 35	. 24		. 40	· ň	• 13		. 11	• ň	• 478	• 132	· 624
1968:	168	: 60	:	2:99	: 7	: 51	: 33	: 0	: 37	: 0	: 68	: 4	: 9	: 0	538	: 132	672
1969:	185	: 82	: (	5:93	: 9	: 55	: 33	: 0	: 44	: 0	: 51		: 13	: 0	: 567	: 130	697
		:	:	:	:	:	: .				:	:	: .	:	:	:	
1970:	192	: 73	: (	): 99	: 11	: 42	: 29	: 4	. 44	: 0	: 62	: 0	: 20	: 0	. 575	: 134	710
1971:	251	: 57	: (	): 99	: 11	: 60	: 15	: 11	: 46	: 0	: 53	: 0	: 20	: 0	: 624	: 128	752
1972:	220	: 75	: '(	); 82	: 4	: 40	: 0	:108	: 51	: 0	: 48	: 0	: 22	: 0	: 653	: 101	754
1973:	143	: 88	: (	): 73	: 0	: 49	: 0	:146	: 40	: 24	: 40	: 7	: 24	: 0	: 633	90	732
1974:	192	: 84	: ``	): 75	: 0	: 37	: 0	:203	: 29	: 37	: 26	: 20	: 40	: 4	: 747	: 137	884
:		:	:	:	:	:	:	:	:	:	: 20	: 20	: 40	: -	: ,4/		004
1975:	179	: 42	: (	): 64	: 0	: 35	. 0	:240	: 22	: 53	: 29	: 22	: 31	: 4	. 763	. 97	855
1976 1/:	187	: 71	: (	): 57	: 0	: 37	: 0	:287	: 27	: 66	: 22	: 29	: 37	: 0	: 816	: 117	977
		•	•			•					• • • •		• 57		. 010		

(In	thousand	ls of	pounds	)

 $\frac{1}{2}$  Estimated.  $\frac{2}{2}$  Exports of seed expressed as oil assuming an extraction rate of 47 percent.

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

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

A-7

Table 7.--Coconut oil: U.S. production, exports, imports for consumption, Jan. 1 stocks, and apparent consumption, 1960-76

(Quantity in millions of pounds; value in millions of dollars; unit value in cents per pound)

Year	Produc- tion	Exports	Imjorts	Jan. l stocks	Apparent con- sumption	:Ratio (perc :of imports : consumptio	ent) to n
:			Qua	antity			
1960	495 : 499 : 429 : 348 : 328 : 365 : 363 : 350 : 392 : 386 : 247 : 269 : 269 : 295 : 280 : 38 :	7 3 2 10 2 12 9 12 6 6 6 10 15 10 10 6	$\begin{array}{c} 156\\ 163\\ 266\\ 372\\ 429\\ 397\\ 499\\ 504\\ 434\\ 429\\ 595\\ 629\\ 677\\ 718\\ 542\\ \end{array}$	226 : 339 : 319 : 243 : 200 : 154 : 90 : 68 : 87 : 59 : 101 : 104 : 104 : 117 :	631 679 769 753 801 831 836 864 801 837 874 880 949 999 562		78 74 56 41 44 43 41 49 46 28 31 31 28 7
1975:	0:	6	869	118 :	867	:	0
1976:	0:	44	<u> </u>	114 :	1,149	:	0
1960: 1961:	69 : 60 :	1 2/	20 : 16 :	$\frac{1}{1/}:$	$\frac{1}{1}$	$\begin{array}{c} \vdots & \underline{1}/\\ \vdots & \underline{1}/\end{array}$	
1962 1963 1964 1965 1966 1966	47 : 42 : 43 : 55 : 44 : 49 :	$\frac{2}{2}$	25 30 51 52 60 50 50	$\frac{1}{1}$ : $\frac{1}{1}$	1/ 1/ 1/ 1/ 1/ 1/	$\begin{array}{cccc} : & \frac{1}{2} \\ \\ : & \frac{1}{2} \\ \end{array}$	
1969	53 40 38 30 64 19	1 2 2 1 2 2 1	50 50 73 79 63 94 235 200	$\frac{1}{1}$ : $\frac{1}{1}$ : $\frac{1}{1}$ : $\frac{1}{1}$ : $\frac{1}{1}$ : $\frac{1}{1}$ : $\frac{1}{1}$ :	1/ 1/ 1/ 1/ 1/ 1/	$\begin{array}{c} \underline{1}'\\ \vdots & \underline{1}'\\ \end{array}$	
1976	-	8	182	$\overline{\overline{1}}'$ :	$\overline{\underline{1}}'$	$\frac{1}{1}$	
			Unit	value			
1960         1961         1962         1963         1965         1966         1967         1968         1969         1970         1971	3/ 14 3/ 12 3/ 11 3/ 12 3/ 13 3/ 15 3/ 15 3/ 12 3/ 14 3/ 17 3/ 17 3/ 17 3/ 16 3/ 14 3/ 14 3/ 10 3/ 23 3/ 50	14 12 11 12 13 15 12 14 20 17 20 13 10 20 25 23 18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1	1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1	$\begin{array}{c} : & \frac{1}{1} / \\ : & 1$	

 $\frac{1}{2}$  Not available.  $\frac{2}{2}$  Less than \$500,000.  $\frac{3}{2}$  Pacific price.

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

Scurne	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
	:						(	Quantity (1	,000 pound	s)							
	:	: :		:	:	;		: :	:	:		: :	:		:	: :	•
Philippine	1 1 1 5 70	:			:	:	· *	:			501 606	(	(7( 000 )	716 700		: 000 007 .	1 195 007
Kepublic:	2 121,379	: 162,/84 :	200,627 :	3/2,230 :	397,133 :	402,386 :	510,179	523,003	443,788 :	42/,458 :	594,020	: 628,432 :	0/0,923 :	110,120	: 333,031	: 020,927 :	1,103,007
Sri Lanka	. 3,400		0:	11 :	2 :	8 :	U	0:	0 1	0:	0	. 0:	0:		· · ·	: 2,230 :	7,713
indonesia	. 0	• 0 •	0:	0 :	0:	0:	0	: 0:	0 1	0:	0	. 0.	0:		. 0	: 3,331 :	7,062
Japan	: 0	: 0;	: 0:	0:	0 :	0 :	0 :	. 0:	0:	0:	0	. 0.	0			: 13,400 ;	2,215
Xalaysia:	: 0	• _0 •	0:	0 :	0 ÷	0 :	0	: 0:	0:	0:	0	: 0:	0 :	40	: 7,995	: 1,8/6 :	1,120
All other:	: <u>31,115</u>	: 32 :	115 :	. 0 :	4 :	4 :	42 :	7 :	4 :	<u> </u>	68	<u>: /9 :</u>	46 :	135	: 1,233	: 13,284 :	3,444
Total:	: 156,162	: 162,823 :	265,742 :	372,247 :	397,139 :	402,395 :	510,221	: 523,010 :	443,792 :	427,474 :	594,694	: 628,511 :	6/6,969	716,909	: 542,259	: 869,062 :	1,207,963
	:							Value (1.0	00 dollars	)					•		
Philippine :	:	: :	:	:	:	:		;	:	:		: ;		:	:	: :	
Republic:	: 15,045	: 15,966 :	25,342 :	38,926 :	47,525 :	51,808 :	60,144	: 57,438 :	65,177 :	49,492 :	77,248	: 78,773 :	62,631 :	: 93,325	: 230,164	: 189,903 :	178,672
Sri Lanka	: 519	: 1:	- :	1 :	1/ :	1:	- :	: - :	- :	- :	-	: - :	- :	: -	: -	: 386 :	1,047
Indonesia	: -	: - :	:	- :	:	- :	-	: - :	- :	- :	-	: - :	- :	: -	: ~	: 833 :	1,026
Japan	: -	: - :	- :	- :	- :	- :	-	: - :	- :	- :	-	: -:	- :	: -	: -	: 3,985 :	354
Malaysia:	: -	:	:	- :	- :	- :	-	: - :	- :	- :	-	: - :	- :	: 6	: 4,127	: 1,942 ;	167 🕁
All other	4,517	: 5:	16 :	- :	1:	2:	8	: 2:	1:	10 :	17	: 8:	13 :	: 66	: 610	: 3,417 :	728
Total	: 20,181	: 15.972 :	25.358 :	38,927 :	47.526 :	51.811 :	60,152	57.440 :	65,178 :	49,502 :	77,265	78,781 :	62,644 :	93,897	: 234,901	: 200,466 :	181,994
	:							Unit	value (cen	ts per pou	nd) /						
Philipping					·				•			• •		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	: :	
Republic	. 12	. 10 .	10	10	12 .	13.	12		15 .	12 .	13	. 13 :	09	13	. 43	: 23 :	15
Sri Looka	. 15	. 10.		12 .	14 .	15.					-					: 17 :	14
Jadoposia				12 :	14 :	15 :	-			_ :	_		_			: 25 :	13
Iconesid					- :		_				-					: 30 :	16
Malayein					- :	- :	-				-			_	. 52	: 25 :	15
Vil ashar							10		25.	 62 .	25	· ·	28		. 49	: 26 :	21
ALL DENET	· <u> </u>	10:	14 :	10	12 -	12 .	12	29:	15 .	12 .	12	12.		13	43	23	15
Average		. 10:	10 1	10 :	, 12 ;		12			12 :	13						
		·	·			·		·		······		••••••	···	·	•	······································	

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Table 8. -- Coconut oil: U.S. imports for consumption, by principal sources, 1960-76

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1/ Less than \$500.

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

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Table 9 .-- Copra and coconut oil: World commercial production and exports, by major

				(In n	nillions	of pour	nds)				
:	Phil:	ippines	Indones	sia 1/	Sri L	anka	: Fapu	a		: All :	World
Item and year									Subtotal,	: other :	total.
• •	<b>^</b>	: Coco-		: Coco-		: Coco-	: :	Coco-:	coconut	: (coco- :	coconut
:	Copra	: nut	: Copra	nut :	Cipra	inut :	Copra:	nut	011	: nut :	oil
		: 011	:	. 011		: 011				. 011)	
Broductions 2/			•	•	•					•	
1960	2 7/2	.1 755	. 1 201	. 760	. 412	. 265	. 203 .	130	2 919	• 1 402	. 4 321
1961	2,743	.1 979	. 1 6 2 9	.1 0/0	505	. 205	. 205.	136	3 443	· 1 306	4,321
1062	2,93/	.1 972	. 973	558	668	• 628	. 209.	127 .	2,445	• 1 / 02	· 4,0.33
1902:	2,921	.2 10/	. 886	567	570	· 3/0	. 205.	132	2,774	• 1 /63	4,400
1963:	2,420	.2,174	. 1 4 2 6	. 013	710	• 454	. 205.	128 .	3,233	• 1 /61	·
1964:	3,199	:2,040	1,420		, 110	• •/•	. 201.	120 .		. 1,401	
: 10/5	2 4 2 7	.2 179	• 1 071	• 686	. 597	• 181	 	174	3 419	• 1 387	4 806
1965	2,437	.2,170	• 1 177	· 754	• 492	• 315	. 251 .	161	3 748	1 340	5 088
1966	2,722	.2,010	• 2 088	· 831	· 421	269	245	157	3 344	: 1,365	4 709
196/	2,203	.1 027	1 027	• 963	• 428	. 273	· 289 ·	185	3 349	· 1 373	4,702
1968:	2,009	·1,327	• 1 626	• 910	• 441	· 282	· 282 ·	181	3,095	1 406	4,722
1969:	2,090	•1,722	. 1,424	• • • •	• •••	• 202	• • •	101		. 1,400	4,502
1070	2 760	.1 766	• 1 587	•1 016	• 403	· 258	. 276 :	176	3,217	1.473	4.689
19/0:	2,700	.2 405	• 1 6/9	•1 056	. 430	· 276	. 295 .	190	3 926	• 1 484	5,410
19/1:	1, 501	.2,405	• 1 963	•1 103	• 562	· 250		209	4 694	· 1 532	6 226
19/2:	3 094	.2,952	• 1 578	•1 010	· 231	· 148	· 265 ·	170	3 878	· 1 486	5 364
19/3:	3,300	.1 0/2	. 1 605	·1 027	• 231	· 212	. 209.	108	3 380	· 1 550	. 4,029
1974	3,034	:1,942	• 1,005	• • • •	• ))1	• • • •	• • •	170 .		• • •	· · · · · · · · ·
1075	1 705	.2 060	• 1 863	.1 103	• 463	. 295	• 326 •	209	4 766	1.556	. 6 3 2 3
1975:	5 /01	.3,009	• 1 944	•1 243	• 463	295	· 326 :	209	5.205	: 1,578	6,784
19/6 3/	5,401		• 1,544	• • • • • •	. 405			200			• •,•••
Europeanti		•	•	:	:	:	: :				
1060	1.321	: 132	: 335	: 4	: 42	: 123	. 75 :	40	2.072	: 468	2.540
1961:	1,380	: 163	: 419	: 0	: 79	: 205	: 97 :	44	2,388	: 553	2,941
1062	1,206	: 309	: 251	: 0	: 104	: 229	84	51	2,233	: 463	2,696
1963:	1,340	: 476	: 194	: 2	: 62	: 181	: 77 :	51	2,383	: 538	2,921
1964:	1.166	: 507	: 276	: 2	: 84	: 262	: 84 :	51 :	2,432	: 509	2,941
1904	-,	:	:	:		:	: :		-,	: .	,
1965	1.230	: 516	: 174	: 0	: 60	: 194	: 95 :	55 :	2.324	: 516	2,840
1966	1,318	: 697	: 165	: 2	: 29	: 163	: 90 :	49	2.513	: 582	3.095
1967	1,173	; 516	: 159	: 4	: 22	: 150	: 84 :	53	2,161	: 507	2,668
1968:	937	: 595	: 306	: 37	: 31	: 141	: 110 :	51 :	2,209	: 637	2.846
1969	813	: 470	: 223	: 9	: 26	: 123	: 110 :	46	1.820	: 595	2,416
1,0,		:	:	:		:	: :		2,020	: 272	-,
1970:	600	: 743	: 260	: 7	22	: 123	: 99 :	46 :	1.900	: 602 :	2.502
1971:	1.025	: 902	: 90	: 9	: 24	: 157	: 104 :	60 :	2,370	: 536	2,906
1972:	1,429	:1,030	: 60	: 75 :	62	: 192	: 108 :	60 :	3.014	: 478 :	3.492
1973:	1.030	: 939	: 51	: 37	. 4	: 40	: 71 :	64 :	1,629	: 450 :	2,685
1974:	443	: 952	: 2	: 0	: 5/	: 49	: 99 :	84	1,629	: 478	2,108
		:	:	: :		:	: :		-,	: :	_,
1975:	1,166	:1,307	: 46	: 53 :	: 2	: 152	: 132 :	77 :	2,937	: 467 :	3,404
1976 6/:	7/	:2,866	: 7/	: 110 :	: 7/	: 110	: 7/ :	209 :	3,296	: 474 :	3.770
· · · · · ·	<u></u> '	:	:	:		:	: - :	:	- • • •	:	

producing and exporting countries, 1960-76

1/ Estimated on the basis of the copra equivalent of exports.

 $\frac{1}{2}$ / Estimated commercial production of copra in year indicated. Oil production estimated on the basis of commercial crop assuming an extraction rate of 64 percent.

3/ Estimated. 5/ Less than 500,000 pounds. 6/ Estimated.

 $\overline{2}$ / Exports of copra and coconut oil are combined and included under "coconut oil."

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

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

Year	: Production <u>1</u> /:	Imports	: Exports :	Apparent con-
	•	Ouantity	: (1.000 pou	sumption 2/
1960	55,752 :	14,036 :	8 :	69,780
1961:	68,270 :	17,677 :	377 :	85,570
1962:	69,297 :	22,579 :	129 :	91,747
1963	72,584 :	16,479 :	244 :	88,819
1964:	77,740 :	13,366 :	81 :	91,025
	:		:	04 000
1965	: 76,866 :	17,494 :	6/:	94,293
1960	83,849 :	21,233 :	98 :	104,984
196/	79,007 :	23,163 :		102,062
1968	79,104 :	19,954	247 :	98,871
1969	72,540 :	14,435 :	200 :	00,001
1970	45.824	33 824	107 •	79 541
1971	72,401 :	34 474	100 :	106 775
1972	48,970 :	46,252	38 :	95,184
1973	67,950 :	33,506 :	40 :	101,416
1974	66,403 :	36,790 :	40 :	103,153
	:	:	:	,
1975:	66,665 :	34,205 :	9:	1.00,860
1976:	74,551 :	50,887 :	0:	125,438
		Value (1	1,000 dolla	urs)
	:	······		· · · · · · · · · · · · · · · · · · ·
1960	33,567 :	7,183 :	: 7:	40,743
1961	35,770 :	8,122 :	213 :	43,679
1962	38,893 :	10,810 :	91 :	49,612
1963	40,750 :	8,220 :	: 151 :	48,819
1964	42,803 :	6,560 :	: 51 :	49,312
. :	: (0.100		:	
1965	40,182 :	7,104 :	: 34 :	47,252
1966	37,729:	8,979 :	45 <b>:</b>	46,663
1967	44,/49:	12,289 :	· /0 :	57,013
1968		12,5/3	199:	63,902
1969	00,409	12,684	189 :	72,964
1970	43.533.	20 064	112	63 50%
	55.177	18 030		72 156
1972	40.191	25 926	26 ·	66 091
1973	51.193 •	32 042	. 20 . ເຊິ່	83 107
1974	95,552	55,018	82 •	150.488
		55,010		±20,400
1975	116.306	44.092	14	160.384
1976	70,949 :	83,203		154.152
	:		: :	<b>,</b>

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Table 10.--Cocoa butter: U.S. production, imports, exports, and apparent consumption, 1960-76

1/ Derived by the U.S. International Trade Commission.

2/ Consumption reported by confectioners in U.S. Department of Commerce, Confectionery Manufacturers Sales and Distribution.

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

Source	1967	1968	1969	1970	1971	1972 <mark>:</mark>	1973	1974	1975	1976
:			· · · · · · · · · · · · · · · · · · ·	Qua	ntity (1,0	00 pounds)				
Ivory Coast:	: 4 023 ·	921 ·	1,335 •	5 770 :	8 542 .	; 7 837 ·	3 362 •	:	: 9 840 ·	19 142
Brazil:	5.238 :	4,539 :	2.421 :	9.232	5,752 :	15,609 :	9 819	3 456 .	9 802	13 363
Mexico:	1.731 :	2,699 :	2,665	2.641 :	1.975 :	4,986 :	5,560 :	5,145 :	3,333 :	7,271
Ecuador:	0 :	176 :	0 :	906 :	22 :	1.908 :	485 :	1.832 :	2,612	1,940
United Kingdom:	0 :	0 :	1 :	112 :	0:	0:	0:	405 :	1,295 :	1.542
Philippine Republic:	1.544 :	1.179 :	720 :	691 :	516 :	2.136 :	1.947 :	1,959 :	1,396 :	2.033
Netherlands:	3,253 :	4,240 :	4.689 :	5.597 :	2.404 :	1,221 :	1,664:	1,173 :	1,151 :	1,234
All other:	7.274 :	6,200 :	2.624 :	S.375 :	16.163 :	12,555 :	10,669 :	9.072 :	4,776 :	4,362
Total:	23,163 :	19,954 :	14,455 :	33,824 :	34,474 :	46,252 :	33,506 :	36,790 :	34,205 :	50,837
•			·····	V	alue (1,00	)0 dollars)				, <u>, , , , , , , , , , , , , , , , , , </u>
	:			:	 :					
Ivory Coast	2.156 :	564 :	1.166 :	3.852 :	4.324 :	4.936 :	3.060 :	6.909 :	12.588	35.234
Brazil:	2.686 :	2.784 :	2.137 :	5.816 :	2.971 :	8,709 :	9.166 :	19,770 :	12.268 :	18,968
Mexico:	918 :	1.638 :	2,257 :	1.872 :	483 :	2.382 :	4.667 :	6.463 :	3,990 :	11,730
Ecuador:	- :	112 :	- :	499 :	12 :	1,037 :	475 :	2,743 :	: 061,5	3,100,
United Kingdom:	- :	- :	1/ :	83 :	- :	- :	- :	667 :	2,640 :	3,041
Philippine Republic:	894 :	748 :	-640 :	435 :	228 :	1,093 :	1,949 :	2,829 :	1,710 :	2,667
Netherlands:	1,806 :	3,022 :	4,211 :	4,497 :	1,309 :	805 :	2,083 :	1,872 :	1,646 :	2,065
All other:	3,829 :	3,705 :	2,273 :	6,010 :	8,712 :	6,954 :	10,642 :	13,765 :	6,120 :	6,409
Total:	12,289 :	12,573 :	12,684 :	23,064 :	18,039 :	25,926 :	32,042 :	55,018 :	44,092 :	83,203
:				Unit	value (cer	its per pou	nd)			
			:		:			:	:	i
Ivory Coast:	54 :	61 :	87 :	67 :	51 :	63 :	91 :	1.84 :	1.28 :	1.34
Brazil:	51 :	61 :	88 :	63 :	52 :	56 :	93 :	1.47 :	1.25 :	1.42
Mexico:	53 :	61 :	.85 :	71 :	.45 :	48 :	84 :	1.26 :	1.20 :	1.61
Ecuador:	- :	64 :	- :	55 <b>:</b>	54 :	54 :	98 :	1.50 :	1.20 :	1.57
United Kingdom:	- :	- :	90 :	74 :	- :	- :	- :	1.65 :	1.58 :	1.97
Philippine Republic:	54 :	63 :	89 ;	63 :	44 :	50 :	1.00 :	1.44 :	1.22 :	1.31
Netherlands:	56 :	71 :	90 <b>:</b>	80 :	54 :	66 :	1.25 :	1.60 :	1.43 :	1.67
All other:	53 :	60 :	.87 :	68 :	54 :	<u> </u>	1.00 :	1.52 :	1.23 :	1.47
Average:	53 :	63 :	88 :	68 :	52 :	56 :	95 :	1.50 :	1.29 :	1.64
:	:	· :	:	:	:	:		:	:	···
1/I Loca than $6500$										

Table 11.--Cocoa butter: U.S. imports for consumption by principal sources, 1967-76

 $\underline{1}$  / Less than \$500.

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

Source	1967	1968	: 196	9	: 1970	1971	:	1972	1973	: :	1974	: :	1975	19	76
	•					Quantity	(1	,000 pound	s)						
Brazil	: 150,856	: : 70,738	: : 113,6	96	: : 130,621	: : 123,738	::	: 136,784 :	84,565	: : ]	117,279	:	: 164,156 :	12	31,066
Ghana:	: 153,989	: 164,364	: 188,6	27	: 232,845	: 266,108	:	197,919 :	150,479	: 1	123,869	:	101,926 :	10	07,199
Nigeria:	96,773	: 68,915	: 33,5	91	: 39,122	: 112,344	:	33,740 :	101,542	:	49,359	:	34,114 :	ç	95,047
Dominican Republic:	: 51,453	: 56,122	: 51,2	45	: 75,969	: 51,230	:	70,829 :	48,711	:	56,768	:	50,205 :		52,661
Ivory Coast:	59,290	: 48,182	: 36,3	42	: 53,843	: 54,051	:	77,565 :	73,311	:	30,623	:	74,919 :		2,154
New Guinea:	9,800	: 6,788	: 5,5	13	: 13,493	: 25,578	:	9,526 :	13,843	:	26,794	:	25,465 :	2	27,875
Ecuador:	42,763	: 39,926	: 14,0	25	: 32,193	: 33,633	:	37,640 :	20,983	:	45,763	:	23,079 :	2	22,663
All other:	: 68,209	: 56,129	: \$46,2	82	: 47,346	: 40,791	:	68,067 :	62,005	:	44,741	:	48,105 :	2	8.578
Total:	633,133	: 511,164	: 489,3	21	: 625,432	: 707,473	:	632,070 :	555,439	: 4	495,196	:	521,969 :	52	27,243
:						Value (1	,00	)0 dollars)	)						
:		:	:		:	:	:	:		:		:			
Brazil:	33,037	: 18,488	: 43.4	74	38,108	: 28,492	:	33,201 :	36,318	:	77,596	:	96,200 :	ę	39,359
Ghana:	37,099	: 45.515	: 57.3	44 :	81.241	: 75,570	:	48,759 :	55,476	:	66.593	:	64.839 :	$\epsilon$	54.643
Nigeria:	22,543	: 16,680	: 10.1	48	13,517	: 30,992	:	8.491 :	36,416	:	28,163	:	21,607 :	5	8.794
Dominican Republic:	11,466	: 13,887	: 19,2	50 :	19,925	: 11.344	:	15,776 :	18,671	:	43,072	:	24,919 :	4	2,869
Ivory Coast:	13,061	: 13,947	: 14.3	95 :	: 19.856	: 14.250	:	18,009 :	25,055	:	18,838	:	54.855 :	2	27,375
New Guinea:	2,304	: 1,779	: 1,6	43 :	3,906	: 6,494	:	2,277 :	5,201	:	18,349	:	17,104 :	2	1,180
Ecuador:	10,449	: 10.804	: 5.0	17 :	9,453	: 7,452	:	8.429 :	9,559	:	33,667	:	13,533 :	1	.8.071
All other:	16,352	: 14,929	: 16,8	79 :	14,712	: 6,735	:	15.743 :	25,269	:	30,105	:	30,612 :	3	15,999
Total:	147,211	: 136,029	: 168,1	50 :	200,718	: 181,329	:	150,685 :	211,965	: 3	316,383	:	323,669 :	35	8,290
:						Unit value	2	(cent per p	pounds)						
		:	:			:	:			:	····	•	•		· · · · · · · · · · · · · · · · · · ·
Brazil:	22	. 26	:	38	. 29	23	:	24 :	43	:	66	:	59 :		. 68
Ghana:	24	: 28		30	35	: 28	•	25 •	37	•	54		64 :		60
Nigeria:	23	: 24	:	30 :	35	: 28		25 :	36	:	.57	:	63 :		62
Dominican Republic:	22	: 25	:	38 :	26	: 22	:	22 :	38	:	76	:	50 :		81
Ivory Coast:	22	: 29	:	40 :	37	: 26	:	23 :	34	:	62	:	73 :		65
New Guinea:	24	: 26	:	30 :	29	: 25	:	24 :	38	:	68	:	37 :		76
Ecuador:	24	: 27	:	36 :	29	: 22	:	22 :	46	:	74	:	59 :		80
All other:	24	: 27	•	36 :	31	: 17	:	23 :	41	:	67	:	64 :		74
Average:	24	: 27		34	32	: 26	:	24 :		:	64	<u>.</u>	62 :		68
		:	•		5-	:	:		50	:	~ 1	:			

Table 12 -- Cocoa beans: U.S. imports for consumption, by principal sources, 1967-76

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

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		<u> </u>			
:	: :	: :		Beginning	: Apparent
Year :	: Imports :	: Exports :	Shrinkage <u>1</u> /	stocks 2/	: ·con-
:	::				: sumption 3/
:		0			
:	:	Qu	antity (1,000 p	Junas)	
		:			:
1960	550,906	16.797	11.018	152.000	482,600
1961	766,733	13.878	15,335	192,491	540,400
1062	639 491	15 875	12,790	389 611	561,700
1902	630 820	15 318	12,616	• 438 737	· 583 500
1905	506 975	15 221	11 028	· /58 122	. 587 600
1964:		,	11,950	. 400,120	
:	700 001	1/ 0/5	16 070		
1965:	793,931	14,965	15,8/9	: 440,129	628,400
1966:	/15,156	: 15,594 :	14,303	: 5/4,816	: 646,500
1967:	633,133	16,009 :	12,666	: 613,575	: 647,900
1968:	511,164	: 13,897 :	10,223	: 570,304	: 640,900
1969:	489,321 :	: 19,699 :	9,786	: 416,448	: 593,100
:	: 1	: :		:	•
1970:	625,432	: 13,699 :	12,509	: 283,184	: 585,400
1971:	707,473	: 11,091 :	14,149	: 297,008	: 615,300
1972:	632,070	8,826 :	12,641	: 363,941	: 637,200
1973	555,439	20,693	11.109	: 337.344	: 615,300
1974	495,196	38,215	9,904	245,681	: 505,600
1075	521 060	. 10 250 .	10 / 30	• 197 158	• 457 400
1975	507 7/2		10,455	· 222 020	. 407,400
19/0:	521,245	22,000	10,545	. 222,025	490,000
:			Value (1,000	dollars)	
			······	:	:
1960:	143.073	5.068	4/	4/	. 41
1961	159 479	3,677	$\frac{1}{4}$	$\frac{1}{4}$	
1062	131 407	3 775	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
1962	135 170	3 005	$\frac{1}{4}$	$\frac{4}{5}$	$\frac{4}{5}$
1903	133,179	· 3,335	$\frac{4}{\lambda}$	$\frac{4}{1}$	$\frac{4}{4}$
1964:	130,700	5,014	<u>4</u> /	• <u>4</u> /	<u>4/</u>
:	100 507		, ,	. , ,	
1965:	120,507	3,781	$\frac{4}{4}$	$\frac{4}{4}$	$\frac{4}{1}$
1966:	122,206	: 4,003 :	$\frac{4}{4}$	: 4/	: <u>4/</u>
1967:	147,249	: 4,381 :	$\frac{4}{4}$	: <u>4/</u>	: <u>4/</u>
1968:	136,029	: 4,166 :	4/	: <u>4/</u>	: <u>4/</u>
1969:	168,150	: 7,786 :	<u>4</u> /	: <u>4</u> /	: <u>4</u> /
:	: :	: :		:	:
1970:	200,718	: 4,849 :	<u>4</u> /	: <u>4</u> /	: <u>4</u> /
1971:	181,329	: 3,273 :	<u>4</u> /	: 4/	: 4/
1972:	150,685	: 2,514 :	4/	: 4/	: 4/
1973:	211.965	: 10,339 :	<u> </u>	: 4/	: 4/
1974	316.383	: 24.566 :	4/	: 4/	: 4/
	<b>, -</b>	,		:	: –
1975	323,669	13,257	4/	: 4/	4/
1976	358,290	17,407	4/	· <u>4</u> /	4/
			<u></u>		:

Table 13. -- Cocon bears: U.S. imports, exports, shrinkage, beginning stocks, and apparent consumption, 1960-76

1/ Weight loss of 2 percent of imports. 2/ 1960 stocks are as reported by the U.S. Department of Agriculture;

all other stocks are derived by the The U.S. International Trade Commission. <u>3</u>/ Reported U.S. cocoa bean grind. <u>4</u>/ Not available.

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

Table 14Cooca beans:	World commercial production and exports,	by major producing
	and exporting countries, 1960-76	

		(In mi	llicn o	f pounds)				
Item and year	Chana	Brazil	Ivory Coast	: Nigeria :	Cameroon	Ecuador	All other	Total
	:	: :		: :	:	: :		
Production:	: :	: :		: :		: 1	. :	
1960	: 710 :	: 443 :	137	: 346 :	: 141	: 77 :	467 :	2,321
1961	: 970 :	: 273 :	207	: 437 :	163	: 93 :	. 478 <b>:</b>	2,621
1962	: 919 :	: 260.:	181	: 428 :	165	: 84 :	476 :	2,513
1963	: 946 :	: 249 :	227	: 395 :	168	: 86 :	522 :	2,593
1964	: 977 :	: 276 :	218	: 483 :	: 187	: . 79 :	500 :	2,720
:	:	: :		: :	:	: :	. :	•
1965	: 1,249 :	: 262 :	326	: 657 :	201	: 106 :	. 525 <b>:</b>	3,325
1966	: 919 :	: 381 :	249	: 408 :	: 174 :	: 79 :	492 :	2,703
1967	: 842	: 386 :	331	: 589 :	: 190	: 117 :	525 :	2,978
1968	: 930 :	: 317 :	324	: 527 :	: 203	: 152 :	531 :	2,985
1969	: 747 :	: 364 :	320	: 423 :	229	: 117 :	538 :	2,738
	: . :	: :	:	: :	:	: :	: :	
1970	: 917 :	: 443 :	399	: 492 :	238	: 121 :	553 :	3,164
1971	864	: 401 :	397	: 679 :	247	: 134	580 :	3,302
1972	: 1.022	: 368	498	: 562	271	: 148	617 :	3,488
1973	922	: 357	399	: 531 :	236	: 95	522 :	3,062
1974	772	542	461	: 474	243	: 159	540 :	3,190
1)/4		: 3,2		:		:	2101	5,250
1075	831	602	534	• 472 •	260	. 172	534	3 404
1976 1/	· 875	534	509	• 476	212	139	549	3 309
1970 17	• • • •							5,505
Furneytet	•	•	•	•		•		
1060	. 670	• • • • •	130	• 252	• 130	. 70	. 320 .	1 075
1900	. 0/9	· 270	106	• 412	. 145	· 73	280	· 1,275
1961	. 903	. 225	· 190	• 412	• 145	• 68	. 200 .	2,244
1902	. 944	. 152	. 223	. 437	. 140	. 00 . 77		2,200
1903	: 906 . 955	· V 166	· 220		. 170	. 60	· 3/3 ·	2,295
1964	. 600	. 103	275	. 441	. 130	. 60	357 :	2,202
10/5	. 1 107		170	. 202	170	. 06		2 075
1965	: 1,107	: 205 :	2/0	: 003 :	1/2	. 00	344	2,0/5
1966	: 8//	: 247	: 2/3	: 425 :	: 1/2	; /1 :	381 :	2,44/
1967	: 739	: 168 :	: 267	: 54/ :	: 150	: 100	362 :	2,379
1968	: /39	: 168	: 267	: 461	: 146	: 143	: 395 :	3,317
1969	: 675	: 265	: 262	: 384	: 163	: /1	3/3:	2,191
	:	:		:	:	:	; ;	2 465
1970	: 809	: 265 :	: 315	: 432	: 159	: 79 :	: 406 <b>:</b>	2,405
1971	: 692	: 262	: 324	: 600	: 176	: 112	: 488 :	2,615
1972	: 1,908	: 225	: 351	: 503	: 181	: 99	448	2,/14
1973	: 825	: 183	: 315	: 472	: 185	: 66	: 370 <b>:</b>	2,416
1974	: 692	: 287	: 445	: 434	: 196	: 126	: 368 <b>:</b>	2.549
1075	:	:		: / 20	. 150	: 0/	; <b>4</b> 53	2 / 00
1970	: 085	: 390 :	392	: 430	: 159	: 84	; 35/:	· · · · · · · · · · · · · · · · · · ·
TA10	: <u>2</u> /	: <u>2</u> /	: <u>2</u> /	: <u>2</u> /	: _2/	: <u>2/</u>	<u>_</u> 2/:	3/ 2,40/
	:	:		:	:	:	: 7	

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 $\frac{1}{2}$  Preliminary.  $\frac{2}{3}$  Not available.  $\frac{3}{2}$  Estimated.

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

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

	Pri	ncipa	al c	ocoa-b	ean prod	uci	ing coun	tries	: :			Princ	ipa	al consu	ımin	g coun	tries				:	
Year	Brazil	: Ivo : Coa	ry: st:	Ghana	Ecuador	:	All : other :	Total	: Ŭ : S	Inited : States :(	West : Germany:	Soviet Union	: 1	Nether- lands	: Ur : St	nited ates	France		All : other :	Total	-' : :	fotal
:		:	:		:	:	:		:	:	:		:		:		:	:	:		:	
1960:	137	:	0:	9	: 11	:	185 :	342.	:	481 :	254 :	66	:	187	:	165	: 117	:	441 :	1,711	:	2,052
1961:	101	:	ñ:	20	: 11	:	218 :	350	:	540 :	256 :	79	:	216	:	179	: 134	:	507 :	1,911	:	2.262
1962:	117	:	ñ :	44	: 13	:	205 :	379	:	562 :	298 :	97	:	227	:	212	: 143	:	551 :	2.090	:	2.469
1963:	93	:	ō ;	51	: 13	:	212 :	368	:	584 :	293 :	119	:	227	:	207	: 146	:	600 :	2,176	:	2.544
1964:	82	:	2:	68	: 15	:	223 :	390	:	589 :	309 :	146	:	231	:	194	: 139	:	637 :	2.244	:	2.634
:		:	:		:	:	:		:	:	:		:		:		:	;	:	-,-	:	-,, p
1965:	123	: 3	29 :	106	: 18	:	201 :	476	:	628 :	346 :	161	:	260	:	225	: 139	:	708 :	2.467	•	2.943
1966:	134	: 4	40 :	115	: 20	:	209 :	518	:	646 :	333 :	170	:	258	:	238	: 139	:	758 :	2.542	:	3,060
1967:	139	:	49 :	121	: 20	:	227 :	556	:	648 :	317 :	185	•	247	:	112	: 112	:	668 :	2,500	:	3,056
1968:	130	:	71 :	117	: 22	:	287 :	626	:	642 :	306 :	214	:	247	:	205	: 110	:	758 :	2,482		3,108
1969:	115	: 1	68 :	108	: 22		304 :	617	:	593 :	269 :	218	:	245		203	: 95	:	743 :	2,366	:	2,983
		:	:		:	•	:		•	:				2.0	•	200	:	•		2,000	:	2,703
1970:	134		79:	93	: 26	•	298 :	631	•	586 :	278 :	225	:	253	:	181	: 88	:	750 :	2.361	:	2:992
1971:	132	:	B2 :	110	: 29	:	311 :	683	:	615 :	293 :	243	:	267	:	185	: 93	:	791 :	2,487	:	3,170
1972:	198	: 4	84 :	115	: 29	:	340 :	765	:	637 :	306 :	291	:	273	:	216	: 106	:	858 :	2,687	:	3,452
1973:	192	:	71 :	99	: 33	:	320 :	714	:	613 :	335 :	295	:	271	:	236	: 104	:	864 :	2,718	:	3,432
1974:	229		79:	104	: 35	:	311 :	758	:	507 :	304 :	315	:	254	:	205	: 82	:	831 :	2,498	:	3,256
:		:	:		:	•	:		:	:			:		:		:	:	:	_,	:	-,
1975:	216	: 1	17:	101	: 46	:	302 :	783	•	459 :	306 :	331	:	262	:	161	: 75	:	807 :	2,401	:	3,184
1976 1/:	247	: 1	17 :	106	: 66	:	306 :	842	:	496 :	311 :	309	:	280	:	183	: 79	:	816 :	2.474	:	3,316
	<u> </u>	:	 :	200	: 00	:	:	- 14	:	:	:		:		:		:	:		-,	:	-,
						<u> </u>			_													

Table 15. -- Cocoa beans: World grindings, by selected countries, 1960-76

(In million of pounds)

1/ Preliminary.

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

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

	:	(In mi	llions of	f pounds) Year be	ginning Og	t. 1			
Item	1960	1961	1962	1963	1964	1965	· 1966	1967	1968
II S-produced: 1/	•		:	•	:	•	:	:	:
Soupean of lange-	. 3 320	3 540	3 674	• • 4 058	• 4 069 •	• 4 687	• / 837	. 5 006	•
Butterananananan	1,380	1,400	1 332	• 4,000	1 291	. 1193	• 1 088	· 1 1 7 2	• 1 1/6
Lard	1 969	1,982	1,904	1.786	: 1,780	: 1,676	· 1 781	• 1,172	· 1,140
Tallow edible	• 411	438	457	578	: 527	: 530	• • • 563	• 567	. 526
Cottoppood oil	• 1 481	1 352	1 347	1 407	1 555	1 590	• 1 157	• 1 000	. 1 031
Corp oil	• 411	370	381	416	: 462	439	• 438	· 1,090	· 1,051
Peaput oil	. 86	70	69	. 69	: 59	: 133	• 172	• • • • • • • • • • • • • • • • • • • •	. 168
Other	• -	32	119	160	100	• 123	· 150	• • 124	. 115
Subtotal	9,047	9,184	9,233	9,873	: 9,843	: 10,371	: 10,195	10,526	: 10,881
Imported	: :		:	:	:	:	•	:	:
Coconut oil	: 675	749	773	805	. 759	. 842	. 871	- - 786	. 270
	. 49	54	43	2 23	: 17	34	. 07	. ,00	. 161
Palm-kernel oil	· 82	. 86	82	. 23	· 85	• 92	• 110	• 109	· 112
Othor	. 57	58	38	. 67	• 48	• 49	• 56	. 109	. 112
Subtotal	863	94.7	936	• 976	• 909	$\frac{7}{1017}$	· 1 130	· 1 013	1 162
Uneposified exports 2/	· _83	77	-94	111	79	• -64	. 1,130	. 1,013	. 1,102
Total disappearance	. 9 827	10 054	10 075	· 10 738	$\frac{-7}{10}$	11 324	· 11 249	11 / 80	· 11 082
iotal disappeatance	. ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	. 10,004	10,075	• • •	: 10,075	• • •	• **,275	•	•
Ratio of imported fats and oils	:			:	:	:	:	:	:
to total consumption (per-	:			:	:	:	:	:	:
cent)	:8.8	9.4	9.3	<u>9.1</u>	<u>: 8.5</u>	<u> </u>	: 10.0	: 8.8	: 9.7
	1969	1970	1971	1972	1973	1974	1975 <u>3</u> /	1976 4/	:
U.S-produced: 1/	:		;	:	:	:	:	:	:
Soybean oil	: 6,328	: 6,253 :	6,439	: 6,685	: 7,255	: 6.518	: 7,906	: 7,425	:
Butter	: 1,106 :	: 1,075 :	: 1,043	: 1,024	: 964	: 1,056	: 923	: 950	:
Lard	: 1,425	: 1,645 :	1,480	: 1,185	: 1,150	989	: 792	: 850	:
Tallow, edible	: 544	: 518 :	546	: 479	: 500	: 548	: 470	: 550	:
Cottonseed oil	: 1,052 :	: 890 :	834	: 980	: 991	622	: 451	: 550	:
Corn oil	: 454 :	: 445 :	439	: 492	: 450	: `399	: 410	: 475	:
Peanut oil	: 151 :	: 193 :	200	: 162	: 150	: 175	: 237	: 400	:
Other	: 107	: <u>100</u> :	<u>90</u>	: 118	: 98	: 158	: 155	: 115	:
Subtotal	:11,167	: 11,119	11,071	: 10,646	: 11,558	: 10,465	: 11,344	: 11,315	:
Imported:	:		:	:	:	:	:	:	:
Coconut oll	: 855	/80	948	: 9/4	: 63L	6/5	: 1,1/5	850	:
Palm oil	: 122 :	182 :	351	: 356	: 294	: 692	: 888	: //5	:
Palm-kernel 011	: 85	94	92	: 107	: 120	: 103	: 151	: 125	:
Other	: <u>0</u> 5	1 1 2 2	1 460		<u> </u>	48	<u> </u>	<u> </u>	<u></u>
	: 1,12/ :	· 1,133 :	1,400	. 1,497	: 1,097	: 1,500	: 2,275	: 1,812	:
Unspecified exports 2/	: -03 : 12 221		-70	-07	-91	-//	$\frac{-101}{11}$	-/3	<u>.</u>
lotal disappearance	:12,231	. 12,231	12,401	: 12,076	: 12,004	; 11,900	: 11,510	: 13,032	•
Dette of incorted fate and oils					•	•	•	•	•
RALIO OF IMPORTED FATS AND OILS	•		•	•	•	•	•	•	•
to total consumption (per-			117	• 12 /	. 97	. 13 7	• 16 9	. 130	•
Cent )	: 9.4		. 11.7	: 12.4	: 0.7	: 13.2	: 10.0	: 13.9	:
$\frac{1}{2}$ May include some imported o	ils which	amount t	o less t	han 0.5 p	ercent of	the subt	otal v fato		
$\frac{27}{3}$ Preliminary.	iis (not	CIASS1116	a by kind	uy snorte	uing, and	secondar	γ ταίδι		
4/ Estimated.									

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

Item	Coco-	Palm	Soy	bean	Cotton- seed	:	Peanut	:	Tallow	:	Palm kernel 2/
:			:	:		:		:		:	,
Coconut:	1 :	30	:	.30 :	.21	:	.34	:	.07	:	.94
Palm:	:	1.	:	19 :	12	:	69	:	.19	:	55
Soybean:	:	:	:	1:	.89	:	.58	:	.42	:	.10
Cottonseed:	:	:	:	. :	1	:	.60	:	.10	:	.25
Peanut:	:	:	:	:		:	1	:	.16	:	52
Tallow:	:	ł	:	. :		:		:	1	:	17
Palm kernel 2/:	· :	:	:	:		:		:		:	· 1
- :	:	1	:	:		:		:		:	

Table 17.--Price correlations of vegetable oils and animal fats: 1952-67 1/

1/ An index of 1 indicates 100-percent correlation.

 $\overline{2}$ / Palm kernel coefficients are based on only nine observations since prices were not quoted prior to 1959.

Source: Albert Myberg, "The Demand for Laurie Oils in the United States," American Journal of Agricultural Economics, February 1970.

	: Pa :kern	1m e1 24	: /:b	Cocoa utter <u>2</u> /:	Palm	:	Coconut	:	Soybean	c	ottonseed	:	Peanut	:	Tallow	:	Lard
	:		:			;		;		;		:		:		:	
Palm kernel	•:	1	:	.79 :	.9	3 :	.94	:	.95	:	.96	:	.93	:	.89	:	.86
Cocoa butter	-:		;	1 :	.8	4 :	.72	:	.82	:	.85	:	.88	:	.81	:	.81
Palm	-:		:		1	:	.80	:	.95	;	.96	:	.96	:	.95	:	.95
Coconut	-:		:			:	1	:	.90	:	.90	:	.82	:	.80	:	.73
Soybean	-;		:	:		:		:	1	:	.99	:	.96	:	.97	:	.95
Cottonseed	•:		:	:	;	:		:		:	1	:	.97	;	.94	:	.92
Peanut	•:		:	:	:	;		:		;		;	1	;	.95	:	.94
Tallow	• :		:	:	:	:		:		:		:		:	1	:	.99
Lard	•:		:	:	i i	:		:		;		:		:		:	1
	:		:		l	;		:		;		:		:		:	

# Table 18.--Vegetable oils and animal fats: Correlations of prices, among selected fats and oils prices, $1960-76 \frac{1}{2}$ /

1/ A coefficient of 1 indicates 100-percent correlation.

 $\frac{1}{2}$ / Palm-kernel oil and cocoa-butter data are unit values, f.o.b. port of export.

Source: Data used are compiled from official statistics of the U.S. Departments of Agriculture and Commerce.

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	: Pa :kerr	alm nel <u>2</u> 4	: ':b	Cocoa utter <u>2</u> /	:	Palm	:	Coconut	:	Soybean	;(	Cottonseed	:	Peanut	:	Tallow	:	Lard
	:		:		:		;		:		;		;		:		:	
Palm kernel	:	1.00	:	.35	:	.73	:	.90	:	.73	:	.78	:	.66	:	.59	:	.53
Cocoa butter	:		:	1.00	:	07	:	.45	:	.49	:	.52	:	.59	:	.40	:	.46
Palm	:		:		:	1.00	:	.61	:	.55	:	.58	:	.42	:	.52	:	.47
Coconut	•		:		:	c	:	1.00	:	.79	:	.80	:	.67	:	.63	:	.53
Soybean	:		:		:		:		:	1.00	:	.95		.89	:	.92	:	.89
Cottonseed	:		:		:		:		:		:	1.00	:	.88	:	.79	:	.76
Peanut	:		:		:		:		:		:		;	1.00	:	.80	:	.82
Tallow	:		:		:		:		:		:		:		:	1,00	:	.97
Lard	:		:		:		:		:		:		:		:		:	1.00
	:		:		:		:		:		:		:		:		:	

# Table 19.--Vegetable oils and animal fats: Correlations of prices deflated by the Wholesale Price Index, 1960-76 1/

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 $\frac{1}{4}$  coefficient of 1 indicates 100-percent correlation.  $\frac{2}{2}$ / Palm-kernel oil and cocoa-butter data are unit values, f.o.b. port of export.

Source: Data used are compiled from official statistics of the U.S. Departments of Agriculture and Commerce.

Dependent variable			Variab	e coeffi	cients		;	Statistic	al tests
<u>(n = 17)</u>			(t-	statistic	s)		. :	of the ed	uations
	Constant	LPIO	LPIOI	LPDIF	LGNPR	LPSOY	. :	R <sup>2</sup>	DW
U.S. imports of all	:	:	:	:	:	:		:	· · · · · · · · · · · · · · · · · · ·
imported food	: :	:	:	:	:	. :	:	:	•
vegetable oils:1/:	: :	: 0 / 8 /			1 36 .	0 41 •		0.82 •	1 20
Equation 1	(1 27)	(1 99)			(5 17)	(2, 12):	•	0.02 :	1.29
		(1.))):		:	(5.17):	(2.12):			
Equation II	: -3.64 :	- :	- :	-0.33 :	1.49 :	.14 :	:	.88 :	1.83
•	: (2.35):	:	:	(3.31):	(6.13):	(1.44):	:	:	
T		55.		:	1 55 .	:	:	80.	1 77
Equation 111	: -3.60 : · (2.38)·	35 :	(1, 65)	- :	1.00:	. 33 :		.09:	1.//
	. (2.30)	(2.42).	(1.00).	·	(0.25):	(1.03)	•	•	
U.S. imports of	Constant	LPLO	LPLOI	LUVPO	LGNPR :	LCFFO :		:	
lauric-oils: 2/	: :	:	:	:	:		:	:	
Equation IV	: 1.24 :	-0.41 :	-0.19 :	0.27 :	1.13 :	- :	:	.80 :	1.65
	: (1.08):	(3.98 :	(2.03):	(2.05):	(6.55):	:	:	:	
		25	10		:	:	:		1 6 2
Equation V	(2, 17)	(3, 31)	(1,75)	(1,55):	- :	(5,94):		.// :	1.05
	: (2.1/):	(3.51);	(11/5/1	(1.55):	:	:			
Equation VI	: 1.39 :	31 :	- :	.09 :	.94 :	- :	:	.74 :	2.09
	:(1.27):	(3.00):	:	(.88):	(6.00):	<u> </u>		: :	
	Constant	LMPOQI	LUVPO	LUVPOI	LUVPOD	LPSOY :	LGNPR	:	
US imports of palm-									
oils: 3/	: -22.94 :	0.50 :	- :		-1.42 :	0.92 :	3.32	.85 :	1.73
Equation VII	: (2.13):	(2.62):	:	:	(1.56):	(1.33):	(1.97):	: :	
	: : :		0 00			1 02 .	2 21		1 00
Equation VIII	: -24.6/ : · (2.03)·	.5/:		-	- :	1.02:	(1 67)		1.99
	: (2,05):	(,	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			:	(1.07)		
Equation IX	: -41.72 :	<u> </u>	-4.36	2.29	- :	3.42 :	4.78	.79 :	1.28
-	: (3.69);	: :	(1.80):	(2.05):	:	(1.89):	(2.52):	: :	
	: :				-1 6 10	:		: .	
1/ Includes paim 01.	1, paim-kei od fate and	nel oll, a	nd coconu millione	it oil, whi	lch for 19 Hel	60-76 acc	ounted it	or over 95	percent
2/ Lauric oils are	palm-kernel	oil and	coconut c	oil (milli	lons of po	unds).			
$\frac{1}{3}$ In millions of p	ounds.			•	····· ·· ·				
	l scontables	haina ir	log for						
List of variables (al	ion of conf	ectionery	i iog iorn v fats and	n); toils			it voluo	(fob' II	s porte)
(in millions of p	ounds).	cecioner	1420 411		of nal	welage un m-kernel	oil and a	coconut di	l veighter
LGNPR = U.S. GNP (b	illions of	1972 doll	lars).	•	by imp	orts.	orr und		2 1026.000
LMPOQI = U.S. impor	ts of palm	oil (mill	ions of p	oounds)	LPLOI =	LPLO lagg	ed 1 year	r.	
lagged 1 year.					LPSOY =	Price of	soybean o	oil, crude	, tanks,
LPDIF = Positive ch	ange in imp	ported veg	getable-o:	il price	f.o.b.	Decatur.		-1	
(LFIO) from previ	ous year.	te / nound'		out oil	LUVPO =	Unit valu	e of U.S	. paim-oii	imports
nalm oil and palm	-kernel oil	l. weighte	ed by impo	orts	(1.0.t	. port of First di	fference	of LUVPO	
(f.o.b. port of e	xport).	.,			LUVPOD -		anged 1	vear.	
LPIOI = Imported ve	getable-oil	price, 2	Lagged 1	year.	POALOT -		-66-4 -	,	
Source: Compiled f	rom officia	al statis	tics of th	he U.S. Do	epartments	of Agric	ulture a	nd Commerc	e.

Table 20.--Simple U.S. food fats and oils import demand: Results of OLS regression, using aggregated annual data, 1960-76

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Dependent vari- able (n = 17)			Vai	ciable c	oefficie	nts (t-si	tatistic	s)	Statistic the e	al tests of quation
:		:	:	:	:	:		:	: R <sup>2</sup>	: DW
:					:	•		:		:
U.S. imports of :		•		•	:	•		•	•	:
principal :		:			:	:		:	:	:
crude cocoa :		: :	: :		:	:		:	:	:
bean prod-		:			:	:		:	:	:
ucts: <u>1</u> / :	Constant	LCOCDI	LPCOC	LGNPR	: LSCB	: LPSOY	LPCOF	.:	:	:
Foundation Towns	4 21	. 0 38 .	0 27	0.36	:			:	: 0.40	:
Equation 1:	(2.46)	(1.88)	(3 19)	(1.43)	· (3.58)	• -	-	•	. 0.63	: 2.03
	(2.40)	: : :		. (1.75)	: (3.50)	:		:	•	•
Equation II:	4.51	.33 :	30	.33	:26	: 0.08	-	:	.64	. 2.06
•	(2.41)	:(1.50):	: (3.10):	(1.25)	: (2.42)	: (.67)		:	:	:
:		: :	: :		:	: :	:	:	:	:
Equation III:	6.00	: .38 :	34 :	.01	:29	: - :	.25	:	: .76	: 2.32
:	(3.63)	:(2.21):	(4.47)	(.04)	: (4.03)	:	(2.42)	:	:	:
ILS imports of :				•				•	•	:
cocoa :		<u> </u>		·	:			:	:	•
butter: 2/ :	<b>c</b> onstant :	MCXQ1 :	PDIF :	GNPR	: GNPDIF	SCB	:	• • • • • • •	:	
:	-10.18	: :	-5.76	0.05	. 0.11	: 0.04	:	:	: .78	: 2.58
Equation IV:	(1.21)	: - :	(.78);	(4.39)	: (1.71)	: (2.72):	;	:	<b>:</b> 1	:
· · · · · · · · · · · · · · · · · · ·	:	:			:		:	•	1	:
Fruction V	10 (0			05	. 10			:		• · · · · · · · ·
Equation v:	-10.69			.05	(1 63)	04		•	• • • / 2	2.44
:	(.00)	: :		(4.42)	: (1.05)	(2.00)		•	:	
Equation VI:	-21.6	: 0.20 :	7.08 :	.04	-	08		:	.73	2.37
•	(.94)	: (.62):	(.70):	(2.34)	:	: (1.30):	:	:	:	:
:	1	: :	: :		:	: :	:	:	:	:
U.S. imports :								:		
of cocoa :								:		
beaus. <u>5</u> / :	Constant	· LPCOC ·	LPCOCI	LGNPR	LSCB			•	•	
Equation VIL_:	5.22	• 4 36 •	·	0.46	0.13	· · · · · ·	1	•	68	179
	(4.04)	:(4.16):	:	(1.89)	(1.72)					±.,,,
•		: :	۲.					:	:	<b>.</b> .
Equation VIII-:	7.20	:27 :	0.18 :	.37	29	: :		: ;	.80 :	1.33
:	(5.45):	:(3.23):	(1.55):	(1.59):	: (3.03):	: :		:	: ;	
	= -1		:			:		:		3 75
Equation IX:	5.14 : (4 20)	·20 :	- :	.23	-				.00	1./2
	(4.23)	: : :		(1100)				:		

#### Table 21.--Simple U.S. crude cocoa products import demand: Results of OLS regression, using aggregated and disaggregated annual data, 1960-76

 $\frac{1}{1}$  Includes cocoa beans, cocoa butter, and chocolate liquor, which are in millions of pounds of cocoa-bean equivalent.

 $\underline{2}$  / In millions of pounds of cocoa butter.

3/ In millions of pounds.

Source: Data used are compiled from official statistics of the U.S. Departments of Agriculture and Commerce.

Note .--- Figures in parentheses are the appropriate t-statistics.

List of variables: GNPR = Real U.S. GNP (billions of 1972 dollars). GNPDIF = First difference in GNPR. LCOCDI = Once lagged U.S. imports of principal crude cocoa products (millions of pounds in cocoa-bean equivalent). LGNPR = Log of GNPR. LPCOC = Price of cocoa beans (cents/pound), average of Accra and Bahia types, New York. LPCOCI = LPCO lagged 1 year. LPCOF = U.S. wholesale price of coffee, Robusta, cents/pound. LPSOY = Price of soybean oil, Decatur, crude, bulk, cents/pound. LSCB = Log of SCB. MCXQI = U.S. imports of cocoa butter (millions of pounds), lagged 1 year. PDIF = First difference of unit value price of cocoa butter. SCB = U.S. stocks of cocoa beans on January 1 (millions of pounds).

#### A-22

	:							Depen	de	ent variables	5					
Explanatory variables	:	<pre>(b) Palm- il import- supply</pre>	: -: :t	Palm-oil consump-	::	Palm-oil price change	::	Palm-oil change in stocks	:	Lauric-oils import- supply	::	Lauric-cils consumption demand	:	Lauric-oils price	: '	Lauric-oils stocks
	:	Million pounds	:	Million pounds	:	Cents per pound	:	<u>Million</u> pounds	:	<u>Million</u> pounds	:	Million pounds	::	Cents per pound	::	Million pounds
l-unit change of time (years)	: :	28.4	: :	16.2	:	-0.28	:	12.2	:	28	:	9.2	: :	-0.31	: :	0.67
l-unit change of real GNP (billion 1972 dollars)	:		::	.12	::	.003	:	12	::		::	.28	::	.005	::	28
price (1 cent per pound) 1-unit change in world pro-	• : :		:	8.9	:	.52	:	-8.9	:		:	2.4	:	.8	• • •	-2.4
duction of palm oil (million pounds)	:		: :	.17	: :	003	::	<u>2</u> /17	::		: :		:		: :	
1-unit change of world pro- duction of lauric oil	: :		::		::		::		:		:	042	::	- 001	:	2/ - 0//
(million pounds)	:		:	<u></u>	:		:		:	<u> </u>	:	.042	:	001	:	<u>2</u> /042

#### Table 22.--Impact multipliers of the 2SLS palm-oil and lauric-oils models: Impact of a l-unit change in explanatory variables upon the dependent variables 1/

 $\frac{1}{2}$ / These results are derived from the reduced-forms equations.  $\frac{2}{2}$ / The unexpected (negative) impact of world production variables upon U.S. stocks in the lauric-oils model and changes in stocks in the palm-oil model is a result of the specifications of import-supply in both cases as dependent only on trend and the coincident identities relating stocks to consumption and supply. Essentially, the impact of world production variables on the stocks variables reflects only the effect of increased consumption on stocks.

Appendix B

Simultaneous Equation Results

### Simultaneous equation results

Palm-oil\_and\_lauric oil\_models.--The following results were obtained using two-stage least-squares (2SLS) estimation procedures for import-supply, 1/ consumption-demand, and price functions for palm oil and the lauric oils. 2/

Palm Oil

 $Q_{t} = \frac{-133 + 0.54Q_{t-1}}{(-1.48)} + \frac{28.4T}{(2.34)} R^{2} = 0.81$   $C_{t} = \frac{-560 - 54.2\Delta P + 0.29Y + 38.3P_{s}}{(-4.21)} R^{2} = 0.95$   $P = -2.8 - 0.024\Delta S + 0.32P_{s} - 0.007\Delta WP_{p0}$   $R^{2} = 0.71$   $R^{2} = 0.71$   $R^{2} = 0.71$   $R^{2} = 0.71$ 

The Lauric Oils 3/

 $Q_{t} = 702 + 28T - 401D_{74} R^{2} = 0.84$   $C_{t} = 675 - 31.3P + 0.42Y + 26.9P_{s} + 281D_{74} R^{2} = 0.87$   $C_{t} = 675 - 31.3P + 0.42Y + 26.9P_{s} + 281D_{74} R^{2} = 0.87$   $P_{t} = 18.6 - 0.16S_{t} + 0.75P_{s} - 0.002WP_{10} + 19.3D_{74} R^{2} = 0.95$  (3.36) (-1.31) (3.66) (-1.60) (3.43)  $S_{t} = Q_{t} - C_{t} + S_{t} - 1 (identity)$  (t-statistics are in parentheses)

I/ The imports-as-supply concept was developed for the "internal market" configuration of the model. Modified trends were used to project imports for simplicity---a fuller descriptive effort at import-supply would involve expanding the model by at least one order of magnitude. Inherent problems relating to model stability and inadequate description of market forces were disregarded, not without some trepidation. However, forecasts of the foreign availability of supply (USDA) and domestic demand determinants (GNP, soybean oil prices) point to the satisfactory nature of a trend format in the short-run.

2/ Although the coefficient of determination ( $\mathbb{R}^2$ ) and the t-statistics are not sometimes published when 2SLS is employed owing to the difficulty of interpretation, those statistics are, nevertheless, useful in judging the relative merits of some explanatory variables or the goodness of fit for purposes of forecasting, and are therefore included in this report,

 $\underline{3}$ / The dummy variable (D<sub>74</sub>) used in the lauric oils equations reflects the world agricultural shortfall which occurred in 1974 partly as a result of abnormal weather conditions. Such "short-supply" conditions, should they occur again, would proportionately decrease U.S. imports-supply and consumption, ceteris paribus.

List of variables:

 $C_t = U.S.$  reported consumption (millions of pounds).

D<sub>74</sub>= Dummy variable for 1974.

 $\Delta P$  = Change in unit value or price from prior year (cents per pound).

 $P_s$  = Price of soybean oil (cents per pound, crude, Decatur).

P<sub>t</sub> = Weighted unit value (f.o.b. U.S. ports) of palm-kernel oil and coconut oil (cents per pound).

 $Q_t = U.S.$  annual imports (in million of pounds) in year "t".

Stocks on January 1, as reported by U.S. refiners (in millions of pounds).

$$\Delta S$$
 = Change in stocks from prior year ( $S_t - S_{t-1}$ ).

T = Time trend, in years.

- - - - - -

WP<sub>10</sub>= World production of lauric oils (billions of pounds).

 $\Delta WP_{po}$  = Change in world production of palm oil (billions of pounds).

Y = U.S. GNP (in billions of 1972 constant dollars).

Actual and predicted value for all equations are depicted in figures B-1 through B-6 on the following pages.

Figure B-1. --Palm oil: U.S. imports for consumption, with predicted values, 1960-76.



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

Figure B-2. --Palm oil: U.S. consumption, with predicted values, 1960-76.



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



Figure B-3 .--Palm oil: Year-to-year changes in the U.S. price, with predicted values, 1961-76.

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

Figure B-4. --Lauric oils: U.S. imports for consumption, with predicted values, 1960-76.



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

Note.--Imports of lauric oils are palm-Kernel oil and coconut oil, including the coconut oil equivalent of copra imports.





Source: Compiled from official statistics fo the U.S. Department of Commerce and Commission estimates.

Note.--Consumption of lauric oils is the reported factory consumption of palmkernel oil and coconut oil.

# Figure B-6. --Lauric oils: Weighted average, U.S. price, with predicted values, 1960-76.





Note .-- The lauric oils price is the weighted average unit value of palm-kernel oil and coconut oil, f.o.b. port of export.

Appendix C

Tariff Treatment

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The most favored nation (MFN) rates of duty applicable to imports are as follows:

DIIDT

TSUS

item no.	Commodity	Rat	e of duty	
	Palm Oil and Palm-Kernel Oil			
176.32 *176.33 176.34	Palm-kernel oil, inedible Palm-kernel oil, edible Palm oil		Free 0.5¢ per Free	16
	Copra and Coconut Oil			
TSUS	Commodity	Rat	e of duty	

	<u>oomiour oy</u>	1100	<u> </u>	109
175.09	Copra	J	Free	
176.17	Coconut oil	:	l¢ per	r lb

## Cocoa Beans and Cocoa Products

item no.	Commodity	Rate of duty
156.10	Cocoa beans	Free
	Chocolate:	
156.20	Not sweetenedSweetened:	Free
*156.25	In bars or blocks weighing 10 pounds or	
	more each	0.4¢ per 1b
**156.30	In any other form	5% ad val.
<b>*156.35</b>	Cocoa butter	3% ad val.
*156.40	Cocoa, not sweetened, and cocoa cake suitable	
	for reduction to cocoa powder	0.37¢ per 1b
<b>*</b> 156.45	Cocoa, sweetened	5% ad val.
*156.47	Confectioners' coatings and other products (except confectionery) containing by weight not less than 6.8 percent non-fat solids of the cocca bean nib and not less than 15 percent of vegetable fats other than cocca butter	2.5% ad val.
	Cocoa cake not suitable for reduction to cocoa powder, and other residues from the processing of cocoa beans:	
156.50	Cocoa bean shells	Free
156.55	Other	Free

\* Designated for Generalized System of Preferences duty-free entry from eligible countries.

**\*\*** TSUSA items 156.3050 (sweetened chocolate containing over 5.5 percent butterfat by weight of butterfat) and 156.3065 (sweetened chocolate containing not over 5.5 percent butterfat or containing milk solids) are subject to quota under section 22 of the Agricultural Adjustment Act, as amended (7 U.S.C. 624). Appendix D

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