Both the Solomon Islands and Papua New Guinea are exporting nearly all of their palm oil and palm kernel production, consuming only a few percent domestically. According to the Oil World periodicals, the combined exports of the two countries doubled from 30,000 tons in 1976 to 60,000 tons in 1981.

Since the area is suitable for oil palm cultivation and has only a few other industries, both production and exports are likely to soar in the next 10 or 20 years. However, there are many problems yet to be solved, such as expansion of transportation facilities by, for example, port improvement, and the construction of processing equipment.

5. Latin America

The major producing countries in Latin America are Colombia, Brazil and Ecuador. Although palm oil production has recently been on the increase, the output is entirely used for home consumption, and there is no surplus for export.

Colombia, the biggest producer in Latin America, showed an increase of up to 30% over the two years of 1978 and 1979. The cultivation is carried out along the upper reaches of the Amazon River (near the border with Brazil), where there is a reliable high precipitation throughout the year, and also on the coast. However, the area covered by plantations is reported to be close to the limit.

6. Other Countries

The most important of the other major producing countries is (mainland) China. For China's 1979 production, the amount reported by the FAO is twice as high as that of the USDA (184,000 tons as against 93,000 tons), but because of natural conditions (temperature), possibilities for palm cultivation are limited to Hainan Island and the southern part of the mainland. According to the sources related to Hainan Island, palm oil production there has been sluggish since its peak of 20,000 ha of plantations which was reached in the late 1960s, and China's maximum production is estimated at about 80,000 tons.

On the island, Nan Hai Plantation of Hong Kong, a joint venture between the Malaysian Guthrie and the Singaporean Nan Hai Plantations, embarked on a 25-year joint project with the local government in 1981. Its plan is to carry out continuous operations of planta-

tion, oil production, refining and processing. The planned refining mill will be able to handle about 480,000 tons of crude, and if both the transplantation now under way for the improvement of current varieties and new planting proceed smoothly, an increase in production can be expected.

The country other than China expected to expand production is the Philippines. Mindanao Island has begun small-scale oil palm developments, and in the early 1980s it initiated a few development projects in a joint venture using European capital related to oil palm cultivation in Malaysia, so its progress is being watched.

C. CONSUMPTION

I. World Consumption

Until the 1960s, more than half of the world's palm oil production was consumed by traditional producers in Africa such as Nigeria, the Ivory Coast, Zaire and Ghana, as well as Malaysia, Indonesia and Colombia. In the 1970s, however, partly because the price was relatively lower than those of rival oils such as soybean and rapeseed oils, consumption in non-producing countries, mainly the industrialized nations, rose sharply. The sharp rise in exports and the high productivity per hectare brought forth warnings against palm oil in such vegetable oil producing countries as the United States and Canada (Appendix Table 5-3).

Since 1976 or 1977, on the strength of the increased foreign currency reserves, South Asian developing countries and Middle Eastern petroleum producers have expanded their domestic demand for fats and oils. In addition, because palm oil was suitable as a raw material for ghee and vanaspati,[1)] traditional foodstuffs of the region, and especially because Indians liked palm oil as a substitute for peanut oil, consumption of palm oil shot up in this area.

It is worth noting that the marked increase in domestic consumption in the palm oil producing nations has resulted in the decrease of exportable surplus in these countries parcicularly in African countries where the domestic consumption increased due to the increased income. In Indonesia, the oil and fat supply policy, which replaced the scarce coconut oil for cooking with palm oil and palm kernel oil, has brought the recent domestic consumption of palm oil up to 60 to 70% of the production. Malaysia expanded its consumption by approximately 30% a year because of the increased processing after refining.

The major consumers among the industrialized nations are Japan, the Federal Republic of Germany, the United Kingdom and the United States, each of which consumes in the range of 130,000 and 180,000 tons, but consumption has remained the same or has decreased since 1977. The increased demand in South Asian nations and the Middle Eastern petroleum producing countries, as well as India's large purchases caused the rises of palm oil prices, which consequently narrowed the price spread with the rival oils, and caused users in the industrialized nations to shift to other materials such as soybean oil. As a reference, these four developed nations' combined consumption accounted for 23% of the total world production in 1977, but the share in 1982, as estimated by USDA, was about 10%.

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1) Refer to C-II-2 of Section [1-2-3] Soybean

Of the other nations, the USSR --- like the South Asian countries and Middle Eastern petroleum producers --- has increased its consumption since about 1977, and the demand for palm oil is expected to continue rising in countries with centrally planned economies, including the East European nations and China.

Although demand in the industrialized nations has been stagnant, worldwide consumption of palm oil showed a big increase (an average of 9.7% a year), from 3.06 million tons in 1975 to 4.86 million tons in 1980, as a result of the increased demand in developing nations including producers, and in the Middle Eastern petroleum producing countries and countries with centrally planned economies (Appendix Table 5-3). This growth rate of consumption, which exceeds that of production, seems to have supported the firm price level of the palm oil as mentioned later.

II. Situation in Major Consuming Countries

1. India

India could not produce sufficient vegetable oil to meet increasing demand, as a result of sluggish production of peanut, rapeseed and cottonseed, which are the main oil crops of the country. The Government therefore embarked on a stable-supply policy (including the reform of the distribution system with a fair price system in order to stabilize the prices). It also took urgent steps to import edible oil on the strength of the improved foreign currency situation brought about by the remittance from abroad (foreign reserves are estimated at US$6 trillion as of 1977). All these caused sharp increases in the imports of soybean oil and palm oil, starting in 1977. Since palm olein suits the Indian taste as a substitute for peanut oil, consumption swelled nearly twentyfold from 21,000 tons in 1976 to 386,000 tons in 1977 [1] despite the price increase from US$407/t in 1976 to US$530/t in 1979 (CIF Europe) [2] (Table C-1). Another reason for this is that the average domestic prices of other vegetable oils exceeded the international prices. Today India is one of the biggest consumers along with such palm oil producers as Malaysia, Indonesia and Nigeria, using up to 10% of the total world production (Appendix Table 5-3). In 1981 it was still the biggest palm oil importer, but the Oil World reports

1) According to the USDA's survey, India's palm oil consumption was 40,000 tons in 1976 and 439,000 tons in 1977.
2) This sharp palm oil price rise is said to be due in part to India's bulk purchases.

Table C-1 Production, Trade and Consumption of Palm Oil by Major Countries

(1,000 MT)

India

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	11	-	11
1967	-	8	-	8
1968	-	1	-	1
1969	-	0	-	0
1970	-	0	0	0
1971	-	1	-	1
1972	-	1	0	1
1973	-	52	-	52
1974	-	53	-	53
1975	-	18	-	18
1976	-	21	-	21
1977	-	386	-	386
1978	-	379	-	379
1979	-	400	-	400

Pakistan

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	-	-	-
1967	-	6	-	6
1968	-	-	-	-
1969	-	1	-	1
1970	-	-	-	-
1971	-	-	-	-
1972	-	3	-	3
1973	-	-	-	-
1974	-	29	-	29
1975	-	123	-	123
1976	-	136	-	136
1977	-	124	-	124
1978	-	133	-	133
1979	-	201	-	201

Germany, FR

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	114	2	112
1967	-	99	2	97
1968	-	126	3	123
1969	-	132	4	128
1970	-	115	5	110
1971	-	150	4	146
1972	-	151	6	145
1973	-	151	7	144
1974	-	133	11	122
1975	-	209	20	189
1976	-	193	20	173
1977	-	197	18	179
1978	-	170	18	152
1979	-	174	15	159

Japan

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	20	0	20
1967	-	22	0	22
1968	-	28	0	28
1969	-	41	1	40
1970	-	40	0	40
1971	-	40	0	40
1972	-	54	1	53
1973	-	100	1	99
1974	-	115	0	115
1975	-	107	0	107
1976	-	153	0	153
1977	-	146	0	146
1978	-	141	1	140
1979	-	138	0	138

USSR

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	3	-	3
1967	-	1	-	1
1968	-	1	-	1
1969	-	1	-	1
1970	-	-	-	-
1971	-	-	-	-
1972	-	-	-	-
1973	-	-	-	-
1974	-	3	-	3
1975	-	-	-	-
1976	-	10	-	10
1977	-	46	-	46
1978	-	38	-	38
1979	-	98	-	98

Netherlands

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	68	8	60
1967	-	64	8	56
1968	-	71	11	60
1969	-	77	16	61
1970	-	89	19	70
1971	-	129	42	87
1972	-	161	60	101
1973	-	160	64	96
1974	-	147	50	97
1975	-	185	57	128
1976	-	190	69	121
1977	-	182	74	108
1978	-	150	59	91
1979	-	167	56	111

UK

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	150	0	150
1967	-	98	0	98
1968	-	108	0	108
1969	-	139	-	139
1970	-	162	1	161
1971	-	222	0	222
1972	-	207	3	204
1973	-	244	0	244
1974	-	219	0	219
1975	-	205	3	202
1976	-	242	0	242
1977	-	228	1	227
1978	-	219	2	217
1979	-	228	1	227

USA

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	-	34	-	34
1967	-	29	-	29
1968	-	46	-	46
1969	-	72	-	72
1970	-	63	-	63
1971	-	103	-	103
1972	-	195	-	195
1973	-	176	-	176
1974	-	200	-	200
1975	-	442	-	442
1976	-	360	-	360
1977	-	250	-	250
1978	-	149	-	149
1979	-	144	-	144

Malaysia

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	189	0	184	5
1967	225	0	188	37
1968	282	0	285	-3
1969	351	0	356	-5
1970	430	2	401	31
1971	588	4	573	19
1972	728	0	696	32
1973	812	0	797	15
1974	1,031	1	901	131
1975	1,161	1	1,160	2
1976	1,380	0	1,263	117
1977	1,614	0	1,299	315
1978	1,786	0	1,280	506
1979	2,180	-	1,356	824

Indonesia

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	174	-	177	-3
1967	174	-	133	41
1968	188	-	152	36
1969	188	-	179	9
1970	216	-	159	57
1971	248	-	208	40
1972	269	-	236	33
1973	290	0	262	28
1974	351	0	281	70
1975	411	0	386	25
1976	433	0	405	28
1977	497	0	404	93
1978	524	-	412	112
1979	610	-	350	260

Nigeria

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	713	-	145	568
1967	410	-	17	393
1968	370	-	3	367
1969	445	-	8	437
1970	540	-	8	532
1971	600	-	20	580
1972	590	-	2	588
1973	590	-	0	590
1974	600	-	0	600
1975	640	-	31	609
1976	655	-	3	652
1977	660	1	1	660
1978	670	5	3	672
1979	675	12	-	687

Zaire

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	124	-	78	46
1967	149	-	109	40
1968	242	-	97	145
1969	245	-	135	110
1970	231	-	119	112
1971	220	-	36	184
1972	208	-	83	125
1973	194	-	67	127
1974	184	-	69	115
1975	181	-	40	141
1976	175	-	42	133
1977	173	-	21	152
1978	170	-	10	160
1979	170	-	-	170

Ivory Coast

	Prod.	Imp.	Exp.	Apparent domestic consump.
1965				
1966	17	4	1	20
1967	20	1	1	20
1968	22	2	0	24
1969	28	1	2	27
1970	50	-	12	38
1971	61	-	28	33
1972	93	-	47	46
1973	99	-	55	44
1974	145	-	101	44
1975	153	-	113	40
1976	150	-	91	59
1977	148	-	78	70
1978	145	-	75	70
1979	158	-	49	109

Source: FAO

that imports fell by 11% from the previous year to 475,000 tons. This was because the domestic supply of peanut oil was more adequate than usual as a result of production increase encouraged by the government, and the use of palm oil for making vanaspati was banned as a result of pressure from domestic vanaspati makers. A further reason was that soybean oil imports increased since soybeans and their oil were heavily oversupplied worldwide and prices were lower than for palm oil. India's consumption classified by use is not clear, but most of it is taken to be used for vanaspati.

2. Pakistan

Pakistan's economy is not in good shape because of the stagnation of production of cotton and exports of cotton products, the country's key industry. However, consumption of palm oil, along with other edible oils, increased steadily, aided by the liberalization of edible oil imports in July 1978. Remittances from Pakistani workers in the Middle East petroleum producing nations, which substantially improved the country's international balance of payments, were also a contributory factor.

Palm oil is mainly used as a raw material of vanaspati. There are two types of vanaspati makers: government-run and private. The former are obliged to use the palm oil imported by the Pakistan Trade Corporation, but private manufacturers can import their own. Recently the imports by these private companies have been on the increase, causing various problems in the distribution process. The Government is consequently intending to restrict imports by these private makers in the near future, and as a first step, in December 1981, it reportedly started to make substantial increases in import duties on privately imported oil.

Pakistan's imports and consumption of palm oil are also likely to be affected by the domestic production of vegetable oil (mainly cottonseed oil), the foreign currency situation and political trends.

3. Petroleum Producing Countries in the Middle East

In countries like Iraq, Saudi Arabia and Kuwait, vegetable oil consumption began to increase in the mid-1970s backed by the increased petroleum revenues. It is still growing because palm oil can be used as a substitute for ghee, as mentioned before, and it suits the people's taste in these nations.

Iraq's palm oil imports rose from 50,000 tons to 80,000 tons from the 1960s to the mid-1970s, but has stayed somewhat above 100,000 tons per year since 1974's import which was in total of

107,000 tons. In 1976 Saudi Arabia and in 1979 Kuwait entered the palm oil market, importing about 70,000 tons and 60,000 tons, respectively, in 1981.

This increase in imports is due in large part to the switch from processed soybean oil from the EC nations to refined palm oil from Malaysia, which has advanced refining technology as well as a geographical advantage. These importing countries do not have sufficient processing facilities, and when compared with processed soybean oil, palm oil is preferable because it is more suited to the Middle Eastern palate, even though it is more expensive. This is considered to be the reason for the steady growth in consumption. Political stability, amelioration of port facilities and domestic transportation and further improvement in the local diet will be necessary for steady growth in palm oil consumption in the future. However, in the light of the size of the population, consumption cannot be expected to grow beyond a certain level.

4. Nigeria and Other African Countries

Nigeria is a traditional palm oil producer as well as the biggest consumer, and is the country with the largest population in Africa. In recent years per capita oil consumption has grown with the increasing petroleum revenues and the population concentration in the cities, making the country a typical consumer.

The country had been the world's largest producer of palm oil until 1971 and biggest exporter until the early 1960s (Tables B-1 and Appendix Table 7), but the strife in Biafra in the 1970s brought about the devastation of oil palm estates and production thereafter has been stagnant. Meanwhile, the production of peanut — the country's main supply source of vegetable oil — slumped in 1973 because of a drought, which brought this industry to its knees by 1975, and palm oil was diverted to domestic use. In 1977, the country became an importer of palm oil. Nigeria's palm oil is not likely to be on the international market in the near future.

According to the FAO, Nigeria's palm oil consumption grew by an average of 2.6% per year, from 532,000 tons in 1970 to 687,000 tons in 1980 (Appendix Table 5-3). In 1979, it is the largest consuming country in the world, most of the oil being used for food.

Increased incomes brought about by petroleum revenues and draining of the agricultural population into the cities are aggravating the sluggishness of farm production and accelerating the growth of consumption. As a food importer, the country is already becoming a market of some significance.

Among the other major consuming countries in Africa are the

Ivory Coast and Zaire. Both are palm oil producing countries, but, as in Nigeria, domestic consumption tends to expand every year. Although the Ivory Coast is one of the biggest exporters, after Malaysia and Indonesia, the surplus available for export is decreasing.

In the whole of Africa, vegetable edible oil consumption showed a sharp increase: 3% of oil consumption were imported in the 1950s, 13% in the 1960s and 18% in 1976. This is because in African nations south of the Sahara, oilseed production as a whole had been considered to be a base for material supplies to their former suzerain states, while increased income after independence has increased the importance of home consumption. In the north African Arab nations also, particularly in Egypt, increasing level of oil consumption is thought to be contributing to the expansion of oil imports.

Table C-2 Output, Exports and Imports of Edible Vegetable Oils in Africa

(MT)

	Output	Exports	Imports	Balance
Peanut	1,004	273	150	581
Soybean	18	-	149	167
Rapeseed	7	-	137	144
Sesame seed	248	56	15	207
Cottonseed	342	11	182	513
Sunflower seed	145	-	27	172
Olive	195	75	43	163
Palm	1,084	125	-	959
Palm kernel	320	207	-	113
Copra	115	35	-	80
1976/77 Total	3,478	932	553	3,099
1960s	3,083	1,449	238	1,872
1950s	2,747	1,286	42	1,503

Notes: 1) All items are calculated in terms of oil equivalent.
2) For the sake of convenience, peanuts and sesame seeds for eating are included in the figures for these products.

Source: Oil Industry Yearbook, 1978

5. EC Countries

The EC countries have traditionally been a large market for palm oil. However, unlike consumption in the South Asian countries and Middle Eastern petroleum producers, that in the countries of the EC has remained unchanged since the late 1970s, and in 1981 imports decreased from the previous year by 13% to about 660,000 ton. This was mainly because of a narrowed price difference between palm oil and soybean oil resulting from mass purchases of palm oil by such countries as India. Especially in 1981 a relatively abundant supply caused by huge opening stocks of soybean oil in the world changed the price relationship in favor of soybean oil: the monthly average price of palm oil was at most $127 and at least $24 higher ($64 annual average) at CIF Rotterdam, and this has driven users to soybean oil. Furthermore, the EC countries' slow consumption can also be attributed to the differential import taxes (imposed by the EC) —— 4% on crude and 12% on refined oil, while 8% is levied on refined soybean oil for food and 5% on industrial use. Thus, most of the palm oil imported by the EC countries is crude.

However, although heavy duties are imposed on refined palm oil, imports have been on the increase in recent years. According to Oil World, 163,000 tons of refined oil was imported from Malaysia in 1979 (RBD [1] palm oil, 9,000 tons; olein, 28,000 tons; stearin, 65,000 tons), but this figure increased to 230,000 tons (47,000 tons, 31,000 tons, 67,000 tons respectively) in 1980.

The uses of palm oil differ from country to country, and have recently begun to show variations. In the Federal Republic of Germany, palm oil is used for processed foods such as margarine and shortening. The British used it as cooking oil and the Dutch put it to industrial use such as raw material for soap (Table C-3). Sales of stearin, in particular, which is used for making soap and fatty acids, are rising sharply. Aside from the problem of import taxes, the EC is considered a potentially large palm oil market both now and in the future.

However, in the EC nations, as in the United States and Japan, competition with other oils and fats such as soybean, rapeseed and sunflower seed oils, tallow, lard, fish oil, etc., is intense. Since the demand for soybean cake as a feed is growing, the supply of soybean oil is also expected to go on increasing in strong competition with palm oil. Therefore no sharp increase in consumption of palm oil is likely in the near future.

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1) RED: Refined, bleached and deodorised

Table C-3 Consumption in Major Consuming Nations, by Use
(Averages for 1972-74 and 1975-77)

(1,000 MT)

	1972-74				1975-77			
	Manufacture				Manufacture			
	Food	Non food	Food	Total	Food	Non food	Food	Total
Non-producing countries								
Developing countries								
India	-	36	-	36	114	-	-	114
Pakistan	-	16	-	16	33		98	131
					(25)		(75)	(100)
Developed countries								
UK	65	62	97	224	48	70	106	224
	(29)	(28)	(43)	(100)	(21)	(31)	(47)	(100)
Germany, FR	137	-	-	137	180	-	-	180
Netherlands	38	60	-	98		119		119
	(39)	(61)		(100)				
USA	141	40	10	191	308	15	36	358
	(74)	(21)	(5)	(100)	(86)	(4)	(10)	(100)
Japan	19	58	12	89	31	84	20	135
	(21)	(66)	(13)	(100)	(23)	(62)	(15)	(100)
Centrally planned								
USSR	-	-	-	-	15			15
China	-	122	22	144	-	147	26	173
		(85)	(15)	(100)		85	15	100
Producing countries								
Malaysia	5	14	14	33	59	87	34	181
	(15)	(42)	(42)	(100)	(33)	(48)	(19)	(100)
Indonesia	-	-	32	32	-	-	57	57
Nigeria	-	19	438	458	128	20	495	642
		(4)	(96)	(100)	(20)	(3)	(77)	(100)
Ivory Coast	-	35	9	44	1	8	43	52
		(80)	(20)	(100)	(2)	(15)	(83)	(100)
Zaire	-	10	99	108	7	-	128	135
		(9)	(91)	(100)	(5)		(95)	(100)

Note : 1) Percentage by use is listed in ( ).
2) Figures for food in Japan might be bigger than the figures which appear in this Table.

Source: FAO, Food Balance Sheet

6. The United States

The United States is the world's largest soybean producer, and the importation and consumption of palm oil change according to the price relationship between the two oils. Imports are down to between one-third and one-fourth of the large imports in 1975 and 1976, but palm oil's characteristic stability and suitability for processing have made the demand continuously steady. In 1981, despite the relative stability in the soybean oil price, palm oil consumption even increased.

Palm oil is mainly used for making processed foodstuffs, e.g., margarine, shortening, refined lard, etc.

7. Japan

Palm oil entered the Japanese market when its production in Malaysia expanded in the early 1970s when the Malaysian production expanded remarkably. At the same time, the sharp rise in the international price of soybean (in 1973) and soybean oil (in 1974) occurred. In 1973, 100,000 tons of palm oil was imported, nearly doubling the previous year's figure of 55,000 tons.

The reasons for this high growth of palm oil import are: a. Supply was stable; b. Consumers wishing to avoid cholesterol favored vegetable oil; c. It was easy to process into foods like margarine; d. The price was lower than that of soybean oil; and e. Having similar properties to lard, it was capable of being used as a substitute for it.

However, consumption peaked at 153,000 tons in 1976 and in 1980 a recovery of demand took it up to 148,000 tons, but the trend is generally level off or on a gradual decrease. The main reason for this is that, although palm oil entered the Japanese market as a "cheap oil", it lost its comparative cheapness and approached soybean oil in price. In Japan, more than half of the use of cooking oil is for frying, and palm oil with a high melting point has certain limitations in this use. In any case, in Japan, as in the Western nations, the demand for palm oil is still determined by its price relationship with other oils especially soybean oil.

The palm oil in Japan was previously for non-food use to some extent, but now it is mostly used for processed oil foods, such as margarine and shortening (Table C-4).

In 1981, while the total imports of palm oil decreased by 5% to 141,000 tons, imports of palm oil stearin doubled from the previous year's 5,000 tons to 10,000 tons. Since the use of stearin, which

Table C-4 Palm Oil Consumption in Japan

(1) Consumption for Food Manufacturing

(tons of crude)

	1976	1977	1978	1979	1980	1981
Margarine	25,584	24,658	25,331	26,616	23,627	29,866
Shortening	29,894	35,466	33,170	32,184	35,944	35,671
Refined lard	8,372	6,377	5,000	5,494	6,196	8,400
Other edible processed oil	27,278	28,648	29,899	32,633	37,172	35,560
Total	91,128	95,149	93,400	96,927	102,939	109,497

Source: Food Oil Division, Ministry of Agriculture, Forestry and Fisheries, Government of Japan

(2) Consumption in Oil Processing Industry

(MT)

	1976	1977	1978	1979	1980	1981
Hardeners	11,180	19,146	8,943	9,971	11,354	12,779
Solvents	126	-	-	19	63	29
Soap	36	40	23	49	22	10
Detergents, surface active agents, higher alcohols	1,452	1,991	1,762	1,441	861	982
Others	43,154	46,393	54,462	54,622	56,500	40,887
Total	55,948	67,570	65,190	66,102	68,800	54,687

Note : "Hardners" and "Others" are taken mostly for food, whereas, "Solvents", "Soap", "Detergents, etc." are for pure industrial use.

Source: Chemical Industrial Statistics Division, Ministry of International Trade and Industry, Government of Japan

has a melting point of 47°C to 48°C, is limited to a particular field, much of the volume imported is for industrial use, and such imports are likely to increase. Malaysia's repeal of the export tax on RBD stearin in October 1981 made it competitive to tallow.

8. USSR

The USSR, along with India, has increased its palm oil imports and consumption drastically during the last 4 to 5 years. Imports soared over quintuple, from 10,000 tons in 1976 to 46,000 tons in 1977, and in 1979 they reached 105,000 tons — more than twice the previous year's figure. Oil World predicts that in 1981 the imports will be 147,000 tons — 45% over the 1980 level — and will reach the 300,000 ton mark in 1982.

About 90% of the imports are thought to be RBD palm oil used for making margarine and ghee, and the rest consists of stearin, which is used as a substitute for tallow in the manufacture of soap.

The major oilseeds produced in the USSR are sunflower seed and cottonseed, whose combined production represents about 90% of the total. Recently, however, production has tended to level off, and imported seeds and their processed goods are continuing to increase the proportion in the total supply.

According to the U.S. Department of Agriculture,[1] imports of soybean oil in 1980/1981 exceeded those of palm oil, but in 1978/1979 and 1979/1980, palm oil imports were the second largest next to those of butter, so that it became a major imported oil. Because of the great demand for oil meal for use as feed, the USSR imports much more soybean than other oilseeds, but its trade partners and the amount of purchases vary widely depending on political factors. In the last few years it has been reported that the country is trying to stabilize the domestic supply by increasing the imports of vegetable oils, so the importance of palm oil for mixing into butter, which is in short supply, is likely to continue.[2]

The USSR usually buys an amount equivalent to several months' demand at a time, and this action, as in the case of grain, causes disturbances in the international market.

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1) USDA, Foreign Agriculture Circular, September 1981

2) It is thought that the USSR has not yet established advanced palm oil processing technology. However, it is reported that the oil can be made into margarine in that country.

9. China

According to the FAO, China has been increasing its palm oil consumption since the 1960s, along with an expansion of production, starting at an annual rate of 12.5% in the 1960s. Although the growth rate slightly diminished in the 1970s (7.9%), consumption reached 229,000 tons in 1979. Meanwhile, palm oil imports, which were negligible in the 1960s, began to grow around 1977 and reached 45,000 tons in 1979 (Appendix Table 8). It is thought that China's palm oil processing techniques, like those of the USSR, have not yet reached a satisfactory standard, but the oil is mainly used for industrial purposes, stearin being used in making soap, and olein for food.

In the last 4 or 5 years, the production of oil, chiefly from rapeseed and peanut, has been on the rise in China. As of 1981 the per capita consumption of edible oil is as little as 3.3 kg, but if the country adopts a policy of increasing this figure, the consumption of palm oil will also expand. As mentioned before, the country is trying to raise palm oil production around Hainan Island, but there is a possibility that it will increase imports even more. Such changes are being watched for.

D. INTERNATIONAL TRADE AND PRICES

I. The International Trade Situation

Until the 1960s, the general flow of oil palm products in the world was from Africa to Europe, but today they are spreading out all over the world from Malaysia and Indonesia. In the late 1970s, the South Asian countries and the petroleum producing countries in the Middle East emerged as large palm oil importers (Fig. D-1).

Palm oil exports went up rapidly at the beginning of the 1970s, reflecting Malaysia's production growth. During the 9 years from 1971 to 1979, world palm oil exports rose from 1.16 million tons to 2.29 million tons, a high average rate of 7.8% a year (Table D-1).

In Malaysia, refined palm oil (RBD palm oil, palm olein, palm stearin, etc.) accounted for 17.5% of the country's palm oil exports in 1975, but due to the policy of raising added value, the proportion rose to 93.9%, or 2.35 million tons, in 1981 (Table D-3). Only a little of crude palm oil are now exported from Malaysia, including that from East Malaysia. Thus the exports from the Peninsular Malaysia are mostly refined; but the greater part of palm crude oil is exported to the EC nations such as the United Kingdom and the Netherlands. In these countries palm oil refining and processing industries have long been established, and there exists a strong demand for crude oil. The governments of these countries impose duties on processed oil products ducts in favor of crude oil imports (see Appendix Table 4 in [1-1] Generenal Description on Oilseeds and Oils).

Palm oil imports are increasing chiefly in the South Asian and Middle Eastern developing countries. India and Pakistan, in particular, increased their imports from 140,000 tons (7.1% of the total world imports) in 1975 to 600,000 tons (24.5%) in 1979. This is closely related to the production of oilseeds such as peanut, rapeseed, etc., in the region, and to the foreign currency situation. According to Oil World, India reduced its palm oil imports in 1981 by 11% from the previous year to 475,000 tons because of the domestic oil situation.

With the growing population and income, oil consumption in the developing countries is expected to increase from now on, and their trade in palm oil is likely to become vigorous. In African nations which are traditional palm oil producers, the surpluses available for export are shrinking, and the volume of exports is likely to dwindle. The oil trade will therefore expand with even more dependence on Malaysia.

Fig. D-1 Flow of Palm Oil: 3-Year Averages for 1979 - 81, 1972 - 74

(1,000 MT)

Palm Oil Prodn.

4,114 (100%)	Malaysia 1,860 (45.2)	Nigeria 668 (16.2)	Indonesia 544 (13.2)	China P.R. 176 (4.3)	Zaire 171 (4.2)	Others		(1977-79)
2,661 (100%)	Malaysia 857 (32.2)	Nigeria 593 (22.3)	Indonesia 303 (11.4)	Zaire 195 (7.3)	China P.R. 152 (5.7)	Ivory Coast 113 (4.2)	Others	(1972-74)

Palm Oil Exports

3,402 (100%)	Malaysia 2,231 (65.6)	Singapore 531 (15.6)	Indonesia 350 (10.3)	Others		(1979-81)
1,242 (100%)	Malaysia 799 (64.3)	Indonesia 100 (8.1)	Zaire 72 (5.8)	Ivory Coast 69 (5.6)	Others	(1972-74)

Palm Oil Imports

3,372 (100%)	Singapore 555 (16.5)	India 467 (13.9)	Pakistan 221 (6.6)	UK 192 (5.7)	N. lands 180 (5.3)	Germany, FR 168 (5.0)	Japan 143 (4.2)	Others	(1979-81)
1,544 (100%)	Singapore 250 (16.2)	UK 225 (14.6)	USA 191 (12.3)	Netherlands 157 (10.2)	Germany, FR 144 (9.3)	Japan 90 (5.8)	Iraq 90 (5.8)	Others	(1972-74)

Palm Oil Disapp.

4,406 (100%)	India 459 (10.9)	Nigeria 440 (10.0)	Indonesia 314 (7.1)	W. Malaysia 305 (6.9)	Pakistan 221 (5.0)	UK 190 (4.3)	Others (1979-81)

Source: Oil World; Production: FAO

Table D-1 Trends in Exports and Export Values of Palm Oil

(MT; US$1,000)

	Malaysia	Singapore	Indonesia	Nether-lands	Ivory Coast	Papua New Guinea	Germany, FR	Solomon Is.	Cameroon	Benin	Zaire	World Total
Amount of Exports												
1966	184,617	55,947	177,084	8,127	680		2,884		5,698	9,907	78,026	698,984
1967	188,077	62,535	133,302	8,492	513		2,174		9,938	8,515	109,040	573,657
1968	285,965	91,434	152,409	11,289	194		3,984		7,327	10,067	96,580	689,497
1969	356,743	113,171	179,100	16,396	2,025		4,816		6,301	12,591	134,576	860,918
1970	401,931	133,265	159,100	19,314	12,542		5,270		8,429	15,000	118,926	906,198
1971	573,355	194,242	208,978	42,947	28,019		4,856		8,265	18,466	35,605	1,162,477
1972	696,984	213,252	236,474	60,291	47,635	3,464	6,981		1,008	7,237	82,539	1,381,516
1973	797,805	223,866	262,689	64,643	55,729	8,066	7,705		1,017	5,558	66,525	1,514,351
1974	901,566	217,554	281,226	50,580	101,618	8,734	11,406		18,040	1,649	69,143	1,683,552
1975	1,160,568	140,413	386,187	57,363	113,791	18,438	20,267		9,070	5,770	40,253	2,005,023
1976	1,263,192	155,605	405,647	69,965	91,842	27,087	20,013	3,545	5,511	3,191	41,625	2,114,127
1977	1,299,342	207,338	404,638	74,012	78,815	26,883	18,847	6,246	8,803	3,277	20,522	2,176,292
1978	1,280,768	177,077	412,153	59,231	75,126	29,156	18,729	10,334	9,395	755	9,647	2,114,193
1979	1,356,000	383,292	350,780	56,719	49,542	29,424	15,053	12,779	7,000	3,000	-	2,294,672
1980	2,137,341	656,035	434,300	76,508	76,000*	35,456	27,115	15,649	13,763	11,022	9,500*	3,534,169
Value of Exports												
1966	39,225	11,869	33,403	2,399	187		877		924	1,824	17,290	145,171
1967	37,702	12,724	23,561	2,454	137		614		1,860	1,069	22,272	112,871
1968	40,662	12,938	19,517	2,469	49		1,005		1,168	1,693	17,356	102,478
1969	49,984	16,122	24,080	3,886	376		1,170		942	1,702	19,465	123,700
1970	86,324	28,316	35,100	6,085	2,878		1,590		2,146	3,331	28,181	200,923
1971	124,641	44,438	44,679	13,724	6,945		1,646		2,120	4,074	7,755	261,507
1972	128,638	39,178	41,270	16,519	8,688	605	2,164		210	1,489	15,119	260,207
1973	191,631	50,526	70,159	25,956	15,072	1,492	3,335		299	1,450	19,199	385,457
1974	451,050	108,097	157,318	38,534	63,607	3,960	8,709		9,812	560	39,781	892,103
1975	551,279	73,362	151,639	40,469	48,880	9,290	13,590		3,939	1,847	20,461	930,772
1976	454,618	63,194	135,517	35,656	32,614	8,344	10,817	1,421	1,893	845	10,530	767,232
1977	682,572	116,535	183,604	49,269	42,522	9,832	14,682	3,210	4,304	798	9,541	1,133,398
1978	718,922	104,749	208,804	46,704	46,611	13,527	16,124	5,328	5,577	82	5,000	1,191,452
1979	858,300	238,192	204,544	47,404	34,800	16,822	13,521	7,368	4,600	1,000	-	1,451,620
1980	1,158,035	408,457	215,355	70,051	45,600	20,643	22,154	7,953	6,850	5,839	4,800	1,994,599

* Unofficial figures

Source: FAO, Trade Yearbook, 1980

Table D-2 Trends in Imports and Import Values of Palm Oil

(MT; US$1,000)

	Singapore	Pakistan	Nether-lands	UK	Germany, FR	Japan	USA	Iraq	USSR	Bangladesh	India	World total
Amount of Imports												
1966	58,805		68,988	150,246	114,851	20,170	34,422	36,015	3,008			681,553
1967	67,541	6,032	64,564	98,706	99,101	22,029	29,148	51,890	1,500			626,691
1968	58,393	20	71,083	108,739	126,398	28,078	46,851	54,012	1,400	25		672,335
1969	113,224	1,000	77,445	139,396	132,483	41,811	72,402	58,323	1,500			857,177
1970	140,836	930	89,342	162,720	115,907	40,292	63,896	98,539		12	10	923,884
1971	211,624		129,093	222,539	150,189	40,947	103,415	78,358		6	669	1,209,436
1972	230,876	3,356	161,612	207,936	151,375	54,864	195,548	81,861			672	1,372,133
1973	253,836	970	160,802	244,120	151,565	100,320	176,106	82,021			51,536	1,548,829
1974	265,566	29,844	147,120	219,294	133,011	115,334	200,352	72,628	3,000		53,134	1,559,215
1975	127,704	123,620	185,640	205,844	209,722	107,740	442,174	115,843		1	18,045	1,882,163
1976	147,844	136,063	190,902	242,184	193,253	153,489	360,947	35,115	10,200	1	20,783	1,962,373
1977	156,424	124,284	182,907	228,801	197,505	146,720	250,868	103,900	46,600	4	301,000*	2,316,778
1978	85,818	133,032	150,637	219,542	170,375	141,704	149,403	117,600	38,234		378,804	2,031,644
1979	223,220	201,421	167,047	228,735	174,910	138,995	144,633	130,000	98,311		400,000*	2,449,695
1980	692,000	210,960	204,047	183,290	173,679	148,286	116,825	108,500*	101,457	75,800*	530,800*	3,314,528
Value of Imports												
1966	13,023	-	15,204	34,650	27,303	4,853	7,774	8,733	768			159,641
1967	13,817	1,733	14,345	22,196	23,010	4,960	6,450	11,815	312			142,032
1968	7,743	8	11,590	18,502	23,633	4,809	7,426	9,740	230	11		118,626
1969	15,733	282	12,415	21,965	21,745	6,746	10,478	9,282	240			137,519
1970	29,640	268	21,868	38,056	29,095	9,780	14,506	16,677		5	4	210,464
1971	46,359		31,881	55,298	39,655	10,284	23,422	20,188		8	198	300,895
1972	42,780	1,042	33,813	45,979	34,698	11,213	38,739	16,791			157	292,843
1973	55,521	212	42,657	63,417	46,038	28,344	44,343	24,397			19,158	422,943
1974	120,820	15,788	84,653	120,868	86,057	61,448	96,294	36,984	2,100		17,048	836,237
1975	66,662	87,010	85,932	97,806	106,326	51,204	204,830	67,668		1	7,571	971,489
1976	54,218	59,228	73,737	90,417	77,374	58,717	131,125	15,241	7,794	1	9,383	783,852
1977	82,153	62,874	92,620	122,466	108,334	76,240	116,654	60,000	24,160	5	150,000	1,224,316
1978	47,947	68,683	82,657	120,148	92,006	83,822	68,713	74,000	19,666		236,955F	1,161,166
1979	135,404	126,887	105,599	152,041	114,610	93,414	86,249	94,000	59,983	818	256,000*	1,604,947
1980	384,757	135,531	119,761	113,607	108,440	91,134	61,558	74,000	64,643	49,000	358,000	2,053,031

* Unofficial figures; F: FAO estimates

Source: FAO, Trade Yearbook, 1980

Table D-3 Malaysia: Palm Oil Exports by Country

(1,000 MT)

	1970			1975			1979			1980			1981		
	Crude	Refined	Total	Crude	Refined	Total	Crude	Refined	Total	Crude	Refined	Total	Crude	Refined	Total
USA	19.9	-	19.9	262.6	75.1	337.7	7.8	102.8	110.6	-	120.4	120.4	0.5	105.6	106.1
UK	74.9	-	74.9	162.6	0.6	163.2	126.4	35.9	162.3	73.1	58.9	132.0	53.9	106.0	159.9
Netherlands	33.0	-	33.0	163.6	1.3	164.9	89.0	79.3	168.3	80.2	105.7	185.9	64.4	145.9	210.3
Iraq	63.2	-	63.2	74.6	-	74.6	-	66.5	66.5	2.9	56.2	59.1	-	16.3	16.3
India	0.1	-	0.1	23.1	-	23.1	12.2	270.5	282.7	2.0	395.9	397.9	-	410.1	410.1
Germany, FR	6.7	-	6.7	23.1	1.0	24.1	44.6	19.0	63.6	19.3	24.6	43.9	3.6	59.8	63.4
Canada	11.9	-	11.9	24.0	-	24.0	-	-	-	-	-	-	-	14.0	14.0
Japan	11.0	-	11.0	50.8	9.2	60.0	8.8	120.6	129.4	1.0	141.8	142.8	1.1	159.6	160.7
Italy	5.0	-	5.0	7.0	-	7.0	23.0	-	23.0	6.0	10.8	16.8	4.1	19.4	23.5
Pakistan	-	-	-	10.3	-	10.3	5.6	62.3	67.9	4.0	113.4	117.4	-	211.8	211.8
Singapore	143.3	-	143.3	49.1	106.6	155.7	8.6	518.3	526.8	4.0	626.4	630.4	5.3	418.5	423.8
Others	32.7	-	32.7	106.6	9.4	116.0	32.2	268.1	300.2	22.4	408.4	430.8	20.4	685.8	706.2
Total	401.9	-	401.9	957.6	203.2	1,160.8	358.2	1,543.2	1,901.4	215.0	2,062.4	2,277.4	153.3	2,352.8	2,506.1
	(100)	-	(100)	(82.5)	(17.5)	(100)	(18.8)	(81.2)	(100)	(9.4)	(90.6)	(100)	(6.1)	(93.9)	(100)

Note : Percentage shares of total exports are listed in ( ).

Source: 1) PORLA (Malaysia), Palm Oil Statistical Handbook, 1980
2) Oil World

A major characteristic of the palm oil and palm kernel oil trade is the large volume of re-exportation from countries like Singapore and the Netherlands. Exports of crude and kernels from Malaysia, which produces about half of the world total, have come to account for only a fraction of the total due to the country's export taxation system intended to raise added value.[1] Furthermore, the processing industry in the producing countries has been developing. Consequently, the volume of trade of re-exporting nations has been unchanged in the last few years. As for palm oil, however, the Federal Republic of Germany re-exports about 20,000 tons, or 15% of the amount imported; the Netherlands 60,000 to 70,000 tons (one-third to half); and Singapore 400,000 to 700,000 tons (nearly all). The Federal Republic of Germany re-exports to France, Australia, Switzerland and African countries; and the Netherlands to the Federal Republic of Germany, France, Belgium, the Middle East and African countries (Table D-4). Singapore exports to a large number of countries, virtually the whole world, so that it acts as a major distribution center, and there are many European and American dealers handling palm oil and palm kernel oil in Singapore (Table D-5).

Although a succession of palm oil producing countries are becoming independent traders, Singapore is at the center of a network, making the most of its status as a free port. Massive transactions will probably be carried out directly between producing and consuming countries as a matter of policy, but with Malaysia's production on the rise, the role played by Singapore in opening up new markets and creating new demand should be noted. Among the countries to which Singapore exports over 50,000 tons a year are the USSR, Bangladesh, India, Pakistan and Saudi Arabia.

II. Practice of International Trade

International transaction in palm oil depends on the situation in the exporting and importing countries and the relations between nations. Malaysia, which accounts for about 60% of total world palm oil exports, and Europe, where approximately one fourth of the world trade is carried out, are discussed below as examples of an exporter and an importing market.

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1) The export taxation system in Malaysia was revised in January 1, 1978. In this revision, in addition to the basic taxes, tax exemption based on the degree of processing was introduced. The amount of the tax is determined according to the gazette price for raw and processed oils announced on the first of every month (Gazette price: the weighted average of the FOB price of exported palm oil between the fifteenth of the month two months before the given month and the fourteenth of the preceding month).

Table D-4 Imports and Exports of Palm Oil by the EC

(1,000 MT)

		1976	1977	1978	1979	1980
Germany, FR	Imports	193.3	197.5	170.4	174.9	173.6
	Exports	20.0	18.8	18.7	15.1	27.1
Netherlands	Imports	190.9	182.9	150.6	167.0	204.0
	Exports	70.7	74.0	52.9	56.7	76.5
UK	Imports	242.2	228.8	219.5	228.7	183.4
EC	Imports	798.6	766.0	719.2	783.5	756.7
	Exports	96.8	108.5	93.8	89.5	119.3
W. Europe	Imports	858.9	826.7	782.1	852.9	833.9
World	Imports	2,105.1	2,450.1	2,455.0	2,875.3	3,475.4
	Exports	2,228.9	2,397.8	2,474.9	2,956.9	3,636.1

1) Germany, FR's Imports and Exports of Palm Oil

(1,000 MT)

Imports			Exports		
	1979	1980		1979	1980
Malaysia	71.0	53.1	France	1.0	3.0
Indonesia	48.5	51.5	Australia	4.1	4.7
Papua New Guinea	8.2	13.7	Switzerland	1.7	1.7
Ivory Coast	15.7	27.8	Algeria	4.1	3.7
Netherlands	20.5	17.9			
Total	174.9	173.6	Total	15.1	27.1

2) The Netherlands' Imports and Exports of Palm Oil

(1,000 MT)

Imports			Exports		
	1979	1980		1979	1980
Malaysia	78.4	65.9	W. Germany	23.1	19.8
Indonesia	60.5	88.5	France	18.4	17.7
Papua New Guinea	11.7	11.5	Belgium-Luxemburg	4.4	4.6
Ivory Coast	1.5	13.4	UK	2.9	2.6
Zaire	0	4.7	Iran	0	23.1
Total	167.0	204.0	Total	56.7	76.5

Source: Oil World

Table D-5 Singapore's Imports and Exports of Palm Oil

(1,000 MT)

	1979		1980	
	Imports	Exports	Imports	Exports
Palm oil	568.3	492.2	714.3	678.8
Processed oil	(295.1)	(108.7)	(623.2)	(171.0)
Palm kernel oil	9.5	11.4	12.4	13.5

Palm Oil Exports from Singapore

(1,000 MT)

	Palm oil		Processed palm oil	
	1979	1980	1979	1980
Netherlands	52.9	25.5	(3.0)	(3.4)
Italy	8.5	6.7	(-)	(-)
UK	10.0	7.9	(10.0)	(7.9)
Spain	6.2	5.6	(-)	(-)
Portugal	7.3	5.2	(-)	(-)
USSR	39.8	57.1	(-)	(-)
USA	5.0	-	(5.0)	(-)
Japan	12.3	8.1	(5.0)	(8.1)
Korea, Rep of	3.8	20.2	(-)	(-)
Taiwan	1.7	3.2	(0.1)	(1.1)
China	4.3	0.3	(4.3)	(0.3)
Thailand	6.8	17.4	(3.9)	(13.2)
Burma	7.2	6.7	(7.2)	(6.7)
Bangladesh	1.7	50.4	(0.2)	(18.6)
India	100.4	116.6	(17.0)	(22.7)
Pakistan	111.6	154.3	(-)	(-)
Iraq	3.5	10.9	(-)	(-)
Kuwait	0	9.5	(-)	(-)
S. Arabia	57.4	90.5	(38.4)	(59.6)
Israel	10.1	7.6	(2.8)	(0.8)
Jordan	3.3	6.5	(-)	(-)
Syria	1.0	3.7	(1.0)	(3.7)
Egypt				
Tanzania	2.9	2.5	(-)	(-)
Kenya	1.9	3.1	(0.1)	(0.8)
Others	33.1	59.3	(10.7)	(24.1)
Total	492.2	578.8	(108.7)	(171.0)

Source: Oil World

1. Malaysia

Malaysia's palm oil distribution route generally runs from a farm owning an extraction mill that produces crude to the refinery, to the dealer and to the importer.

One distribution system of crude oil in Malaysia is that of the MPOGC (Malaysian Palm Oil Growers' Council), which was reorganized from the MPOPA (Malaysian Palm Oil Producers' Association). Its main member enterprises are major privately-run plantations which carry out the series of operations from cultivation to extraction. While world trade was formerly centered on market prices in London, the European oil palm planters formed a cartel to pool palm oil and control the trade and prices. It is said that MPOPA, which inherited the functions of this London pool, used to handle 90% of the total exports. In July 1974, the pool system was abolished, and each of the former member became free to conduct sales activities in its own way. However, even after the abolition, trade was conducted on bargain contracts established by MPOPA, and other dealers were frequently excluded.

Until the mid-1970s, when most palm oil exports from Malaysia were of crude, the leading plantation groups with large storage facilities held sway over the distribution system and controlled 80 to 90% of the trade. Today, however, since exported palm oil is mostly refined, MPOGC's control is considerably limited.

The shift in exports from crude to refined oil created a similar change in long-term contracts for shipping freights. Formerly there existed a long-term contract between the MPOPA and the FEFC (Far East Freight Conference) for Europe-bound exports, and the members had to use the FEFC, but gained favorable charge conditions from bidding shipping companies. For US-bound exports there was a similar contract with Stalt Nielsen, a large shipping company providing favorable rates for members. However, with the palm crude exports on the decrease, long-term contracts of this type have almost disappeared.

As for refined oil exports, although there are more than 40 refining companies in Malaysia, PORAM (Palm Oil Refineries' Association of Malaysia) does not have such tight control as the MPOPA, and refineries make individual contracts with shipping companies.

Although the quality standards of crude and refined oils are not uniform, their general characteristics are listed in Table D-6.

The total capacity of Malaysia's storage tanks is about 610,000 tons as of 1980, but if the 320,000 ton capacity of porthead tanks (Malaysia, 263,000 tons; Singapore, 59,000 tons) is added, the capacity amounts to 930,000 tons. Major estates have their own large storage facilities, and small ones without them are in practice forced to sell the oil to the big companies.

Table D-6 Quality Characteristics of Malaysian Crude Palm Oil at Time of Shipment

Property	Standard Quality		Special Quality	
	Typical value	Range	Typical value	Range
F.F.A. (%)	3	± 1	1.8	± 0.2
P.V. (m. equiv./kg)	4.5	± 2	3	± 1
100 (a.235 + a.270)	15	± 3	10	± 2
Heat bleach*	0.7	± 0.3	0.5	± 0.3
Mixed bleach	1.2	± 0.6	1.1	± 0.2
Moisture (%)	0.1	± 0.03	0.1	± 0.03
Impurities (%)	<0.01	-	<0.01	-
Iron (p.p.m.)	3.5	± 1	3.5	± 1
Copper (p.p.m.)	<0.2	-	<0.2	-

* Residual colour in Lovibondred units measured in a 1-inch cell after bleaching under CO_2 at 300°C for 30 minutes.

Residual colour in Lovibondred units measured in a 5 1/4-inch cell after a heat bleach under CO_2 at 240°C for 2 hours followed by a 20-minute bleach at 110°C with 1% tonsil earth. In general, it is found that Special Quality oils give consistently better colours with most bleaching methods.

MPOPA: Malaysia Palm Oil Producers Association

(B) Quality Characteristics of Malaysian Processed Palm Oil

Fatty Acid (%)	Symbol	Range		
		Palm Oil	Palm Olein	Palm Stearin
SATURATED				
Lauric	12:0	0.1 - 0.4	0.1 - 0.6	0.1 - 0.4
Myristic	14:0	0.9 - 1.4	0.9 - 1.4	1.1 - 1.8
Palmitic	16:0	41.9 -46.7	37.9 -41.8	46.6 -73.8
Stearic	18:0	4.3 - 5.1	4.0 - 4.8	4.4 - 5.6
Arachidic	20:0	0.3 - 0.7	0.3 - 0.8	0.3 - 0.7
MONOUNSATURATED				
Palmitoleic	16:1	0.1 - 0.3	0.1 - 0.3	<0.05- 0.2
Oleic	18:1	37.3 -40.5	41.2 -43.6	15.6 -37.0
POLYUNSATURATED				
Linoleic	18:2	9.1 -10.6	10.4 -13.4	3.2 - 9.0
Linolenic	18:3	<0.05- 0.6	0.1 - 0.6	0.1 - 0.6
Iodine Value (Wij's)		51.0 -55.3	56.1- 60.3	21.6 -49.1
Slip point, °C		33.2 -38.9	N.M.	44.6--56.2
Cloud point, °C		N.M.	6.1- 14.3	N.M.

* - Source: Tentative results from current PORIM (Palm Oil Research Institute of Malaysia) Survey.

N.M. - Not measured.

The main exporting ports are Port Kelang, Butterworth, Pasir Gudang (Johore) and Kuantan (Pahang).[1)]

Under the policy of raising added value, Malaysia imposes higher export duties on crude, while the duties on processed palm oil go down with each stage of processing (four stages), so that for oil in the fourth stage (fully refined oil) the duty is zero.[2)] The

1) The size of each shipping port is indicated as follows:
   a. Port Kelang: Has a porthead tank of 82,500 tons owned by five private companies (Socfin, Barlow, Boustead, Harrison & Crosfield and Sime Darby), a tank of some 31,000 tons owned by FELDA, and three berths (28,000 tons). The capacities of pipeline (300-600 m) from tankyard to berth are 150-200 tons/hour each.
   b. Butterworth: Has a modern facility owned by United Plantations, a tank of 23,100 tons owned by Palmex, one of 21,000 tons owned by Unilate and one of 6,000 tons owned by Barlow Boustead (total: 56,000 tons). The capacity of the 200 m pipeline from the tankyard to the berth is 200 tons/hour in each case.
   c. Pasir Gudang: Has a tank of 33,000 tons owned by FELDA and Johore Bulkers, which is exclusively for processed palm oil, and a berth with a loading capacity of 150-300 tons/hour still operated by Guthrie. However, until the port was constructed, FELDA used Singapore Palm Oil Bulking (tank, 12,000 tons; shipping capacity, 250 tons/hour), a member of the Guthrie group, and shipped from Singapore.

2) Exemption Formula for Processed Palm Oil with effect from Oct. 23, 1981 at 4:00 p.m.

Export duty for processed palm		Exemption
Category		
I	$95 and less	100%
	above $95 - $200 and less	0.5 (Dp-95) + 95 + .35(Dp-Dc)
	" $200 - $365 "	0.35(Dp-200) + 147.5 + .35(Dp-Dc)
	$365 and above	0.2 (Dp-365) + 205.25 + .35(Dp-Dc)
II	$95 and less	100%
	above $95 - $200 and less	0.6 (Dp-95) + 95 + .35(Dp-Dc)
	" $200 - $365 "	0.45(Dp-200) + 158 + .35(Dp-Dc)
	$365 and above	0.3 (Dp-365) + 232.25 + .35(Dp-Dc)
III	$95 and less	100%
	above $95 - $200 and less	0.65(Dp-95) + 95 + .35(Dp-Dc)
	" $200 - $365 "	0.5 (Dp-200) + 163.25 + .35(Dp-Dc)
	$365 and above	0.35(Dp-365) + 245.75 + .35(Dp-Dc)
IIIA	$95 and less	100%
	above $95 - $200 and less	0.7 (Dp-95) + 95 + .35(Dp-Dc)
	" $200 - $365 "	0.55(Dp-200) + 168.5 + .35(Dp-Dc)
	$365 and above	0.4 (Dp-365) + 259.25 + .35(Dp-Dc)
IV		Full exemption - 100%

Dp = Duty on processed palm oil Dc = Duty on crude palm oil
Source: Royal Customs and Excise Department, Malaysia .

amount of duty is determined by the duty rates corresponding to the gazetted export prices announced on the first day of each month, so producers and dealers watch these price movements with great attention. The gazetted export prices are weighted averages of the FOB export prices between the 16th day of the second month before a given shipment month and the 15th day of the month before. Based on these gazetted prices, the amount of duty is calculated using the formula determined from the duty list (see Appendix Tables 9-1 and 9-2). Most of the palm oil exported from East Malaysia is still crude, so the country grants estates and smallholders a 30% exemption of export duty.

Malaysia imposes export premiums on palm oil. PORLA (Palm Oil Registration and Licensing Authority) exacts M$ 1 per ton of crude from factories for the operating and managing costs of export registration. PORIM (Palm Oil Research Institute of Malaysia) also adds a premium of M$ 4 per ton of crude for the cost of its research activities.

The Kuala Lumpur Commodities Exchange (KLCE) was established on October 23, 1980 as the world's first regular palm oil market. Its system is said to be a miniature of the Chicago Commodity market.[1)] In addition to palm oil, rubber and tin are also traded at KLCE.

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1) Outline of Kuala Lumpur Exchange
Source: Oil, Vol.34, No.1 (in Japanese)

Trading hours:
Open from Monday through Friday for four hours each day: 11:30 a.m.-12:30 p.m. and 3:00 p.m.-6:00 p.m., except on days off designated by the Steering Committee.

Outline of Trade: (In Malaysian $)
Unit: 1 lot = 25 metric tons (Chicago is almost the same: 1 lot = 30 short tons)
Commodity: Malaysian crude palm oil of high quality
Quality : FFA under 4% (at time of storage), FFA under 5% (at time of removal from tank), water and residue under 0.25%
Delivery Destinations: Malaysia's approved tanks in major ports - specifically, Johore, Port Kelang, Kuantan and Butternworth. Others may on occasion be designated by the Exchange.
Currency : Malaysia $ per ton (US$1 is roughly Malaysia $2.15).
Designated months: January, March, May, July, September, November, the current month, the following month and the month after the following. For futures, 18 months ahead.
Limits up and down: The first day, M$50; the second, M$75; the third, M$100; the fourth, no limit; the fifth, M$50, the same as the first (except in the current month. The limit is the closing price on the day prior to the first day.) (cont'd. on next page)

When it opened, trading was done mostly among intertraders and speculators, but now refiners seem to be participating increasingly. However, the volume of lots (1 lot = 25 tons) is small and only crude palm oil is listed, so the relationship between crude and processed oil, the later of which accounts for 90% of all the exports, does not stabilize. It is therefore difficult for it to function as a place of hedging. The reason for the refiners' entry into the market appears to be that the overly high market price of crude had the ill-effect of pulling up the actual trading prices.[1)]

Practical considerations in the basic system, such as delivery of goods and storage fees in the absence of tanks for use in trading, are reported to be unsatisfactory. Moreover, for foreign businesses, there are still some problems to be solved. For instance, only a locally incorporated firm may actually deliver goods; currency exchange is risky; and the commission for buying and selling is high.

2. Europe

The center of the world's palm oil import market is Europe, where about one-fourth of the world's palm oil is traded. Not only palm oil, but such oils as soybean and coconut oils are traded

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(footnote cont'd. from p. [1]-88)

Commission:

For non-members of the Kuala Lumpur Commodity Clearing House:	
Full member of the Exchange	M$12 per lot
Associate member of the Exchange	M$27
Non-member of the Exchange	M$62
For members of Clearing House:	
Full member of the Exchange	M$8 per lot
Associate member of the Exchange	M$20
Non-member of the Exchange	M$48

Commission for registration and user fee: M$8 per lot

If a non-member of KLCE and of the (Kuala Lumpur Commodity) Clearing House is to trade, M$62 plus M$8 (tatal M$70), must be paid for either buying or selling. To become a full member of the Exchange, a membership fee of $50,000 upon admission, an insurance payment of $30,000 and an annual subscription of $1,200 have to be paid. As of 1981 there were 24 member companies, including two Japanese ones. To become a member of the (Kuala Lumpur Commodity) Clearing House, a membership fee of $2,500 upon admission and an annual subscription of $1,000 must be paid. For associate membership of the Exchange, the entrance fee is $10,000 and an annual subscription is $600.

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1) Oil and Fat (Japanese Journal), Vol 34, No.1, 1981

mainly in Rotterdam, Netherlands; London, the United Kingdom; and Hamburg, the Federal Republic of Germany. Rotterdam is the biggest of these, with an estimated trading volume of four times as much as that in London and Hamburg. This is due to its geographical situation: close to the United Kingdom, France and northern Europe and connected to the Federal Republic of Germany through the River Rhine. Rotterdam and the adjoining Europort are equipped with berths for grain tankers and huge leased oil tanks, and attract leading corporations and brokers that do international transactions, including trade with centrally planned economies. As a result, Rotterdam has recently added color to the distribution market, while London and Hamburg have strengthened the color of consumer market. About 50% of the transactions of vegetable oil through brokers are reported to be of soybean oil, 25% of palm oil and 25% of others. Naturally, however, these figures vary widely from year to year.

Although in Europe rapeseed oil is produced in large quantities and accounts for a high percentage of oil consumption, but it is mainly used domestically and seldom appears in international transactions. Animal fat also appears on relatively few occasions for the same reason.

The main transaction route is from the trading firm (or maker) through the broker to the customer in a widespread distribution network. Naturally, experienced grain dealers with a large capital and a full range of trading functions have a great influence. A transaction through brokers sometimes involves 10 or more transfers before the goods at last reach the consumers. During this time, the functioning of the market changes the prices of a variety of oils and raw materials of oils.

The large-scale manufacturers such as Unilever Ltd. exercise influences on the commodities markets not only in the Netherlands but all over Europe. Unilever Ltd. is said to have an 80% market share of oil and oil products in the Netherlands. The company's purchasing policy of materials (fats and oils) has a great effect on market prices.

Generally, about 50% of the industry in the Federal Republic of Germany is located around Hamburg in the Elbe River Valley; the rest is along the Rhine River, but the Rhine area is gradually assuming greater importance. This is because Hamburg has a geographically limited access to the Ruhr Basin, which is the Federal Republic of Germany's biggest consuming region and is substantially affected by the functioning of the Rotterdam market through the River Rhine. Although Hamburg has functions as a domestic distribution market, it lacks to some extent the conditions for internationalization. It might be said that Hamburg is characteristically a local market.

Some transactions are performed directly between a maker and a

customer, but most pass through brokers. In Hamburg, there are international brokers who trade all over Europe. On the other hand, in the Rhine Valley, transactions are carried out directly by brokers in Rotterdam, and recently in Hamburg also, trade by way of Rotterdam has been increasing.

About 60% of the transactions through brokers are in soybean oil, about 15% in palm and rapeseed oils respectively, and the rest in others, but these percentages vary annually. Soybean oil is traded in larger quantities in Hamburg than in Rotterdam. In principle, the extractors' tanks are the places of delivery.

In the United Kingdom also, many of the transactions are by way of brokers. The amount of extraction is relatively small, and extracted oil, rather than raw materials, is imported to make up most of the shortage. Animal fats, such as whale oil, used to take up a large proportion of trade, but recently vegetable oils, especially soybean oil, have been traded in large quantities. Cooperation among dealers is well established, so excessive competition in sales of products is averted. Oil products such as margarine are usually sold directly by the makers, and go through brokers only on rare occasions.

III. Prices

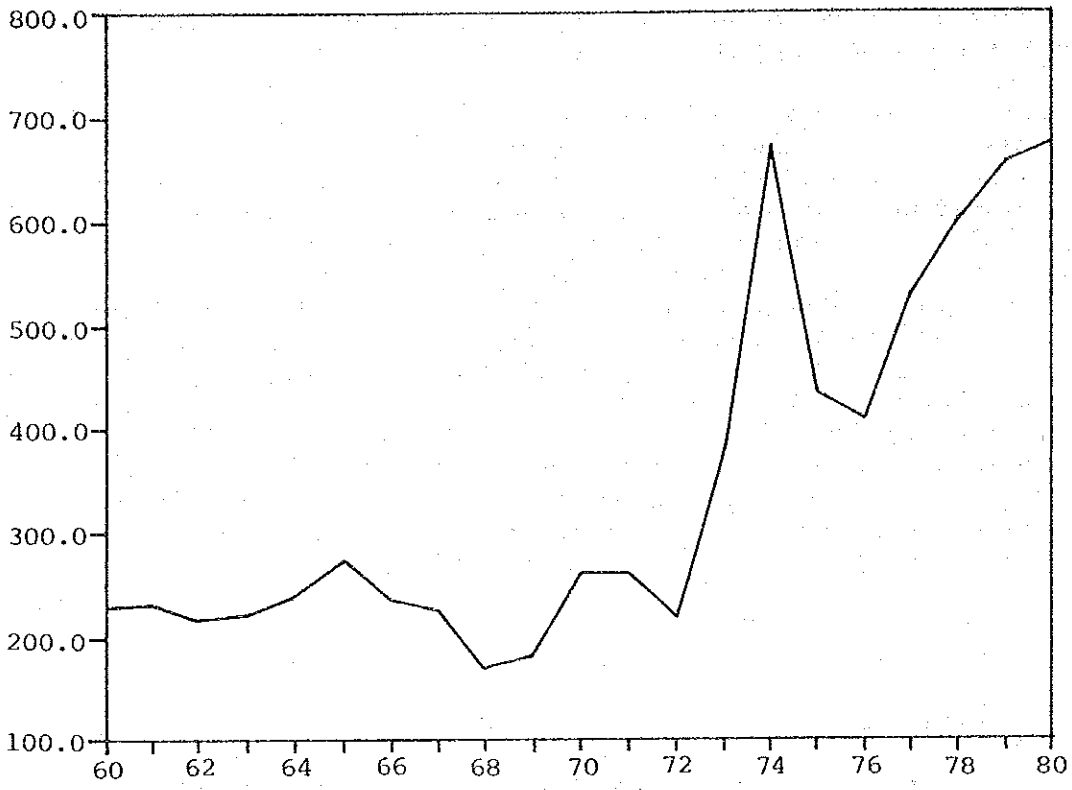
The prices of palm oil, like those of other products, are determined basically by the balance of supply and demand. However, since each vegetable oil can be used as a substitute for others, the price of each is affected by the prices of substitutes for it; and palm oil is no exception to this. At the same time, the price of palm oil affects the prices of other oils.

The oils interrelated with palm oil in relation to price are such animal fats as tallow, and vegetable oils like soybean and rapeseed oils (see [1-1] General Description, Table 10).

Trends in palm oil prices are indicated in Fig. D-2 (For actual prices, see Appendix Table 3 in the General Description). Palm oil entered the world oil market as a cheap oil. The demand for it expanded in the early 1970s, particularly from late 1973 to the spring of 1975, when the prices of edible oils like soybean oil soared, and price rises of palm oil, whose production was growing, were relatively small, making it cheaper than other comparable oils.

However, mass imports by India and Pakistan brought about both by faltering oilseed production at home from around 1977 and by increased foreign reserves, opened up the new palm oil market, and Malaysia's unexpectedly sluggish production in 1977 and 1978 following the

Fig. D-2 Price Movements of Palm Oil, 1960 - 1980
(Malaysia, 5% CIF U.K.)



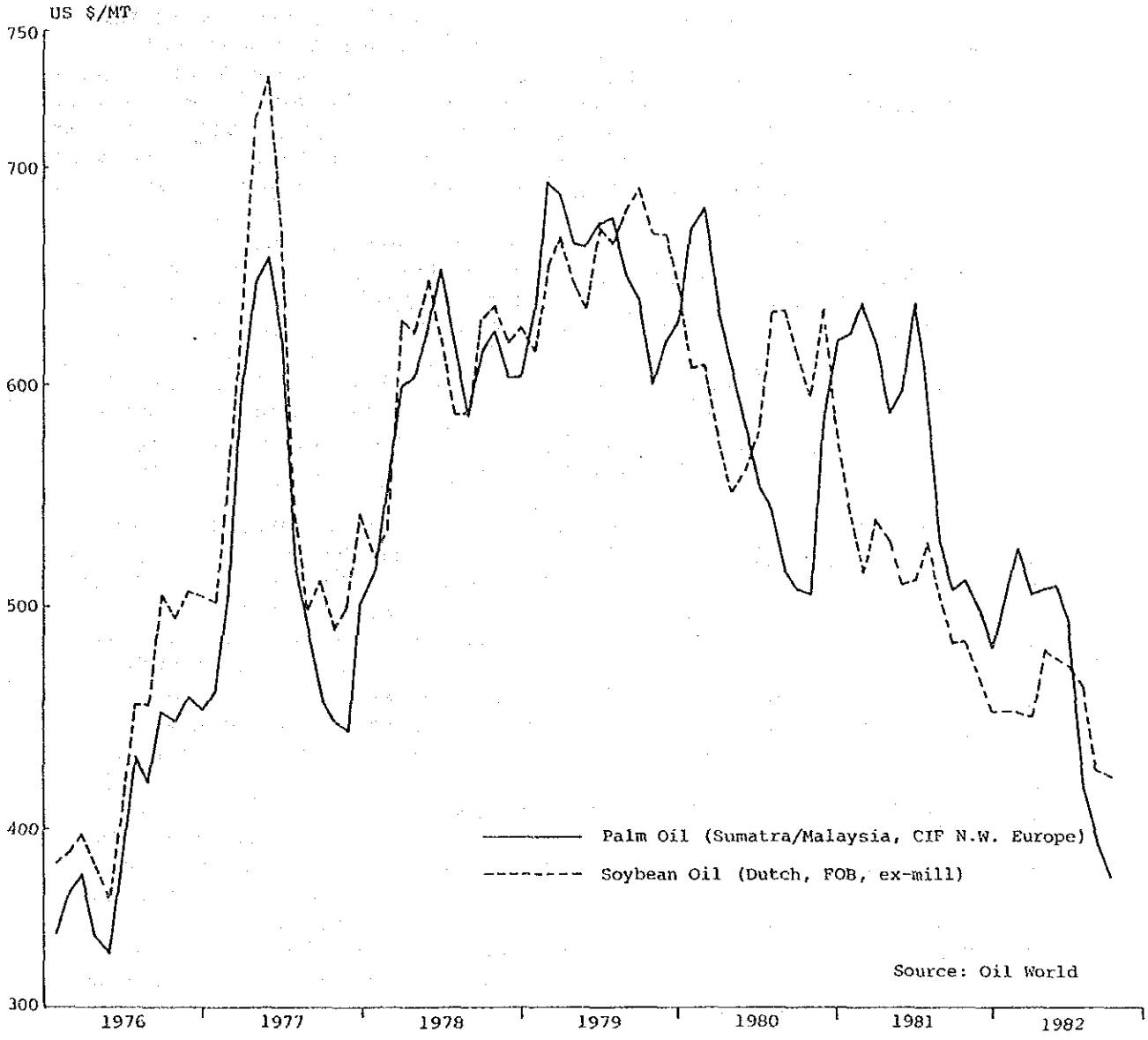
Source: World Bank, Oil Palm Handbook, p. V-5

drought from 1976 to 1977 [1] created a tight supply-demand situation, making the price of palm oil no lower than that of soybean oil. In February 1978, the positions of the two oils reversed, and as a result, Europe's CIF price for palm oil led to a premium of $24/t being added to Holland's soybean oil price (FOB ex-mill) (Fig. D-3).

When the price of palm oil is compared with that of soybean oil, as in Fig. D-3, two characteristics can be found. First, there is a similarity in price trend, and the price movements of palm oil are

1) While the minimum rainfall necessary for palm oil growth is reported to be usually 1,524 mm a year, provided the rainfall is spread throughout the year; otherwise 1,778 mm a year, there were some regions where the rainfall was less than 1,500 mm at that time. The shortage of rainfall occurred most widely in Johore, Selangore, Pahong, Perak and Negri Sembilan. The impact of the drought which became evident one and a half to two years later in these area were said to be more severe than had been anticipated.

Fig. D-3 Price Comparison of Soybean and Palm Oils



affected by those of soybean oil. This occurs because soybean oil is a standard oil which accounts for about 30% of the world consumption of vegetable oil and acts as a price leader.

Secondly, the price difference between the two oils varies according to the inherent factors to palm oil. For instance, the difference continued to widen until the first half of 1979, but in the second half, while the price of soybean oil stayed high due to the USSR's purchases and other factors, the price of palm oil continued to go down because of decline in demand, narrowing the gap almost to zero. After that, palm oil revived toward the end of the year because of the USSR's purchases, and at the beginning of 1980 it shot up when Indonesia suspended exports temporally. However, in May, demand decreased owing to the excessive price difference. In addition, an astonishingly high growth in production loosened the supply and demand situation pushing the price down. In July, despite the sharp rise in soybean prices caused by the United States' severe drought, palm oil continued to fall because of excessive stock.

Apart from these external factors, the difference in processing costs between palm oil and soybean oil affects the price difference. Generally, the processing costs of palm oil, such as for hydrogenation, are lower and this is reflected in the price gap.

Since 1975, because of increasing production of palm oil and slack demand for soybean oil, the world supply and demand of vegetable oil has been moderate, and prices of vegetable oils have remained low on the whole. As for palm oil, Malaysia's entry into the international market for processed oil stabilized the demand of developing nations such as Middle Eastern and African countries without sufficient processing facilities, and the price is showing relatively steady movement. In these nations, if the international price of soybean oil (usually crude) becomes lower than that of palm oil, it is more economical to import processed palm oil like olein than to import processed soybean oil from Europe, and the strong demand for palm oil is likely to continue for some time. In early 1981, Indonesia, the world's largest producer, reduced its crude oil production, tightening the domestic supply and demand, and suspended exports. This created a steady movement of crude palm oil prices in West European markets. In May the same year, also, Indonesia urgently imported olein from Malaysia to prevent cooking oil prices from climbing at home, causing a rise in the international price of olein.

The factors which determine the price trends of palm oil are: a. Malaysia's palm oil production; b. Indonesia's domestic consumption; c. Refiners' response to the decreased cost efficiency brought about by surplus refining capacity; d. Importation by new markets such as South Asian, Middle Eastern and African nations; e. World supply and demand situation, particularly movement of the production of soybean in the United States and South America, sunflower seed in the USSR and oilseeds in India, is also an important factor.

E. SHORT-TERM OUTLOOK

Major factors which affect palm oil production are: a. Area under cultivation (utilization of land); b. Yield per hectare (depending on the techniques of breeding, artificial pollination, fertilizing and control of pests and diseases); c. Management policy; d. Labor; e. Weather; and f. Price. Factors affecting consumption are: a. Population; b. Income; c. Movements of related products, especially competitive oils and oil seeds; d. Eating habits and tastes; e. Price; and f. The world political and economic situation.

However, it is difficult to quantify these factors for the purpose of predicting future production and consumption. Also, lack of statistical data in developing countries and countries with centrally planned economies as well as limited time available for the Study made it impossible to formulate a complex model for projection.

By these reasons, although long-term projection on palm oil production and consumption for the year 2000 was done with a growth curve represented by logistic curve,[1)] in this short-term forecast (until 1985) a linear regression has been adopted. This is because, besides the above reasons, in a short-term forecast of 5 or 6 years, a linear regression was considered to reflect a more realistic situation. However, as detailed below results derived by this method have their own limitations, because important factors in perennials such as hectarage expansion of oil palm were not be able to be fully taken into account.

Similar to the long-term projection, data used here are from the FAO *Production Yearbooks* and *Trade Yearbooks* from 1966 to 1979.

Short-term projections by region are given in Table E-1. Growth of palm oil production and consumption (apparent consumption = production ± trade volume) in the world by region and year is shown in Fig. E-1 and E-2. Output in major producing countries is projected in the same way in Fig. E-3.

The figures show that world palm oil production in 1985 will be 5.64 million tons and consumption, 5.69 million tons, creating a shortage of about 50,000 tons. The data used here are from the period 1966 to 1979, and an average yearly growth rate for the 5 years from 1980 to 1985 will be 4.8% for both production and consumption.

With regard to region (for country classification, see Appendix Table 10), increases in production and consumption over these 5 years are expected to be highest in the Far East —— at average annual rates of

1) See [1-3] Structure of Projection Model and Projected Results

Table E-1 Short-term Projection of Palm Oil Production and Consumption

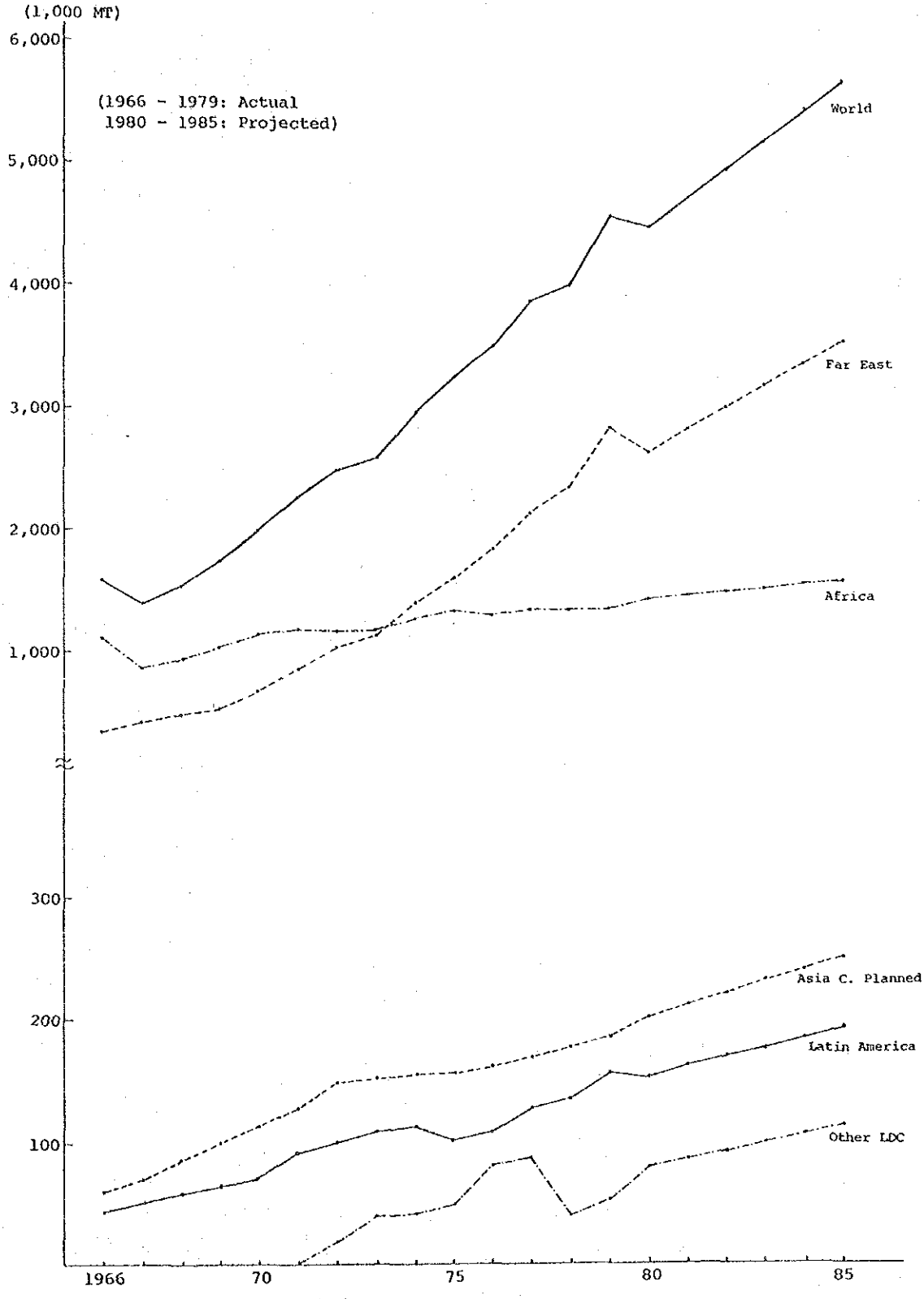
(1,000 MT)

Year	Developed countries					Developing countries						Centrally planned economies			World total
	North America	Western Europe	Oceania	Other	Total	Africa	Latin America	Near East	Far East	Other	Total	Asia Cent. Plan.	USSR & Eastern Europe	Total	
Consumption, in terms of oil															
1973	195	671	6	103	975	1,078	125	89	145	32	1,469	164	9	173	2,617
1980	342	822	25	182	1,371	1,395	163	144	1,012	30	2,744	230	69	299	4,414
1985	447	970	35	245	1,697	1,621	204	178	1,462	34	3,499	288	98	386	5,582
	(5.5)	(3.4)	(7.0)	(6.1)	(4.4)	(3.0)	(4.6)	(4.3)	(7.6)	(2.5)	(5.0)	(4.6)	(7.3)	(5.2)	
Palm oil production															
1973						1,172	108		1,115	40	2,435	152		152	2,587
1980						1,405	153		2,617	79	4,254	203		203	4,457
1985						1,562	192		3,529	112	5,395	249		249	5,644
						(2.1)	(4.6)		(6.2)	(7.2)	(4.9)	(4.2)		(4.2)	
Potential export quantity															
1973	-195	-671	-6	-103	-975	94	-17	-89	970	8	966	-12	-9	-21	-30
1980	-342	-822	-25	-182	-1,371	10	-10	-144	1,605	49	1,510	-27	-69	-96	43
1985	-447	-970	-35	-245	-1,697	-59	-12	-178	2,067	78	1,896	-39	-98	-137	62

Notes : 1) Figures in 1973 are actual (FAO data). Consumption and oil production are projected figures.
2) Figures in parentheses are average growth rates from 1980 to 1985.

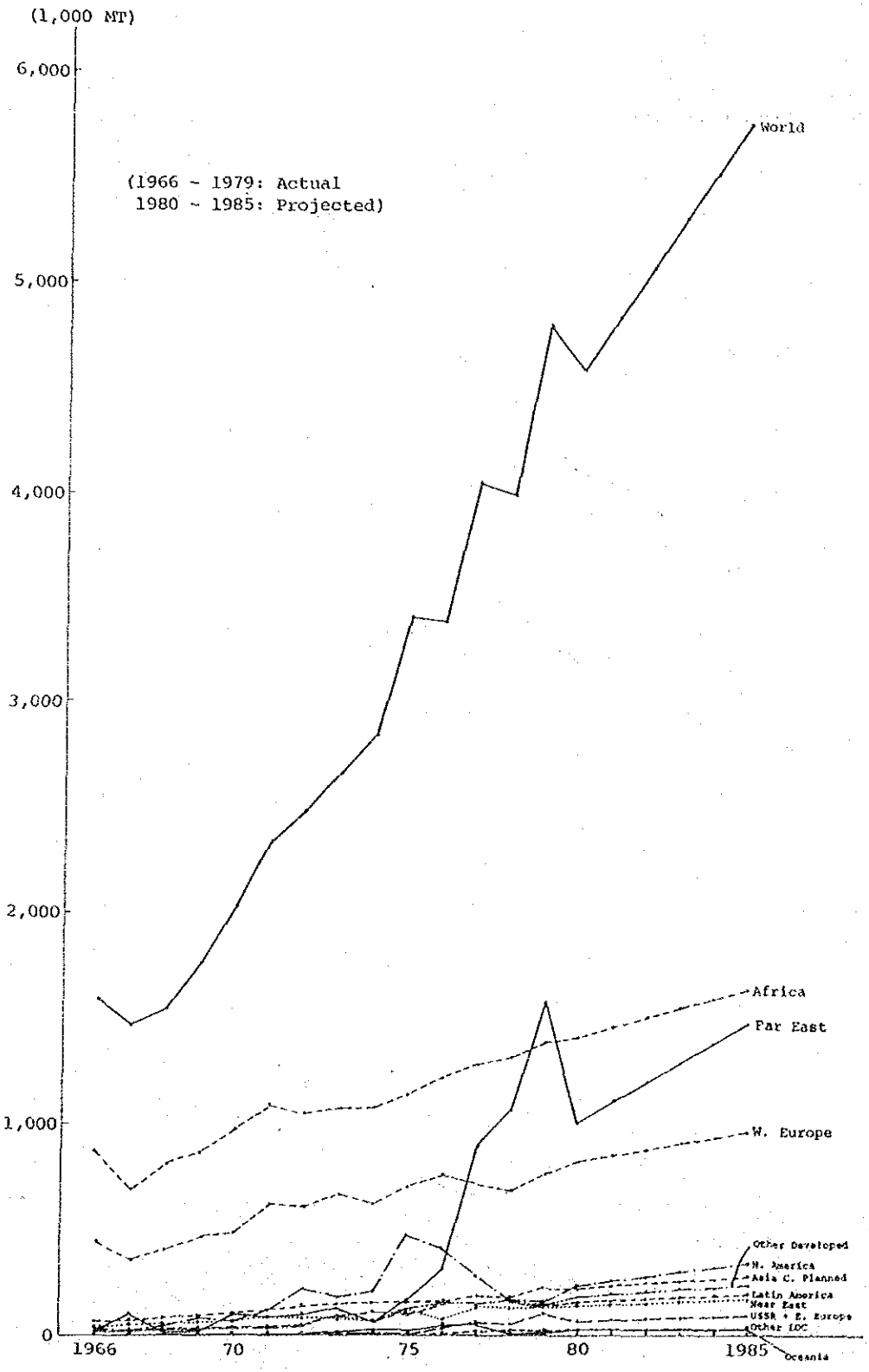
Source: The Study Team

Fig. E-1 Palm Oil Production by Area



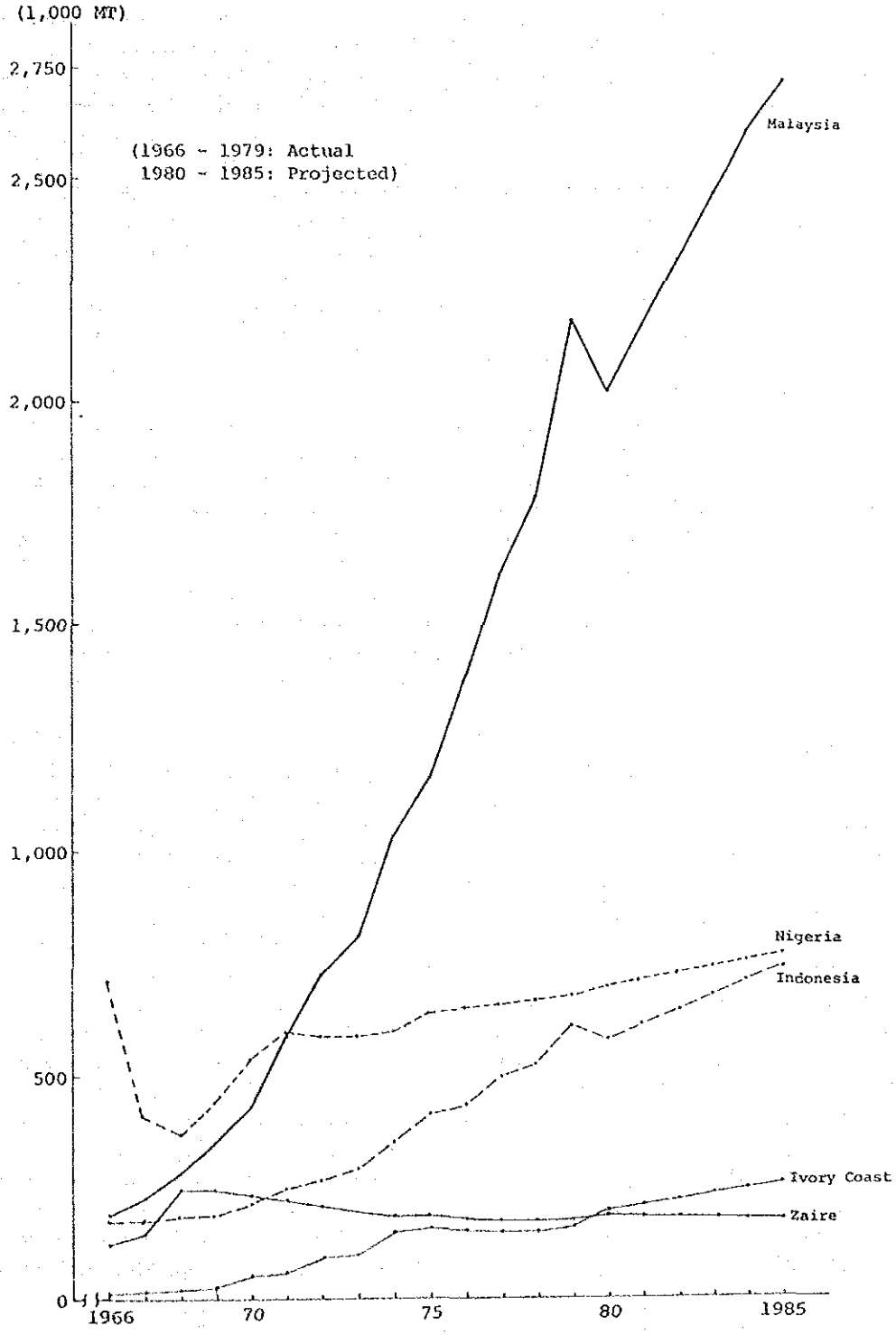
Source: FAO, Production Yearbooks, 1966 - 1979

Fig. E-2 Palm Oil Consumption by Area



Source: FAO, Production Yearbooks & Trade Yearbooks, 1966 - 1979

Fig. E-3 Palm Oil Production (Major Producing Countries)



Source: FAO, Production Yearbooks, 1966 - 1979: Actual

6.2% and 7.6%, respectively. The Far East includes such major producers as Malaysia and Indonesia, and major consumers like India and Pakistan, and if the growth rate until 1979 lasts through 1985, the trend of increased production and consumption in the Far East is likely to continue. However, as shown in Fig. E-3, considering the recent development in the hectarage of oil palm in Malaysia and Indonesia, the projected production seems to be too low. This is because the projected values are simply derived by extrapolating the growth rate from 1966 to 1979.

In Malaysia in particular, planted areas of palm oil reached one million hectares in 1980, as shown in Table B-2, and is planned to expand in the future, chiefly in East Malaysia. If average yield is about 4 tons per hectare, palm oil production for 1985 is estimated at about 4 million tons. The Malaysian Minister of Primary Industry, who visited Japan in September 1981, also indicated the outlook of 4 million tons for 1985 and 6 million tons for 1990.[1)]

The Indonesian Government is reportedly expecting crude oil production to be 1 million tons in 1985.[2)] In Indonesia, total planted area was 220,000 hectares in 1981, and the country is proceeding with development by putting high priority on investment in oil palm, and is expected to be able to come close to reaching the production target of one million tons in 1985.

Therefore, as far as production in Malaysia and Indonesia is concerned, palm oil output in the Far East is expected to be about 5 million tons, exceeding the amount calculated from the linear regression formula by about 40%.

Since it is highly probable that the increased output of palm oil will be devoted to domestic consumption in all producing countries except Malaysia, the only country which will continue to have a substantial effect on the international palm oil market in the foreseeable future will be Malaysia. However, whether or not Malaysia achieves the steady growth it expects in palm oil production depends on the factors mentioned in the first paragraph of this part. For example, natural factors like weather determine production —— the 1976 drought brought about smaller increases than expected in 1977 and 1978. Furthermore, although East Malaysia has abundant land suitable for development, surveys on land resources have not yet been carried out there. Moreover, uncertainty about the suitability of these undeveloped areas for palm growing make it difficult to determine long-term prospects. It is also difficult to predict to what extent the technological improvements in raising yield would bring about actual increase in production. The difference in productivity among various types of management would also affect the future production of palm oil. If the recent trend of shift from private estates as the mainstray of production to governmental or

1) Oil and Fat (Japanese Journal), Vol. 34, No. 11, 1981
2) ibid., Vol, 33, No. 10, 1980

public enterprises is strengthened, productivity as a whole might not be raised as is expected.

As for the influence of prices, since oil palm is a perennial plant, supply may not fluctuate over a short-term price shift; but if a long-term fluctuation adversely affects the operation of plantations, it is possible that oil palm would be displaced by more profitable crops.

In Africa, where some major producing countries are located, production has recently been sluggish. Since output cannot be expected to increase sharply in countries other than Malaysia and Indonesia (as seen in the section B, Production), the world palm oil production is estimated to exceed 6 million tons in 1985 by mainly considering the production increases in these two countries.

With regard to the palm oil consumption, annual per capita consumption of oil is as much as 25 to 30 kg in Europe, and a large increase cannot be expected there. On the other hand, in developing countries, where per capita consumption is low (5 to 6 kg), consumption is continually growing. This is true particularily in the Far East and Africa, but consumption in India and Pakistan, as mentioned before, has remained unchanged in the past 2 to 3 years. The reason for the sharp rise in palm oil consumption that occurred in the late 1970s in these countries and in Middle Eastern petroleum producing countries, is that they increased imports on the strength of increased foreign currency holdings, and processed palm oil such as olein suited to the diet and tastes of the people in the region. Thus, in order to increase these countries' palm oil consumption still further, measures must be taken to increase their foreign currency holdings, which would make imports possible; and to do this, there must be an improvement in the world economic situation. If other developing countries are to be big importers of palm oil, they must first have the potential to consume the oil (i.e. a diet in which oil is used in large quantities). They will not necessarily become big consuming countries, even if they have increased their foreign currency holdings, or if international oil prices are lowered considerably. Countries such as India, China and the USSR, which have a large population and would be expected to import large amounts, have always been major producers of oil seeds, and they may purchase a large quantity of palm oil only because of sluggish domestic production of oil seeds. If that is the case, palm oil imports depend on the movements of domestic output of oilseeds, although their per capita consumption of vegetable oils have a potential for great increase from present low level. In addition, in these three countries, imports are determined by policies covering oil consumption, so it is difficult to apply the market mechanism of free economy and predict future consumption of palm oil.

Demand may change due to price movements, but, as mentioned before, oils and fats are closely correlated in price because of their high degree of substitutability. The supply and demand balance should be seen as a whole.

Although prices decline when supply exceeds demand even slightly, as in the market today, oil consumption is not likely to increase sharply. Such being the case, if the prices are reduced through production increases in the future, an expansion of demand in the market will not follow if the oil does not suit the tastes of the potential consumer. When the price of palm oil remains low, prices of other oils, that are closely correlated in price (i.e. highly interchangeable), generally, also remain low. Therefore it can be said that, except in certain markets, demand for oils seldom centers on palm oil entirely. Demand for palm oil depends to a great extent on the relation between the movements of prices of competitive oils and consumer preference, as well as its own price. There are also other factors which are closely related.

If the trend upto 1979 continues into the future, world consumption of palm oil in 1985 should be, as mentioned before, 6 million tons, creating an oversupply. If this surplus is consumed, it will probably be in the developing countries of Asia and Africa.

Appendix Table 1 Palm Oil Production in Major Producing Countries, Five-year Averages and Percentage Shares, 1960-1979

Country	1960-64		1965-69		1970-74		1975-79		1979
	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT
Western Africa	763.64	59.93	750.98	53.88	995.23	43.02	855.2	36.4	1155.5
Nigeria	497.98	39.09	431.60	30.96	533.40	23.06	480.40	20.80	675.0
Ghana	32.20	2.53	49.20	3.53	61.00	2.64	20.30	0.86	15.0
Liberia	40.48	3.18	41.20	2.96	7.00	0.30	15.60	0.66	28.0
Sierra Leone	36.20	2.84	41.40	2.97	58.00	2.51	48.50	2.06	48.0
Dahomey	38.80	3.05	32.92	2.36	42.60	1.84	28.10	1.20	28.0
Ivory Coast	22.86	1.79	30.50	2.19	91.43	3.95	99.10	4.22	158.0
Togo	0.66	0.05	2.80	0.20	4.70	0.20	6.10	0.26	19.0
Cameroon	38.64	3.03	48.36	3.47	57.60	2.49	54.30	2.31	80.0
Central African Rep.	0.88	0.07	0.64	0.05	0.50	0.02	0.60	0.03	2.6
Congo, PR.	6.62	0.52	6.18	0.44	6.14	0.27	3.80	0.16	7.2
Eq. Guinea	3.12	0.24	3.96	0.28	4.16	0.18	4.10	0.17	4.7
Gabon	-	-	1.56	0.11	2.48	10.11	2.40	0.10	1.4
Gambia	1.42	0.11	2.08	0.15	2.02	0.09	2.20	0.09	2.8
Guinea	8.80	0.69	13.80	0.99	40.56	1.75	35.90	1.53	40.0
Guinea Bissau	6.40	0.50	8.00	0.57	8.00	0.35	4.40	0.19	4.8
Sao Tome/Principe	1.78	0.14	1.18	0.08	0.99	0.04	1.10	0.05	1.0
Angola	26.80	2.10	35.60	2.55	74.60	3.22	39.10	1.66	40.0
Eastern Africa	225.04	17.67	172.58	12.38	182.82	7.90	184.10	7.8	173.9
Tanzania	0.32	0.03	0.78	0.06	1.64	0.07	1.50	0.06	2.7
Burundi	1.00	0.08	1.00	0.07	1.00	0.04	1.00	0.04	1.2
Zaire	223.72	17.56	170.80	12.25	180.18	7.79	181.6	7.43	170.0
Latin America - Caribbean	27.67	2.18	53.48	3.84	92.15	3.98	90.20	3.80	149.3
Brazil	1.28	0.10	10.22	0.73	6.78	0.29	7.10	0.30	16.0
Colombia	0.01	0.00	9.72	0.70	38.62	1.67	36.30	1.54	62.1
Costa Rica	6.00	0.47	10.00	0.72	14.44	0.62	16.50	0.70	24.5
Ecuador	0.46	0.04	2.52	0.18	6.00	0.26	9.00	0.38	24.7
Honduras	1.12	0.09	1.40	0.10	7.28	0.32	5.20	0.22	10.5
Mexico	13.36	1.05	13.00	0.93	11.32	0.49	11.30	0.48	7.0
Paraguay	3.94	0.31	3.12	0.37	7.72	0.33	4.80	0.20	4.5
Venezuela	1.50	0.12	1.50	0.11	0.00	0.00	0.00	0.00	0.0
West Asia - Pacific	256.00	20.10	416.86	29.90	1,043.31	45.10	1,204.70	51.30	2,985.0
China Rep.	-	-	-	-	10.00	1.73	114.00	4.85	184.0
Indonesia	147.52	11.58	176.42	12.65	273.72	11.84	299.60	12.75	610.0
Malaysia	108.48	8.52	240.44	17.25	728.10	31.47	790.00	33.61	2,180.0
Philippines	-	-	-	-	1.49	0.06	1.10	0.05	11.0
Others	1.47	0.12				16.00	0.20	64.6	
World Total	1,273.82	100.00	1,393.90	100.00	2,313.52	100.00	2,350.20	100.00	4,528.3

Source: FAO, Production Yearbook.

Appendix Table 2 Palm Oil: World Production, by Country

(1,000 MT)

	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972
West Malaysia	2,645	2,397	2,033	1,640	1,484	1,261	1,137	942	739	657
East Malaysia	179	179	155	145	129	131	121	88	73	72
Malaysia (total)	2,824	2,576	2,188	1,785	1,613	1,392	1,258	1,030	812	729
Indonesia	742	691	600	525	497	434	411	351	290	269
Nigeria	363	434	389	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ivory Coast	133	182	132	129	118	144	154	139	99	93
Zaire	97	98	95	100	105	129	145	125	140	168
Colombia	80	74	71	49	43	40	n.a.	55*	51	37
Papua New Guinea	45	35	36	30	26	28	-	-	-	-
Benin	17	16	12	10	11	23	15*	49*	45*	43*
Solomon Islands	18	14	13	-	-	-	-	-	-	-
Cameroon	71	70	60	-	-	-	-	-	-	-
Other countries	439	414	407	490	486	469	540	432	408	265
Total	4,830	4,603	4,003	3,118	2,899	2,658	2,523	2,181	1,845	1,604

* Estimate

Source: Oil World

Appendix Table 3 Hectarage by State and Form of Management (1980)

(ha, %)

	Small-holders	FELDA	FELCRA	RISDA	State and regional development	Estates	Total	Share
Johore	16,730	80,515	6,354	2,373	11,631	172,285	289,888	27.8
Kedah	992	-	-	-	-	9,418	10,410	1.0
Kelantan	364	10,688	-	-	-	89,116	19,168	1.0
Malacca	429	-	784	-	-	9,890	11,103	1.1
N. Sembilan	1,700	8,351	-	-	-	31,700	41,751	4.0
Pahang	1,353	160,701	2,914	10,250	5,742	81,526	262,486	25.1
Perak	8,094	13,827	5,645	1,385	7,340	78,940	115,231	11.0
P. Pinang	2,204	-	-	-	-	4,326	6,350	0.6
Selangor	10,753	5,563	-	-	4,393	80,580	101,289	9.7
Trengganu	186	26,948	4,614	10,133	6,792	17,680	66,353	6.3
W. Malaysia								
Total	42,625	306,593	20,311	24,141	35,898	494,461	924,029	88.6
Share	4.6	33.2	2.2	2.6	3.9	53.5	100.0	
Sabah	3,542	-	-	-	16,076	62,311	81,929	7.9
Sarawak	750	-	-	-	11,124	24,876	36,750	3.5
E. Malaysia								
Total	4,292	-	-	-	27,200	87,187	118,679	11.4
Share	3.6				22.9	73.5	100.0	
Malaysia								
Total	46,917	306,593	20,311	24,141	63,098	581,648	1,042,708	100.0
Share	4.5	29.4	1.9	2.3	6.1	55.8	100.0	

Notes : FELDA : Federal Land Development Authority
FELCRA: Federal Land Consolidaton and Rehabilitation Authority
RISDA : Rubber Industry Smallholders Development Authority
Estate: A large-scale private corporation with a hectarage of over 40 ha. For hectarages under 40 ha, the term "smallholder" is used.

The following are the main private-sector corporations.
a) Socfin (Belgium): Malaysia's biggest, specifics not available.
b) harrison & Crosfield (British): hectarage 9,600 ha, annual output 30,000 tons
c) Guthrie (British): hectarage 20,000 ha, annual output 100,000 tons
d) United Plantations (Danish): hectarage 8,000 ha, annual output approx. 20,000 tons
e) Sime Darby (British): hectarage 16,000 ha, annual output 30,000 tons
g) Simlim Investment (Chinese): hectarage approx. 10,000 ha, annual out put 36,000 tons

Source: PORLA, Palm oil Statistical Handbook, 1980

Appendix Table 4 West Malaysia: Estimated Production Costs for Rubber and Palm Oil

(US¢/kg)

Rubber		Palm oil	
Type of cost	Amount	Type of cost	Amount
Fixed:		Fixed: [d]	
Total amortized [a]	4.4	Settlement cost [e]	4.4
	4.4	Administration	.7
		Mills	.4
			5.5
Variable:		Variable:	
Tapping	10.7	Maintenance	3.1
Cultivation [b]	3.8	Fertilizer [f]	3.3
Diseases and pests	.2	Diseases and pests	.4
Collection	15.0	Assisted pollination	1.1
Processing	2.6	Processing	4.9
	32.3		12.8
Transportation:		Transportation:	
Plantation to port	3.7	Plantation to port	3.7
	3.7		3.7
Total	40.4 [c]		22.0 [c]

a) Based on establishment costs of US$1,450 per hectare and an economic life of 30 years for rubber trees.
b) Includes weeding, draining, and fertilizer.
c) FOB excluding export taxes.
d) Based on establishment costs of US$1,680 per hectare and an economic life of 30 years for oil palm trees.
e) Includes felling and clearing costs, construction, roads, and allocation for land input.
f) Computed from average fertilizer costs on FELDA schemes of US$10 per hectare per month.

Note : Figures are averages based on surveys of private and Government plantations and mills in Malaysia.

Source: USDA, The Palm Oil Industry in West Malaysia, 1977, p.23

Appendix Table 5-1 Palm Oil — Summary of World Production, Apparent Consumption and Trade by Economic Regions

COUNTRIES/ ECONOMIES	ACTUAL 1961	1970	1975	1980	PROJECTED 1985	1990	1995	GROWTH RATES/A 61-80	70-80	80-85	85-90	90-95
	(MILLION TONS)							(% PER ANNUM)				
PRODUCTION												
INDUSTRIAL	..	-	-	-	..	..	..	..	..	..	..	..
CENTRALLY PLANNED	..	-	-	-	..	..	..	..	..	..	..	..
DEVELOPING	1.3	2.0	3.2	5.1	6.1	7.7	10.0	8.0	9.5	3.6	4.7	5.4
WORLD	1.3	2.0	3.2	5.1	6.1	7.7	10.0	8.0	9.5	3.6	4.7	5.4
MEMO ITEM: INDUSTRIAL & DEVELOPING	1.3	2.0	3.2	5.1	6.1	7.7	10.0	8.0	9.5	3.6	4.7	5.4
APPARENT CONSUMPTION												
INDUSTRIAL	0.5	0.6	1.3	1.0	1.1	1.2	1.3	6.9	4.6	2.0	1.8	1.3
CENTRALLY PLANNED	0.0	0.0	0.0	0.1	0.1	0.2	0.2	19.8	34.8	2.8	3.0	3.0
DEVELOPING	0.8	1.4	1.7	3.8	4.9	6.3	8.5	8.1	10.8	5.2	5.4	6.2
WORLD	1.3	2.0	3.1	4.9	6.1	7.7	10.0	7.9	9.3	4.5	4.7	5.4
MEMO ITEM: INDUSTRIAL & DEVELOPING	1.3	2.0	3.0	4.7	5.9	7.5	9.8	7.8	9.0	4.6	4.8	5.5
GROSS EXPORTS												
INDUSTRIAL	0.0	0.0	0.1	0.1	0.1	0.2	0.2	12.9	10.6	2.3	2.2	2.0
CENTRALLY PLANNED	..	..	..	..	..	..	..	..	..	..	..	..
DEVELOPING	0.6	0.9	2.0	3.4	4.4	5.9	7.7	10.6	12.5	5.1	6.3	5.4
WORLD	0.6	0.9	2.0	3.5	4.5	6.1	7.9	10.6	12.4	5.0	6.2	5.3
MEMO ITEM: INDUSTRIAL & DEVELOPING	0.6	0.9	2.0	3.5	4.5	6.1	7.9	10.6	12.4	5.0	6.2	5.3
GROSS IMPORTS												
INDUSTRIAL	0.5	0.6	1.4	1.1	1.3	1.4	1.5	7.3	5.0	2.6	2.2	1.4
CENTRALLY PLANNED	0.0	0.0	0.0	0.1	0.1	0.2	0.2	19.8	34.8	3.7	3.7	3.1
DEVELOPING	0.1	0.3	0.5	2.1	3.1	4.5	6.2	15.4	20.3	8.3	7.7	6.5
WORLD	0.6	0.9	1.9	3.3	4.5	6.1	7.9	10.5	12.0	6.3	6.2	5.3
MEMO ITEM: INDUSTRIAL & DEVELOPING	0.6	0.9	1.9	3.2	4.4	5.9	7.7	10.4	11.7	6.4	6.3	5.4

/A LEAST SQUARES TREND FOR HISTORICAL PERIODS (1961-80); END-POINT FOR PROJECTED PERIODS (1980-95).
SOURCES: FAO, PRODUCTION & TRADE YEARBOOK TAPES (ACTUAL);
WORLD BANK, ECONOMIC ANALYSIS & PROJECTIONS DEPARTMENT (PROJECTED).

Appendix Table 5-2 Palm Oil — Production by Main Countries and Economic Regions

COUNTRIES/ ECONOMIES	ACTUAL				PROJECTED			GROWTH RATES/A				
	1961	1970	1975	1980	1985	1990	1995	61-80	70-80	80-85	85-90	90-95
	('000 TONS)							(% PER ANNUM)				
DEVELOPING	1,277	1,972	3,218	5,080	6,070	7,655	9,961	8.0	9.5	3.6	4.7	5.4
ASIA	286	770	1,747	3,437	4,628	6,300	8,478	15.3	15.4	6.1	6.4	6.1
MALAYSIA	95	431	1,161	2,575	3,450	4,650	6,200	20.3	18.3	6.0	6.2	5.9
INDONESIA	146	217	411	650	950	1,400	2,000	8.9	11.9	7.9	8.1	7.4
CHINA	40	115	156	190	200	212	227	10.3	4.4	1.0	1.2	1.4
AFRICA	965	1,128	1,315	1,365	1,240	1,123	1,199	2.0	1.8	-1.9	-2.0	1.3
NIGERIA	538	540	640	675	613	550	584	1.6	2.0	-1.9	-2.1	1.2
ZAIRE	224	232	181	180	142	117	122	-1.3	-2.9	-4.6	-3.8	0.8
IVORY COAST	14	50	153	170	200	234	268	17.8	10.9	3.3	3.2	2.8
AMERICA	26	74	106	177	202	232	284	10.3	7.6	2.6	2.8	4.1
WORLD	1,277	1,972	3,218	5,080	6,070	7,655	9,961	8.0	9.5	3.6	4.7	5.4
MEMO ITEM: INDUSTRIAL & DEVELOPING	1,277	1,972	3,218	5,080	6,070	7,655	9,961	8.0	9.5	3.6	4.7	5.4

/A LEAST SQUARES TREND FOR HISTORICAL PERIODS (1961-80); END-POINT FOR PROJECTED PERIODS (1980-95).
SOURCES: FAO, PRODUCTION YEARBOOK TAPES (ACTUAL);
WORLD BANK, ECONOMIC ANALYSIS & PROJECTIONS DEPARTMENT (PROJECTED).

Appendix Table 5-3 Palm Oil — Apparent Consumption by Main Countries and Economic Regions

COUNTRIES/ ECONOMIES	ACTUAL				PROJECTED			GROWTH RATES/A				
	1961	1970	1975	1980	1985	1990	1995	61-80	70-80	80-85	85-90	90-95
	('000 TONS)							(% PER ANNUM)				
INDUSTRIAL	489	589	1,296	984	1,086	1,189	1,266	6.9	4.6	2.0	1.8	1.3
N. AMERICA	47	76	483	137	147	160	171	16.8	4.5	1.4	1.7	1.3
UNITED STATES	25	64	442	117	126	136	145	21.9	4.5	1.5	1.5	1.3
EEC-10	421	457	661	635	667	708	754	4.1	2.6	1.0	1.2	1.3
UNITED KINGDOM	162	162	203	182	191	201	215	4.2	0.7	0.9	1.0	1.4
GERMANY, F.R.	75	111	190	147	153	160	171	4.1	2.5	0.9	0.9	1.3
NETHERLANDS	85	70	128	128	135	144	155	4.4	3.8	1.1	1.3	1.5
CENTRALLY PLANNED	4	6	17	117	134	155	180	19.8	34.8	2.8	3.0	3.0
DEVELOPING	801	1,395	1,743	3,760	4,850	6,311	8,515	8.1	10.8	5.2	5.4	6.2
ASIA	142	327	435	2,112	2,783	3,813	4,996	15.1	22.7	5.7	6.5	5.6
INDIA	34	0	18	531	665	832	1,046	17.0	108.1	4.6	4.6	4.7
CHINA	40	115	168	247	290	361	453	11.4	6.6	3.3	4.5	4.6
MALAYSIA	6	31	-35	439	552	761	1,073	25.5	40.0	4.7	6.6	7.1
IRAQ	19	99	116	109	139	173	216	9.3	3.5	5.1	4.5	4.5
AFRICA	612	969	1,134	1,379	1,654	2,152	2,888	4.4	3.7	3.7	5.4	6.1
NIGERIA	371	532	609	687	870	1,215	1,770	3.6	2.3	4.9	6.9	7.8
ZAIRE	70	113	136	170	207	272	367	4.3	4.7	4.0	5.6	6.2
AMERICA	31	73	106	184	222	291	392	10.1	7.8	3.9	5.6	6.1
WORLD	1,293	1,989	3,056	4,861	6,070	7,655	9,961	7.9	9.3	4.5	4.7	5.4
MEMO ITEM: INDUSTRIAL & DEVELOPING	1,289	1,983	3,039	4,744	5,936	7,500	9,781	7.8	9.0	4.6	4.8	5.5

/A LEAST SQUARES TREND FOR HISTORICAL PERIODS (1961-80); END-POINT FOR PROJECTED PERIODS (1980-95).
SOURCES: FAO, PRODUCTION & TRADE YEARBOOK TAPES (ACTUAL);
WORLD BANK, ECONOMIC ANALYSIS & PROJECTIONS DEPARTMENT (PROJECTED).

Appendix Table 5-4 Palm Oil — Gross Exports by Main Countries and Economic Regions

COUNTRIES/ ECONOMIES	ACTUAL				PROJECTED			GROWTH RATES/A				
	1961	1970	1975	1980	1985	1990	1995	61-80	70-80	80-85	85-90	90-95
	('000 TONS)							(% PER ANNUM)				
INDUSTRIAL	19	29	86	123	138	154	170	12.9	10.6	2.3	2.2	2.0
EEC-10	19	29	86	121	138	154	170	12.9	10.4	2.7	2.2	2.0
DEVELOPING	610	877	1,960	3,411	4,370	5,930	7,709	10.6	12.5	5.1	6.3	5.4
ASIA	242	694	1,726	3,228	4,172	5,695	7,439	15.8	14.4	5.3	6.4	5.5
MALAYSIA	95	402	1,197	2,137	2,919	4,011	5,412	19.4	16.3	6.4	6.6	6.2
INDONESIA	117	159	386	434	420	510	620	8.6	9.5	-0.7	4.0	4.0
SINGAPORE	29	133	140	656	777	980	1,198	16.3	12.3	3.4	4.8	4.1
AFRICA	367	178	212	129	96	70	50	-6.2	-7.0	-5.7	-6.1	-6.5
ZAIRE	154	119	45	-	-	-	-	-11.9	-24.4	-	-	-
NIGERIA	167	8	31	-	-	-	-	-27.2	7.7	-	-	-
WORLD	629	906	2,046	3,534	4,508	6,084	7,879	10.6	12.4	5.0	6.2	5.3
MEMO ITEM: INDUSTRIAL & DEVELOPING	629	906	2,046	3,534	4,508	6,084	7,879	10.6	12.4	5.0	6.2	5.3

/A LEAST SQUARES TREND FOR HISTORICAL PERIODS (1961-80); END-POINT FOR PROJECTED PERIODS (1980-95).
SOURCES: FAO, TRADE YEARBOOK TAPES (ACTUAL);
WORLD BANK, ECONOMIC ANALYSIS & PROJECTIONS DEPARTMENT (PROJECTED).

Appendix Table 5-5 Palm Oil —— Gross Imports by Main Countries and Economic Regions

COUNTRIES/ ECONOMIES	ACTUAL				PROJECTED			GROWTH RATES/A				
	1961	1970	1975	1980	1985	1990	1995	61-80	70-80	80-85	85-90	90-95
	('000 TONS)							(% PER ANNUM)				
INDUSTRIAL	508	618	1,383	1,107	1,256	1,402	1,503	7.3	5.0	2.6	2.2	1.4
N. AMERICA	47	76	483	137	154	174	186	16.8	4.5	2.4	2.5	1.3
UNITED STATES	25	64	442	117	132	148	157	21.9	4.5	2.5	2.3	1.2
EEC-10	439	486	746	756	841	930	997	4.8	3.4	2.2	2.0	1.4
UNITED KINGDOM	163	163	206	183	200	218	233	4.2	0.8	1.8	1.7	1.3
GERMANY, F.R.	78	116	210	174	195	214	229	4.7	3.6	2.3	1.9	1.4
NETHERLANDS	89	89	186	204	229	252	272	7.1	5.1	2.3	1.9	1.5
JAPAN	15	40	108	148	178	207	239	16.3	14.9	3.7	3.1	2.9
CENTRALLY PLANNED	4	6	17	117	140	168	196	19.8	34.8	3.7	3.7	3.1
DEVELOPING	133	299	484	2,091	3,112	4,514	6,180	15.4	20.3	8.3	7.7	6.5
ASIA	98	252	414	1,903	2,824	4,105	5,626	16.4	21.2	8.2	7.8	6.5
SINGAPORE	29	141	128	692	817	1,030	1,259	16.7	12.0	3.4	4.7	4.1
INDIA	34	0	18	531	680	862	1,060	17.7	152.9	5.1	4.9	4.2
IRAQ	19	99	116	109	146	188	235	9.3	3.5	6.1	5.2	4.6
PAKISTAN	-	1	124	211	269	342	423	89.0	84.8	5.0	4.9	4.3
AFRICA	14	19	31	143	199	276	373	15.2	21.0	6.9	6.8	6.2
WORLD	645	923	1,884	3,315	4,508	6,084	7,879	10.5	12.0	6.3	6.2	5.3
MEMO ITEM: INDUSTRIAL & DEVELOPING	641	917	1,867	3,198	4,368	5,916	7,683	10.4	11.7	6.4	6.3	5.4

/A LEAST SQUARES TREND FOR HISTORICAL PERIODS (1961-80); END-POINT FOR PROJECTED PERIODS (1980-95).
SOURCES: FAO, TRADE YEARBOOK TAPES (ACTUAL);
WORLD BANK, ECONOMIC ANALYSIS & PROJECTIONS DEPARTMENT (PROJECTED).

Appendix Table 6-1 World Palm Oil Production, 1977-1982

(1,000 MT)

	1977	1978	1979	1980	1981	1982
NORTH AMERICA						
COSTA RICA	26	28	31	32	31	35
HONDURAS	10	11	9	8	18	22
OTHER	0	0	1	1	1	1
SUBTOTAL	36	39	41	41	50	58
SOUTH AMERICA						
BRAZIL	12	15	16	12	15	17
COLUMBIA	52	51	71	74	78	80
ECUADOR	25	28	31	38	42	46
OTHER	13	12	13	8	13	13
SUBTOTAL	102	106	131	132	148	156
AFRICA						
BENIN	25	27	28	30	33	35
CAMEROON	77	80	80	80	80	80
GHANA	23	23	21	21	21	20
GUINEA	40	40	40	40	40	40
IVORY COAST	135	150	150	160	180	200
LIBERIA	20	22	25	20	28	30
NIGERIA	510	515	500	520	535	550
SIERRA LEONE	48	48	48	50	50	50
ZAIRE	150	137	98	93	88	83
OTHER	81	79	80	82	83	83
SUBTOTAL	1109	1121	1070	1096	1138	1171
ASIA AND OCEANIA						
CHINA, PR	81	87	93	100	106	112
INDONESIA	497	525	600	691	722	790
MALAYSIA	1613	1786	2189	2576	2750	3000
PAPUA-NEW GUINEA	26	30	36	39	45	50
PHILIPPINES	12	11	12	13	15	18
OTHER	0	8	10	13	16	20
SUBTOTAL	2229	2447	2940	3432	3654	3990
GRAND TOTAL	3476	3713	4182	4701	4990	5375

SOURCE: PREPARED OR ESTIMATED ON THE BASIS OF OFFICIAL STATISTICS OF FOREIGN GOVERNMENTS, OTHER FOREIGN SOURCE MATERIALS, REPORTS OF THE U.S. AGRICULTURAL ATTACHES AND FOREIGN SERVICE OFFICERS, RESULTS OF OFFICE RESEARCH, AND RELATED INFORMATION.
OILSEEDS AND PRODUCTS DIVISION, FAS, USDA. NOVEMBER 1981

Appendix Table 6-2 World Palm Oil Trade, Selected Countries, 1977-1982

(1,000 MT)

	1977	1978	1979	1980	1981	1982
PALM OIL EXPORTS						
IVORY COAST	79	82	50	88	80	88
INDONESIA	421	412	438	455	230	235
MALAYSIA	1427	1514	1901	2260	2345	2510
SINGAPORE	277	299	492	679	450	500
ZAIRE	21	10	0	10	8	5
PALM OIL IMPORTS						
CANADA	31	23	18	20	18	20
UNITED STATES	250	146	143	117	140	140
BELGIUM-LUXEMBURG	34	33	38	41	40	40
DENMARK	18	14	19	13	15	15
FRANCE	69	68	67	71	74	74
GERMANY, FED. REP.	198	170	175	174	165	165
ITALY	33	58	72	70	70	70
NETHERLANDS	173	158	170	214	237	220
UNITED KINGDOM	229	218	229	183	150	140
USSR	46	48	105	103	120	120
INDIA	460	400	360	430	475	520
IRAQ	104	123	140	104	150	180
JAPAN	147	142	139	148	130	150
SINGAPORE	309	321	492	679	470	520
PAKISTAN	134	132	203	233	250	250

SOURCE: PREPARED OR ESTIMATED ON THE BASIS OF OFFICIAL STATISTICS OF FOREIGN GOVERNMENTS, OTHER FOREIGN SOURCE MATERIALS, REPORTS OF THE U.S. AGRICULTURAL ATTACHES AND FOREIGN SERVICE OFFICERS, RESULTS OF OFFICE RESEARCH, AND RELATED INFORMATION.
OILSEEDS AND PRODUCTS DIVISION, FAS, USDA. NOVEMBER 1981

Appendix Table 7 Palm Oil Exports by Major Exporting Countries, Five-year Averages and Percentage Shares, 1960-1979

Country	1960-64		1965-69		1970-74		1975-79		1979
	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT
WEST AFRICA	191.67	31.30	105.45	14.96	86.02	5.18	105.41	4.95	65.2
Nigeria	147.64	24.11	65.23	9.25	5.96	0.44	7.66	0.36	0.0
Ghana	0.06	0.00	0.30	0.04	-	-	0.02	0.00	0.0
Liberia	-	-	-	-	0.23	0.01	1.38	0.06	2.5
Sierra Leone	-	-	-	-	-	-	-	-	-
Dahomey (Benin)	11.61	1.90	10.86	1.54	11.65	0.86	3.22	0.15	3.0
Ivory Coast	0.80	0.14	0.92	0.13	48.90	3.62	81.80	3.84	49.5
Togo	0.43	0.07	0.09	1.09	0.08	0.08	0.00	0.00	
Cameroon	8.26	1.34	8.42	1.19	7.15	0.54	7.96	0.37	7.0
Central Afr. Rep.	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Congo Peop. Rep.	3.31	0.54	0.66	0.09	-	-	0.00	0.00	0.0
Eq. Guinea	2.91	0.47	5.03	0.42	3.00	0.22	3.22	0.15	3.2
Gambia	-	-	-	-	-	-	-	-	-
Guinea	-	-	-	-	-	-	-	-	-
Guinea-Biasau	0.07	0.01	0.08	0.01	0.08	0.00	0.07	0.00	0.0
Sao Tome/Principe	0.95	0.15	0.54	0.07	0.19	0.01	0.00	0.00	0.0
Angola	15.45	2.52	13.44	1.90	7.35	0.54	0.92	0.04	0.0
EAST AFRICA	148.87	24.31	114.24	16.21	89.98	6.67	22.40	1.05	0.0
Tanzania	0.08	0.01	0.05	0.00	0.01	0.00	0.00	0.00	0.0
Burundi	-	-	-	-	-	-	-	-	-
Zaire	148.79	24.30	114.19	16.20	89.97	6.67	22.40	1.05	0.0
LATIN AMERICA	2.28	0.37	3.67	0.52	5.22	0.18	2.68	0.13	2.1
Brazil	-	-	-	-	-	-	-	-	-
Colombia	-	-	-	-	-	-	-	-	-
Costa Rica	0.39	0.06	0.17	0.02	0.19	0.01	0.06	0.00	0.0
Ecuador	-	-	-	-	-	-	-	-	-
Honduras	0.14	0.02	0.83	0.11	0.49	0.03	0.00	0.00	0.0
Mexico	-	-	-	-	-	-	-	-	-
Paraguay	1.75	0.28	2.67	0.37	4.54	0.33	2.62	0.13	2.1
Venezuela	-	-	-	-	-	-	-	-	-
EAST ASIA AND PACIFIC	222.31	36.31	385.44	54.69	903.67	67.05	1,663.90	78.10	1,706.8
China Rep.	-	-	-	-	-	-	0.00	0.00	0.0
Indonesia	113.88	18.60	153.56	21.78	229.70	17.04	391.90	18.40	350.8
Malaysia	108.43	17.71	231.38	32.90	673.97	50.00	1,271.98	59.70	1,356.0
Philippines	-	-	-	-	-	-	0.04	0.00	0.0
EMENA	0.09	0.01	-	-	0.67	0.04	0.09	0.01	0.1
Bahrain	-	-	-	-	0.00	0.00	0.00	0.00	0.0
Lebanon	-	-	-	-	0.00	0.00	0.00	0.00	0.0
Portugal	-	-	-	-	0.67	0.04	0.09	0.01	0.1
Spain	0.09	0.01	-	-	-	-	0.00	0.00	0.0
Syrian Arab Rep.	-	-	-	-	-	-	-	-	-
OTHERS	47.01	7.67	95.93	13.61	262.15	19.45	335.25	15.74	507.5
Austria	-	-	-	-	-	-	-	-	-
Belgium-Luxembourg	7.73	1.26	4.96	0.70	2.72	0.20	7.04	0.33	9.4
Czechoslovakia	-	-	-	-	-	-	-	-	-
Denmark	0.07	0.01	1.59	0.22	0.10	0.00	2.82	0.13	5.0
France	1.65	0.26	0.65	0.09	1.47	0.10	1.06	0.05	1.0
W. Germany	3.12	0.50	3.54	0.50	7.24	0.53	18.50	0.90	15.1
Hong Kong	-	-	-	-	-	-	0.11	0.01	0.1
India	-	-	-	-	0.00	0.00	0.00	0.00	0.0
Italy	0.10	0.01	0.14	0.01	0.61	0.04	0.42	0.02	1.0
Japan	0.18	0.02	0.11	0.01	0.43	0.03	0.38	0.02	0.2
Mali	-	-	-	-	-	-	-	-	-
Netherlands	5.45	0.89	10.00	1.41	47.40	3.51	63.46	2.98	56.7
Nicaragua	0.24	0.03	-	-	-	-	0.00	0.00	0.0
Norway	-	-	-	-	-	-	-	-	-
Papua-New Guinea	-	-	-	-	4.33	0.32	26.18	1.23	29.4
Singapore	27.02	4.41	74.15	10.52	196.43	14.57	212.54	9.98	383.3
Sweden	0.28	0.04	0.16	0.02	0.54	0.04	1.28	0.07	1.8
Uganda	0.37	0.06	0.33	0.04	0.05	0.00	0.00	0.00	0.0
U.K.	0.80	0.13	0.30	0.04	0.33	0.06	1.70	0.08	1.2
Suriname	-	-	-	-	-	-	-	-	2.5
WORLD TOTAL	612.23	100.00	704.73	100.00	1,347.72	100.00	2,129.73	100.00	2,281.7

Source: FAO, Trade Yearbook.

Appendix Table 8 Palm Oil Imports by Major Importing Countries, Five-year Averages and Percentage Shares

Country/Region	1960-64		1965-69		1970-74		1975-79		1979
	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT
EAST AFRICA	4.10	0.72	8.76	1.38	18.68	1.50	41.47	2.06	53.5
Kenya	1.76	0.30	5.94	0.93	13.36	1.07	36.80	1.83	47.0
Mozambique	0.00	0.00	0.50	0.07	0.88	0.07	0.76	0.04	3.3
Rhodesia (Zimbabve)	0.36	0.06	0.30	0.04	0.50	0.04	0.00	0.00	0.0
Sudan	0.16	0.02	0.07	0.01	0.05	0.00	0.01	0.00	0.0
Tanzania	0.06	0.01	0.41	0.06	1.56	0.12	3.42	0.17	2.6
Uganda	1.76	0.30	1.43	0.22	2.29	0.18	0.38	0.02	0.6
Zambia	0.00	0.00	0.06	0.00	0.04	0.00	0.10	0.00	0.0
WEST AFRICA	3.61	0.63	6.61	1.04	8.82	0.70	19.48	0.77	19.0
Angola	0.06	0.01	0.34	0.05	0.05	0.00	4.48	0.22	1.8
Cameroon	0.15	0.02	0.78	0.12	0.04	0.00	0.02	0.00	0.0
CAR	0.19	0.03	0.93	0.14	1.56	0.12	0.13	0.01	0.1
Congo PR	0.10	0.01	0.08	0.01	0.49	0.03	0.84	0.04	1.0
Benin	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Eq. Guinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Gabon	0.00	0.00	0.00	0.00	0.00	0.00	2.66	0.13	3.4
Gambia	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.0
Ghana	0.21	0.03	1.45	0.22	3.78	0.30	6.70	0.33	6.0
Guinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Ivory Coast	2.55	0.44	1.94	0.30	0.00	0.00	0.00	0.00	0.0
Liberia	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.00	0.0
Mali	0.17	0.02	0.12	0.01	0.75	0.06	0.08	0.00	0.4
Senegal	0.01	0.00	0.78	0.12	1.86	0.14	2.80	0.14	3.7
Sierra Leone	0.02	0.00	0.12	0.01	0.11	0.00	0.00	0.00	0.0
Togo	0.15	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.0
Niger	0.00	0.00	0.00	0.00	0.18	0.01	1.74	0.09	2.6
EAST ASIA AND PACIFIC	37.56	6.60	76.67	12.12	229.97	18.42	160.63	7.97	245.4
Khmer Rep.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
China Rep.	0.00	0.00	0.00	0.00	1.62	0.12	0.00	0.00	0.0
Fiji	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.0
Hong Kong	0.00	0.00	0.00	0.00	0.17	0.01	0.46	0.02	0.3
Korea Rep.	0.00	0.00	0.14	0.02	1.03	0.08	4.76	0.24	11.9
Malaysia	3.98	0.70	0.12	0.01	1.37	0.10	0.32	0.02	0.0
Papua New Guinea	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.0
Philippines	4.99	0.87	6.99	1.10	4.32	0.34	1.40	0.07	1.0
Singapore	28.54	5.01	69.34	10.96	221.36	17.73	148.18	7.36	223.2
Thailand	0.05	0.00	0.08	0.01	0.10	0.00	5.48	0.27	9.0
Indonesia	-	-	-	-	-	-	-	-	-
SOUTH ASIA	34.13	6.00	8.39	1.32	33.70	2.70	390.76	19.40	607.3
Bangladesh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Burma	0.00	0.00	0.00	0.00	0.00	0.00	5.98	0.30	5.9
Sri Lanka	0.00	0.00	0.75	0.11	0.50	0.04	0.38	0.02	0.0
India	34.13	6.00	5.52	0.87	23.27	1.86	240.92	11.95	400.0
Pakistan	0.00	0.00	2.12	0.33	9.93	0.79	143.68	7.13	201.4
EMENA	5.64	0.99	5.63	0.88	8.85	0.70	24.26	1.20	154.1
Algeria	0.65	0.11	0.72	0.11	1.00	0.08	1.88	0.09	4.1
Bahrain	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.0
Cyprus	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.0
Iran	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.0
Israel	0.37	0.06	0.78	0.12	1.08	0.08	0.36	0.02	0.1
Jordan	0.72	0.12	1.94	0.30	3.13	0.25	1.84	0.09	2.3
Kuwait	0.06	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.0
Lebanon	0.13	0.02	0.11	0.01	0.07	0.00	0.00	0.00	0.0
Libyan AR	0.01	0.00	0.06	0.00	0.12	0.00	0.84	0.04	1.0
Malta	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.01	0.0
Morocco	0.27	0.04	0.06	0.00	0.00	0.00	1.70	0.08	3.5
Syria	3.40	0.59	1.92	0.30	3.39	0.27	8.52	0.42	11.0
Turkey	0.00	0.00	0.01	0.00	0.00	0.00	8.94	0.44	0.0
UAR	0.03	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.1
Iraq									130.0
Saudi Arabia									2.0

Appendix Table 8 (cont'd.)

Country/Region	1960-64		1965-69		1970-74		1975-79		1979
	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT	%	1,000 MT
LAC	5.25	0.92	4.56	0.72	6.27	0.50	10.61	0.53	11.74
Argentina	0.26	0.04	0.05	0.00	0.05	0.00	0.07	0.00	0.0
Barbados	0.00	0.00	0.02	0.00	0.06	0.00	0.00	0.00	0.0
Brazil	0.00	0.00	0.06	0.00	0.05	0.00	0.80	0.04	2.0
Chile	0.42	0.07	1.43	0.22	0.02	0.00	0.05	0.00	0.0
Colombia	1.11	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Costa Rica	1.08	0.18	1.61	0.25	0.46	0.03	0.08	0.01	0.0
Ecuador	1.51	0.26	0.94	0.14	5.39	0.43	5.38	0.27	7.4
El Salvador	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Guatamala	0.01	0.009	0.02	0.00	0.00	0.00	0.00	0.00	0.0
Guyana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Honduras	0.29	0.05	0.00	0.00	0.06	0.00	2.22	0.11	0.0
Jamaica	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.0
Martinique	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.04
Mexico	0.17	0.02	0.19	0.03	0.16	0.01	1.96	0.10	2.1
Nicaragua	0.01	0.00	0.18	0.02	0.00	0.00	0.00	0.00	0.0
Peru	0.09	0.01	0.06	0.00	0.01	0.00	0.00	0.00	0.0
Trinidad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Venezuela	0.27	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OTHERS	478.28	84.11	521.97	82.51	941.59	75.45	1,367.11	67.87	1,342.1
Australia	2.49	0.43	2.96	0.46	10.01	0.80	20.32	1.0	26.7
Austria	1.28	0.22	0.19	0.03	3.24	0.25	6.66	0.33	6.6
Belgium Lux.	40.19	7.06	26.51	4.19	25.06	2.00	33.74	1.68	43.2
Canada	11.53	2.02	11.08	1.75	18.32	1.46	35.62	1.77	18.4
Denmark	3.84	0.67	1.58	0.24	8.56	0.68	14.68	0.73	19.0
Faeroe Is.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Finland	0.05	0.00	0.02	0.00	0.82	0.06	1.60	0.08	1.1
France	34.90	6.13	38.00	6.00	49.14	3.93	63.72	3.16	69.5
Germany FR	86.57	15.22	115.07	18.19	140.40	11.25	189.18	9.39	174.9
Iceland	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.0
Ireland	4.14	0.72	3.16	0.49	4.25	0.34	5.96	0.30	9.6
Italy	27.59	4.85	38.18	6.03	51.71	4.14	54.50	2.71	71.7
Japan	15.30	2.69	25.70	4.06	70.35	5.63	137.72	6.84	139.0
Netherlands	74.50	13.10	69.32	10.95	137.56	11.02	175.42	8.71	167.0
New Zealand	0.01	0.00	0.01	0.00	0.36	0.02	0.80	0.04	0.0
Norway	0.64	0.11	0.22	0.03	9.93	0.79	3.24	0.16	4.9
Portugal	14.29	2.51	15.48	2.44	18.85	1.51	18.80	0.93	20.0
South Africa	0.00	0.00	0.11	0.01	0.97	0.07	3.70	0.18	3.3
Spain	0.22	0.03	2.39	0.37	5.70	0.45	6.50	0.32	10.2
Sweden	2.03	0.35	2.54	0.40	7.50	0.60	17.88	0.89	20.5
Switzerland	1.55	0.27	2.59	0.40	4.93	0.39	5.96	0.30	6.2
UK	136.70	24.04	122.85	19.42	212.13	16.99	225.00	11.17	228.7
US	15.25	2.68	37.15	5.87	147.86	11.84	269.60	13.38	144.6
Yugoslavia	1.11	0.19	1.31	0.20	0.14	0.01	1.66	0.08	2.9
China	0.03	0.00	0.32	0.05	0.00	0.00	20.68	1.03	44.9
Cuba	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Czechoslovakia	0.72	0.12	0.79	0.12	5.27	0.42	0.52	0.03	0.0
Hungary	1.04	0.18	0.54	0.08	0.12	0.00	0.00	0.00	0.0
Poland	1.08	0.18	1.84	0.29	8.41	0.67	14.98	0.74	10.9
USSR	1.22	0.21	2.06	0.32	0.00	0.00	38.66	1.92	98.3
WORLD TOTAL	568.57	100.00	632.59	100.00	1,247.88	100.00	2,014.32	100.00	2,433.1

Source: FAO, Trade Yearbook

Appendix Table 9-1 Export Duty Structure for Crude and Processed Palm Oil with effect from December 15, 1980 at 4:00 p.m. (in Malaysia)

($/MT)

Gazetted Price	Duty Formula
$500.00 and below per metric ton	Nil
Above $500.00 - $549.21 and below	0.30p - 150.0000
" $549.21 - $598.42 "	0.35p - 177.4605
" $598.42 - $647.63 "	0.40p - 207.3815
" $647.63 - $696.84 "	0.45p - 239.7630
$696.84 and above per metric ton	0.50p - 274.6050

Source: Royal Customs and Excise Department, Malaysia

Appendix Table 9-2 Malaysia: Gazetted FOB Palm Oil Prices and Export Duty Payable

($/MT)

		Gazetted Prices		Export Duty	
		Crude Palm Oil	Processed Palm Oil	Crude Palm Oil	Processed Palm Oil
1980	January	1,289.31	1,384.70	373.98	421.68
	February	1,268.47	1,322.57	363.57	390.62
	March	1,310.97	1,407.63	384.82	433.15
	April	1,347.25	1,398.98	402.96	428.82
	May	1,408.38	1,416.54	433.52	437.60
	June	1,341.93	1,423.06	400.31	440.88
	July	1,292.37	1,334.39	375.53	396.54
	August	1,206.21	1,287.35	332.45	373.02
	September	1,202.57	1,262.71	330.63	363.70
	October	1,080.58	1,199.74	269.63	329.22
	November	1,095.40	1,149.38	277.05	304.04
	December 1-15 *	1,084.36	1,139.09	271.53	298.90
	December 15-31 **	1,084.36	1,139.09	267.57	294.94
1981	January	995.34	1,019.41	223.06	235.10
	February	1,019.21	1,138.34	234.99	294.55
	March	1,114.13	1,252.33	282.44	351.54
	April	1,122.08	1,239.69	286.42	345.22
	May	1,229.32	1,252.23	340.04	351.50
	June	1,212.01	1,230.54	331.38	340.65
	July	1,215.95	1,250.03	333.36	350.40
	August	1,165.01	1,270.16	307.89	360.46
	September	1,141.36	1,272.69	296.06	361.73
	October	1,102.05	1,227.03	276.41	338.89
	November	1,088.31	1,142.88	269.53	296.82
	December	1,000.08	1,094.60	225.42	272.68
1982	January	994.15	1,080.99	222.46	265.87
	February	959.83	1,109.63	205.30	280.20
	March	977.61	1,079.43	214.19	265.10

Source: Royal Customs and Excise Department.

* - Former duty structure

** - New duty structure effective from October 18, 1979.

Appendix Table 10 Country Classification by Economic Group and Region

Using FAO classifications, the world is divided into the following economic groups and regions.

Group I. Developed Countries in the Free World

Area A North America
Canada, the United States

Area B Western Europe
Andorra, Austria, Belgium-Luxemburg, Denmark, Faeroe Is., Finland, France, the Federal Republic of Germany (including West Berlin), Gibraltar, Greece, the Vatican, Iceland, Ireland, Italy, Liechtenstein, Malta, Monaco, the Netherlands, Norway, Portugal (including the Azores and Madeira), San Marino, Spain, Sweden, Switzerland, the United Kingdom (including Channel Is. and the Isle of Man), Yugoslavia

Area C Oceania
Australia, New Zealand

Area D Other developed countries with market economies
Israel, Japan (including Ogasawara Is. and Ryukyu Is.), South Africa

Group II. Developing Countries in the Free World

Area A Africa
Algeria, Angola, Benin, Botswana, British Indian Ocean Territory, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, St. Helena, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, Spanish North Africa, Swaziland, Tanzania, Togo, Tunisia, Uganda, Upper Volta, Western Sahara, Zaire, Zambia, Zimbabwe

Area B Latin America
Antigua, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, British Virgin Is., Cayman Is., Chile, Colombia, Costa Rica, Cuba, Dominica, The Dominican Republic, Ecuador (including Galapagos Is.), El Salvador, Falklands (The Malvinas), French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique,

Appendix Table 10 (cont'd.)

Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St. Kitts-Nevis-Anguilla, St. Lucia, St. Vincent & The Grenadines, Suriname, Trinidad & Tobago, Turks & Caicos Is., Uruguay, U.S. Virgin Is., Venezuela

Area C Middle East
Africa: Egypt, Libya Arab Jamahiriya, Sudan
Asia : Afghanistan, Bahrain, Cyprus, Gaza Strip (Palestine), Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen Arab Republic, Democratic Republic of Yemen

Area D Far East
Bangladesh, Bhutan, Brunei, Burma, Eastern Timor, Hong Kong, India, Indonesia, the Republic of Korea, Laos, Macao, Malaysia, Maldives, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand

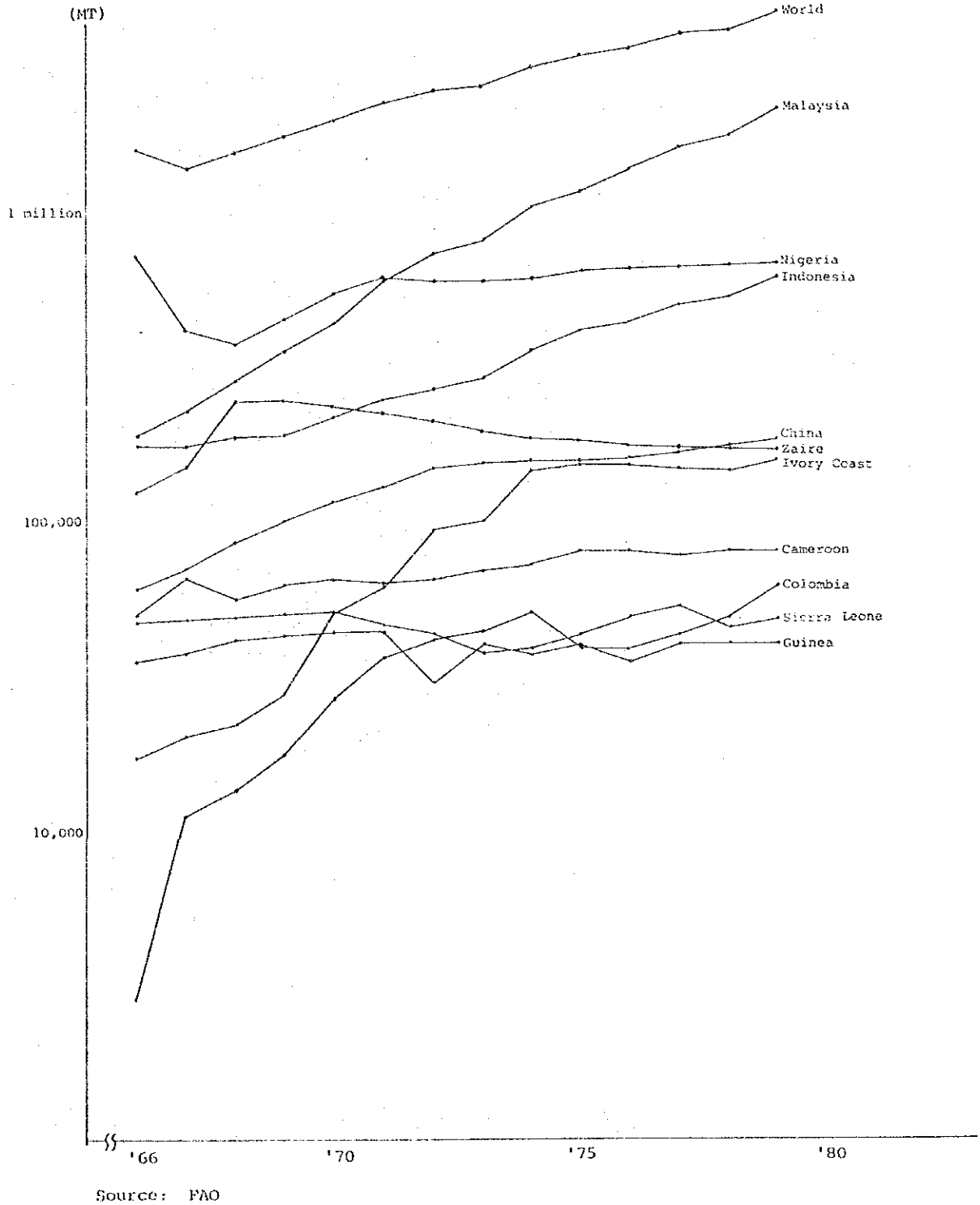
Area E Other developing countries in the free world
America: Bermuda, Greenland, St. Pierre and Miquelon
Oceania: American Samoa, Canton and Enterbury Is., Christmas Is. (Australia), Cocos (Keeling) Is., Cook Is., Fiji, French Polynesia, Guam, Johnston Is., Kiribati, Midway Is., Nauru, New Caledonia, Niue, Norfolk Is., Pacific Is. (Trust Territory), Papua New Guinea, Pitcairn Is., Samoa, Solomon Is., Tokelau, Tonga, Tuvalu, Vanuatu, Wake Is., Wallis & Futuna Is.

Group III. Centrally planned economies

Area A Asia
China, Kampuchea, Democratic Republic of Korea, Mongolia, Viet Nam

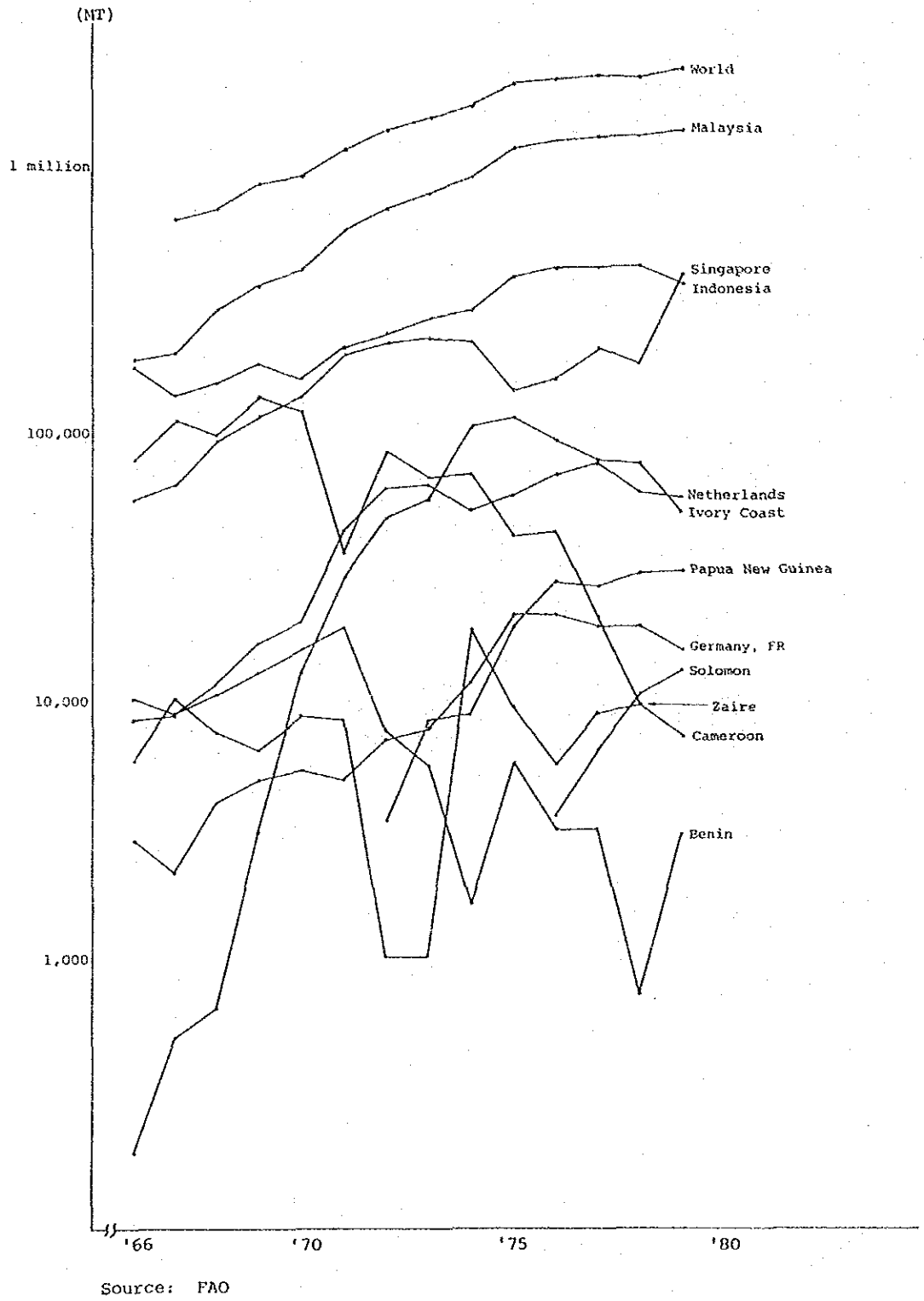
Area B East Europe and the USSR
Albania, Bulgaria, Czechoslovakia, German Democratic Republic (including East Berlin), Hungary, Poland, Romania, the USSR

Appendix Fig. 1 Palm Oil: Production



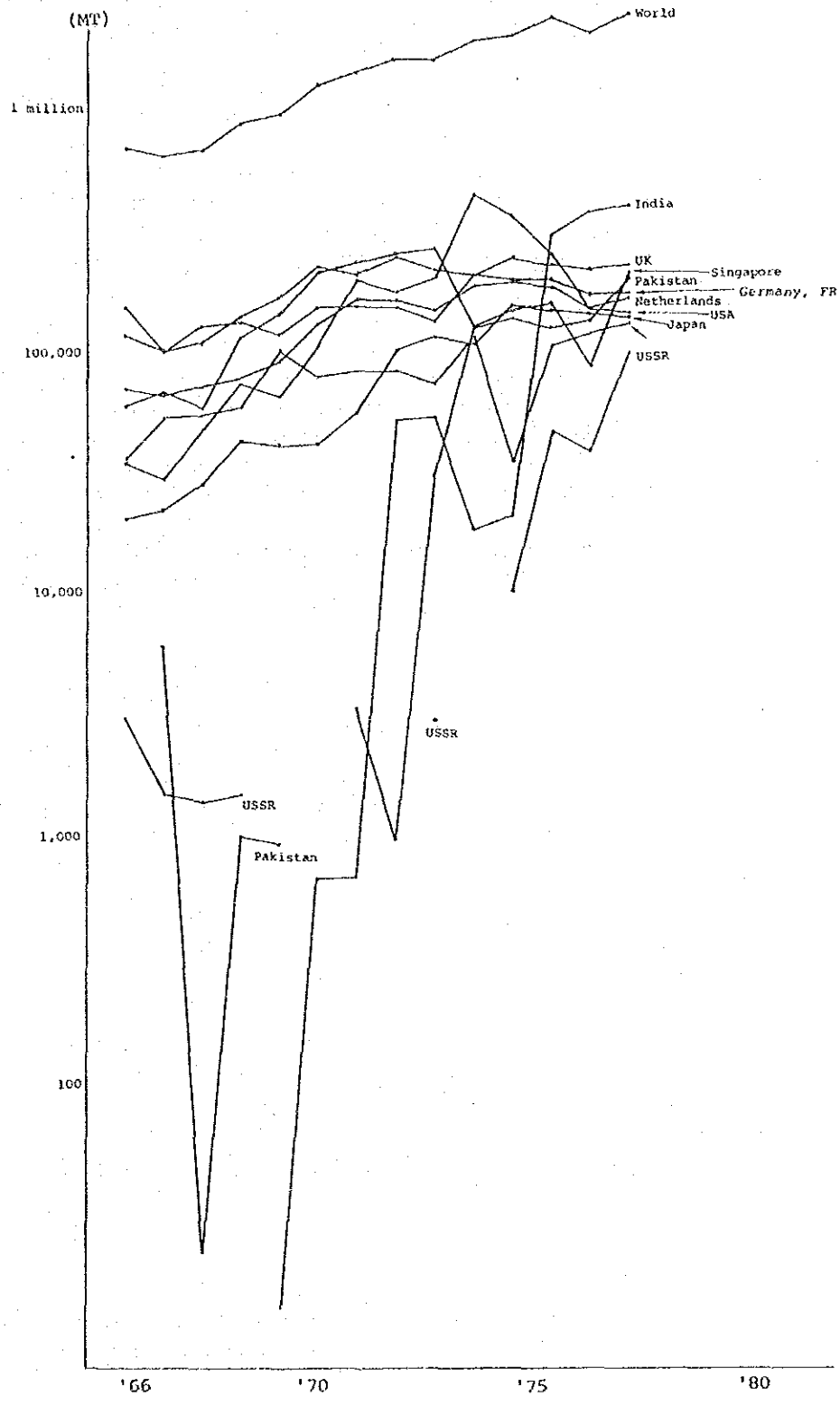
Source: FAO

Appendix Fig. 2 Palm Oil: Export Quantity



Source: FAO

Appendix Fig. 3 Palm Oil: Import Quantity



Source: FAO

[1-2-2] COPRA AND COCONUT OIL, PALM KERNEL AND PALM KERNEL OIL, BABASSU KERNEL AND BABASSU KERNEL OIL

A. CHARACTERISTICS OF OILS

I. Introduction

Babassu, one of the products under study, is produced only in Brazil, and has not yet matured as an international commodity. On the other hand, babassu kernel oil, its major product, can be used as a substitute for coconut oil and palm kernel oil because of its similar chemical composition and range of applications. Therefore, the trend analyses and projections of demand will be made here principally for copra and coconut oil, which holds an overwhelming share of the world production of lauric oils (see Table A-1), as international commodities, from which the future prospects of the market for babassu oil is analogized.

Table A-1 World Production of Palm Oils

(1,000 MT)

	1978/79	1979/80	1980/81	1981/82
Coconut oil	2,803	3,089	3,137	3,137
Palm oil *	4,268	4,796	5,156	5,784
Palm kernel oil	634	690	715	794
Babassu kernel oil	145	128	130	130

* Palm oils denote the oils from plants belonging to Palm family (Palmae). Most of the palm oils are lauric oils in their chemical composition, but the palm oil which is obtained from oil palm (Elaesis sps.) is non-lauric.

Source: USDA, Oilseeds and Products, September 1982

Coconut palm (Cocos nucifera) is one of the most important palms in the wet tropical zone. Its original habitat is presumed to be

tropical Asia or Polynesia, and it is now distributed widely throughout the tropical seashores of the world. The annual yield per hectare is about 1 ton in the form of copra, and the profitability is generally low compared with other perennial crops.

The ideal natural conditions for the cultivation of coconut include an average annual temperature of 27 to 28°C, although cultivation is also possible in Florida, where the average annual temperature is 25°C. However, growth becomes stunted under conditions of extended winter temperatures of 20°C or lower. On the other hand, temperatures higher than the optimal temperature are harmful when combined with conditions of low humidity resulting in a high rate of evaporation. A regular rainfall of 1,250 to 2,250 mm throughout the year is an important factor in coconut cultivation, and in the monsoon zones, reduced rainfall in the dry season lowers the production of coconuts.

The uses of the coconut have been known since prehistoric times, and it is thought to have been utilized for cooking in the form of the meat of the nut, and for the production of coconut wine and vinegar from its sugar content, besides the drinking of the coconut water.

Coconut oil (constituting 63 to 65% of the copra) is extracted from the copra and copra meal is obtained as a byproduct. The oil meal is used mainly as feedstuff or for fertilizers. Coconut oil is one of the rare lauric oils, and is important not only for its use as a food but also as an industrial material. Its unique fatty acid composition is utilized for the production of higher alcohols and surface active agents, from which cosmetics, shampoos, detergents and various kinds of emulsifiers are produced.

The international supply and demand problems in relation to coconut products, especially coconut oil, can be summarized as follows:

a. The instability of production in the Philippines, the major producer, due to the influence of droughts and typhoons creates difficulties for the uses;

b. The instability of production and prices gives rise to problems in the competitive relationship of coconut products with petrochemical products as well as with palm kernel oil, which has a similar composition, in the field of industrial demand.

As stated in the preceding chapter on palm oil, palm kernel is a byproduct of palm oil extraction, and future increases or decreases in production basically depend on trends in the production of palm oil.

The babassu palm is a palmaceous plant growing naturally in the central and northern regions of Brazil. It reaches a height of 20 m and bears fruit bunches twice a year. One fruit bunch contains 200 to 400 fist-sized nuts. One nut contains 2 to 8 kernels.

Babassu grows wild in clumps over a wide range in the states of Maranhao, northern Goias and northwestern Piaui, and is scattered throughout other regions, with individual babassu trees often dotting in other trees. The density of natural clumps is about 200-300 trees per ha, and very dense areas with 1,000 trees or more per ha are common. It is said to grow well under the conditions of high temperature, high humidity and a climate with little seasonal variation.

Since babassu grows wild, it is harvested by picking up the fallen nuts, and both the nuts and the kernels removed from the nuts are marketed within Brazil.

Although various uses of the nuts are known, it is underutilized at the present time, and only the oil contained in the kernel and the oil meal are marketed, a portion of which is exported.

This Study treats the babassu palm as an oil crop for the production of babassu kernel oil, and barely refers to the production situation in Brazil, since the purpose here is to discuss the possibilities for expanding the overseas market for babassu kernel oil.

II. Coconut Oil

Coconut oil is a vegetable oil which follows soybean oil, sunflower seed oil, palm oil, rapeseed oil and cottonseed oil in volume of production. As with other vegetable oils, it is in demand both for industry and as a food, but because of its special chemical structure, it is used more for industry than for food in the developed countries.

Soybean oil, cottonseed oil, peanut oil and tallow, with their higher production levels and generally with a larger demand as edible oils, have a chemical composition consisting chiefly of the palmityl group, with a carbon chain length of 16, and the stearyl group and oleyl group, each with a carbon chain length of 18. Some alkyl groups with their unsaturated bond are also contained, which results in these oils being liquids.

On the other hand, coconut oil consists mainly of groups having a carbon chain length of 12 to 14, and this results in the chemical and physical characteristics of coconut oil being different from those of other oils. As a supply source for the sectors requiring products with a carbon chain length of 12 to 14, coconut oil is the most readily available. Other vegetable oils which can meet the demand in the same sector as a substitute for coconut oil are those of palm kernel oil and babassu kernel oil.

Tables A-2 and A-3 show the fatty acid and triglyceride compositions of these three kinds of oil. Palm kernel oil and babassu kernel

Table A-2 Fatty Acid Composition of Babassu Kernel Oil, Coconut Oil and Palm Kernel Oil

Palm family plant name	Production area	Saturation C_8	C_{10}	C_{12}	C_{14}	C_{16}	C_{18}	Oleic acid	Linolenic acid	Researchers
Babassu kernel oil	Brazil, Mexico, W. Africa	6.5	2.7	45.8	19.9	6.9	-	18.1	-	Helduschka and Agsten
"	Brazil	4.1	7.6	45.1	16.5	5.8	5.5	11.9	2.8	Nobori and Ono
"	Brazil	4.8	6.6	44.1	15.4	8.5	2.7	16.1	1.4	Jackson and Longenecker
Coconut oil	Tropical coasts	9.5	4.5	51.0	18.5	7.5	3.0	5.0	1.0	Armstrong et al.
"	"	8.7	5.6	45.0	18.0	—— not estimated ——				Taylor and Clarke
"	"	7.9	7.2	48.0	17.5	9.0	2.1	5.7	2.6	Collin and Hilditch
"	"	7.8	7.6	44.8	18.1	9.5	2.4	8.2	1.5	Child and Collin
"	"	9.0	6.8	46.4	18.0	9.0	1.0	7.6	1.6	Lepkovsky et al.
"	"	5.4	8.4	45.4	18.0	10.5	2.3	7.5	trace	Longenecker
"	"	7.7	9.7	45.0	18.0	8.4	3.7	5.8	1.5	Dale and Meara
Palm kernel oil	Tropical coasts	4.3	4.8	51.3	16.5	7.6	1.7	11.3	1.3	

Source: Oils and Fats monthly, September 1976

Table A-3 Triglyceride Composition of Coconut Oil, Palm Kernel Oil and Babassu Oil

	Coconut oil	Palm kernel oil	Babassu oil
Saturated glycerides	84	63	63
Monoleyl-disaturated glycerides	12	26	30
Dioleyl-monosaturated glycerides	4	11	7

Source: Oils and Fats monthly, September 1976

oil contain slightly more oleic acid than does coconut oil, while coconut oil contains more saturated glycerides than do the other two oils.

1. Characteristics as an Edible Oil

Coconut oil is used as an edible oil in various forms such as crude oil, refined oil, hardened oil or in combination with palm kernel oil. The representative vegetable oils such as soybean oil and rapeseed oil are called soft oils, whereas coconut oil is classified as vegetable fat because it is solid in the normal temperature with melting points 23 - 25°C.

Table A-4 Characteristics and Applications of Coconut Oil for Food Use

	Process	Product	Applications	Characteristics utilized
For food	Refining	Refined coconut oil	Spray (for snacks) Sandwich cream (biscuit) Caramel, candy Ices (lacto-ice) Cream (topping, coffee) Margarine, shortening Chocolate (for cakes, ice cream coating) Cooking powder Peanut frying	Stability of preservation Light taste Quick melting in mouth Quick drying time Creaminess Low viscosity
	Hydrogenation & refining	Hydrogenated coconut oil		
	Ester interchange	Ester interchanged oil		
	Blending	Blended oil		

Refined coconut oil has the following characteristics.

a. Because it is almost tasteless and odorless, it is ideal for the filled milk.

b. Since it has a high lauric acid content, it is an essential material in the production of powdered milk with properties more closely resembling breast milk, and it is easily digested.

c. Due to its superior creaming property, it is best suited for icecreams, cream and sandwich biscuits.

d. If it is sprayed over biscuits and crackers, the taste is improved and it has a moisture-proofing effect.

e. Because it melts quickly, it is suitable for margarine and shortening.

With the above characteristics, it is an important material for the products which require such characteristics.

2. Characteristics as an Industrial Material

Coconut oil contains 40 to 50% lauric acid, and also contains the saturated acids such as caproic acid, caprylic acid, capric acid and myristic acid, and few oils exist which have such composition. For use, it is decomposed into fatty acids or reduced to higher alcohols after methyl esterifying, or made into various derivatives such as acid amines, nitriles, amines, and surface active agents, which are used in a variety of applications. It is also an important material for the manufacture of soap.

Table A-5 Characteristics and Applications of Coconut Oil for Industrial Use

	Process	Product	Applications	Characteristics utilized
For industry	Decomposition	Various fatty acids & derivatives	Soaps, detergents, cosmetics, shampoos	50% C_{12} contained
			Toothpaste	Much middle-length chain fatty acid
			Textile oil, alkyd resin (paint)	Softness
			Surface active agents, plasticizers, PVC stabilizers	Good absorption
				Low viscosity
	Reduction	Higher alcohols & derivatives	Lubricants, petroleum additives	
			Medium-length chain oils (MCT) for pharmaceuticals	
		Soap	Cake (bath, toilet)	Good lathering
			Powder (washing)	Readily soluble

Fatty acids and higher alcohols are widely used for the products which are daily necessities, including soaps, detergents, cosmetics, toothpastes and shampoos, and for industrial products including surface active agents, textile oils, paints, petroleum additives and lubricants. They are also used for pharmaceuticals.

The characteristics of coconut oil which make it effective for use in the products which comprise the daily necessities of life are its ability to be solubilized, its emulsifiability, its osmotic properties through and emolient effect on the skin, its retentivity of perfume, and its ability to dissolve or disperse colorants.

The characteristics which make it effective for use in industrial products are its viscosity-reducing and antistatic properties, its ability to dissolve and disperse colorants, and in the case of pharmaceuticals, its improvement of the lipid metabolic path as a nutrient and its osmotic properties through the skin. When used in the manufacture of soap, it improves lathering and solubility.

The demand for coconut oil in the field of daily necessities and for soap production is steadily increasing, and continued growth can be expected in the future. Japan is promoting the use of detergents with little or no phosphorus content in order to protect the natural environment, by using the higher alcohols produced from coconut oil, and an increase in this field can also be expected.

The level of demand in the pharmaceutical industry is also increasing, concentrating on the medium-length chain oils (MCT).

III. Palm Kernel Oil and Babassu Kernel Oil

Palm kernel oil is in a solid state in the normal temperature range in the temperate regions. With regard to its fatty acid composition, the saturated fatty acids such as lauric acid and myristic acid account for about 80% of the oil content, while the remaining unsaturated fatty acid content consists of oleic acid which account for 11 to 17%. It is used for foods such as margarine, shortening and frying oil, and also as an oil for lacto-ice and as a substitute for cocoa butter in chocolate. For industrial products, it is used in soap, higher alcohols, fatty acids and surface active agents, though the volume used for these purposes are not so big at present. The oil meal is used as an animal feed.

The fatty acid composition of babassu kernel oil is almost the same as that of palm kernel oil, but it contains slightly more stearic acid and oleic acid than palm kernel oil. Due to this fatty acid composition, babassu kernel oil has a little wider application than coconut oil. The melting point of babassu kernel oil is only slightly lower than that of palm kernel oil.

Babassu kernel oil is used for edible oils, shortening, margarine and for soap as in the case of coconut oil, and it is also used as an industrial material after decomposition into the fatty acids and glycerin.

B. PRODUCTION

I. *Copra and Coconut Oil*

1. Coconut Production

The coconut is widely distributed throughout the tropical zones of the world, but the amount of land suitable for commercial production is limited. According to FAO's Production Yearbook, world coconut production in 1981 stood at 36.665 million metric tons, and of this amount, 30.803 million tons, or 84%, was produced in Asia. Of the quantity produced in Asia, the Philippines and Indonesia each holds a 30% share, and 60% of the world production is accounted for by these two countries. Other producing countries after these two countries are India, Sri Lanka, Malaysia and Thailand by the order of production volume.

The quantity of production in Oceania is 2.274 million tons, which is greater than the amount of production in either Central and South America or in Africa. The combined production of Asia and Oceania accounts for 90% of total world production.

According to the Asian Pacific Coconut Community (APCC),[1] the total quantity of coconut production (copra equivalent) of all the APCC member countries has shown an increase of 1.5 million tons over the 10 years from 1969 to 1978, an average annual growth rate of 3.5%. The largest increase, of almost a doubling of output over this 10-year period, was achieved by the Philippines, while Indonesia, the second largest producer, increased its production at an annual rate of 2.5%. Other producing countries such as India, Malaysia, Papua New Guinea and Western Samoa showed slight increases. On the other hand, a decrease in production was seen in Sri Lanka, Thailand and the Trust Territory of the Pacific Islands.

One of the botanical characteristics of the coconut is that it

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1) APCC: Pacific Ocean countries were added as members to the Asian Coconut Community, which was established in 1969 for the main purpose of mutual cooperation among the coconut producing countries. The member countries are India, Indonesia, Malaysia, the Philippines, Sri Lanka, Thailand, Papua New Guinea, Western Samoa, the Solomon Islands, etc.

is easily affected by strong winds and drought,[1] and in the Philippines and Sri Lanka, which frequently suffer from such conditions, the volume of production greatly depends on these factors. Production in the Philippines is especially affected by these climatic fluctuations, and in 1973 and 1974 this resulted in the volume of production being reduced by more than 500,000 tons (copra equivalent) (Appendix Tables 3 and 4).

2. Cultivated Area and Productivity

Although data for the whole world concerning the planted area under coconut are not available, Appendix Table 5 shows the data from the Asian Pacific Coconut Community.

According to this data, there were 8.377 million ha under coconut cultivation in the APCC member countries alone in 1978, and the countries having more than 1 million ha of cultivated area include the Philippines, Indonesia and India. In the 10 years from 1969 to 1978, the total cultivated area increased at an annual rate of 3.9%. This increase can be mainly attributed to the Philippines and Indonesia, with an average annual increase rate over these 10 years of 6.7% for the former and 4.2% for the latter. Besides these countries, Thailand and Western Samoa have shown some increase, although this is not comparable in scale to that of the two main countries, while hectarage in the other producing countries remained at almost the same level (Appendix Table 5).

The productivity of coconut is often compared with that of oil palm, which belongs to the same group of palm crops. If a comparison of the productivity in Malaysia for each of these two crops is made, the productivity of coconut (copra equivalent) is 0.56 tons/ha (from APCC data), and when this is converted into coconut oil equivalent (extraction yield: 63.5%), the figure obtained is 0.36 tons/ha, while that for oil palm (palm oil equivalent) is 3.44 tons/ha (Department of Statistics, Government of Malaysia) (the productivity in both cases is calculated as the total volume of production divided by the total cultivated area, including the area under immature trees). In other words, in the case of Malaysia, coconut has only 10.5% of the oil productivity level of the oil palm. Furthermore, it should be noted that when palm oil is extracted from the oil palm, palm kernel is obtained as a byproduct which also contains

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1) Its susceptibility to strong winds is due to such structural characteristics as its height and the fact that the leaves extend directly from the trunk, while the fruits are borne on fleshy spikes growing from the leaf axils at the top of the trunk. The poor resistance of the coconut against drought is due mainly to its shallow roots.

the oil, and according to the statistics of the Government of Malaysia, the productivity of palm kernel oil is 0.32 tons/ha.

In terms of coconut productivity by countries, Appendix Table 6 shows the coconut production per ha (copra equivalent), calculated using data from APCC on the cultivated area and coconut production. Since the cultivated area includes the area under immature trees, the figure is low for the Philippines and Indonesia where new planting (i.e., increase in cultivated area) is widespread. The 10-year average for the entire APCC region is 0.75 tons/ha, while production in Sri Lanka, the Solomon Islands, and Western Samoa exceeds 1.0 tons/ha. The lowest figure is that for Thailand, whose average over 10 years is 0.31 tons/ha, only one-third of the production in the high-productivity countries. The productivity in the Philippines, at 0.85 tons/ha, is slightly higher than the APCC average, and if the area under immature trees is taken into account, this figure likely rises to between 1.0 and 1.5 tons/ha.

Coconut cultivation is classified according to the form of management, into small-scale farms directly managed by the farmers and large-scale plantations.

These classifications of the two main forms of management almost fully correspond to the quality of performance of farm management, and naturally the level of productivity is different in each category. Several examples are shown in the list below, and it can be seen that even the highest level of plantation productivity in each of these countries cannot compete with the productivity of palm oil in Malaysia.

Countries	Form of Management	Production (tons/ha)	Notes
Philippines	Plantations	1.5-2.5	(Well-managed farm in Davao)
	Small-scale farms	1.0	(Well-managed)
Papua New Guinea	Plantations	1.0	(National average)
	Small-scale farms	0.5	(National average)
Solomon Islands	Plantations	2.5	(Well-managed farm in Russel Is.)
	Small-scale farms	1.4	(National average, including plantations)
Malaysia	Plantations	1.5-2.5	(Well-managed farm on West Coast of the Peninsular Malaysia
	Small-scale farms	0.8	(National average, Malaysian data)

The productivity of coconut is related not only to the quality of cultivation management but also to a great extent to the production capacity inherent in each particular variety. The most important aspect of the cultivation of coconut, i.e., the productivity of copra, is determined as follows:

(Amount of copra in a nut) x (Number of nuts forming a bunch) x (Number of bunches matured in a year) x (Number of trees standing in one hectare of the farm)

The above four elements show a wide variation depending on the variety of the tree, and because the economic life span of the coconut tree is long, the selection of the variety greatly affects the results of cultivation. Almost 100% of the presently cultivated varieties are ordinary varieties, and even good cultivation management can only obtain a copra production capacity of about 2 tons/ha. Recently, attention has been drawn to the breeding of hybrids using heterosis, and the development of promising varieties such as MAWA (a hybrid of the Malayan Dwarf (Malay origin) and the West African Tall (west African origin) was commenced. Since only a short time has passed since the MAWA variety was first bred, sufficient data are not available, however, there is a experimental report in which the high rate of yield of 5 to 6 tons (copra equivalent) per ha has been obtained. Although the ordinary varieties are expected to be replaced by hybrids in the future, but it will take many years before the hybrid crones are widely distributed because of the low reproduction efficiency of the coconut (fruit mature one year after pollination).

In the Philippines, the main producing country, private enterprises are studying propagation methods using apical meristem culture, in order to improve the propagation efficiency. If they succeed, the speed at which the hybrid varieties of coconut can propagate will be greatly accelerated.

The major producing countries are carrying out adaptability tests on hybrid coconuts to determine the varieties which can meet the natural conditions, but it is difficult to select varieties in a plant whose tree has an economic life span of as much as 50 years. In many countries, after growing and harvesting have been observed for some period, the seeds are released for general use. In the Philippines, a government agency, the Philippines Coconut Authority, had been recommending the MAWA variety for wider use since the late 1970s, but it stops the distribution of this variety in late 1982, probably because there were still some problems of adaptability to the climatic conditions, in the Philippines. This indicates the difficulty of selecting a variety in the case of a perennial plant such as the coconut.

3. Economic Aspects of Coconut Cultivation

As already mentioned, the productivity of copra (coconut oil) in the cultivation of ordinary varieties of coconut is lower than the productivity of palm oil and palm kernel oil from the oil palm, which belong to the same group of perennial oil crops. This is also true in terms of profitability, and in comparison with other tropical perennial crops, the coconut belongs to the lower group with regard to profitability per unit area.

The experience of the plantations in the Philippines, Malaysia, Papua New Guinea, and the Solomon Islands is that the profitability from the cultivation of coconuts exclusively is highly unstable due to the international price for copra showing great fluctuations in addition to their profitability itself is low. A decline in price results in many plantations registering a loss.

An example can be seen in a survey of the production cost of the plantation companies in Papua New Guinea. According to a study carried out by the Department of Primary Industry in this country on 17 plantation companies, the production cost of copra per ton in 1979 showed a wide range, from 128 to 331 kina (1 kina = 1.41 US dollars) among the various companies, with the average cost in these 17 companies standing at 233 kina. The investigated plantations were of 150-1,600 ha in scale per plantation company (some companies reported on a total of several plantations of the company), whose coconut trees were in the producing period.

Since the price [1)] received by the producers in 1979 was high, about 330 kina per ton (April - July 1979) reflecting the high international price, the profitability of the coconut plantations was good. From the peak in 1979, however, the international price of copra followed a downward trend, and the producer price in this country fell below 200 kina in October 1981, with most of the coconut cultivation business operating at a loss.

Although the labor costs and production material costs may vary from country to country, it can be said that plantations exclusively growing coconut in other countries are also facing almost the same situation as the plantations in Papua New Guinea.

However, the coconut is a perennial crop, and once planted, it produces a harvest for 50 years, more than twice the crop-producing life span of the oil palm. Furthermore, although the profitability per unit area is low, coconut has the advantage of not requiring as much manpower as the oil palm, and efforts are being made to improve

1) This is calculated by subtracting the surcharge for the Copra Industry Stabilization Fund from, or by adding a subsidy to, the price at which it was purchased by CMB (Copra Marketing Board).

the profitability through mixed cropping and by grazing cattle among the trees.

In Malaysia, the plantation companies tended to convert to oil palm in the past because the profitability of coconut cultivation was low. However, since the high-yield hybrid MAWA variety appeared, coconut cultivation has again drawn attention by the combined cropping of coconut with cacao, since the cacao plant requires shade, making it suitable for mixed cropping with coconut trees.

According to a study carried out by Harrison & Crosfield (Malaysia) Sdn. Bhd. on the profitability of the newly-developed perennial crop, the mixed cropping of MAWA and cacao results in a far larger sales income compared to that of oil palm cultivation in the same area, and the level of profitability is also high, although the cultivation cost is higher than that of oil palm. This study was made on the profitability of three types of new cultivation developments, namely, oil palm, rubber and the mixed cropping of coconut (MAWA) with cacao. The data used for the study were the production costs such as land development, planting, fertilizing and cultivation management, harvesting, transportation within the plantation, processing (rubber and copra) and shipping (rubber only), but excluding the costs of buildings and vehicles which are considered common for every crop. For the production costs and selling price, the average prices in 1978 were used.

Appendix Fig. 1 shows the profit and loss by year for new planting of the three types of crops.

A large price fluctuation can be seen for all of the subject crops, and it must further be taken into consideration that the production cost for the mixed cropping of coconut and cacao does not include the cost of workers' facilities, despite this type of cropping requires the largest labor force. As a result of this study, it can be said that the mixed cropping of coconut and cacao is promising. Also, mixed cropping provides stability in plantation management because even if the price of copra is low, it may often happen that the price of the other crop is higher.

4. Copra Production

Not all of the coconut crop is used for the production of copra. In the coastal regions of the tropics, the coconut is traditionally deeply rooted in the eating habits of the population, and in some countries such as India and Sri Lanka, only 30 to 40% of the copra equivalent of coconut production, i.e., the potential copra

production,[1] is used for the actual production of copra. In other countries such as Papua New Guinea, almost all of the coconut production is used for copra production. As shown in Table B-1, the copra production ratio (ratio of actual copra production to potential copra production) is 60 to 70% on the average for the APCC members.

Table B-1 Coconut Production (Copra Equivalent) and Actual Copra Production in 1978

(1,000 MT)

	Coconut production (copra equivalent)	Copra production	Copra production ratio (%)
India	850	350	41.2
Indonesia	1,461	900	61.6
Malaysia	190	160	84.2
Papua New Guinea	143	143	100
Philippines	2,501	2,133	85.3
Sri Lanka	448	131	29.2
Thailand	110	40	36.4
Trust Territory of Pacific Is.	15	11	73.3
Solomon Is.	37	28	75.7
W. Samoa	40	14	35.0
Total	5,796	3,910	67.5

Source: APCC

The production of coconut is affected by the weather conditions, and it fluctuates from year to year. Consequently, copra production also fluctuates. Copra is an international commodity with many producing countries importing or exporting copra or coconut oil, and the international price is the most important factor in determining the producer price of the copra. It therefore follows that the copra price is also an important factor influencing the volume of production of copra. The production ratio of copra for the APCC countries taken as a whole reveals that when the price is high, the copra production ratio tends to also be high.

Copra production statistics from the FAO Production Yearbook and from Oil World are shown in Table B-3, Appendix Tables 7 and 8

1) Quantity when the entire volume of coconut production is used for the production of copra.

Table B-2 Coconut Production (Copra Equivalent), and Actual Copra Production, Production Ratio, and Price in APCC Countries, 1969 to 1978

	APCC coconut production (1,000 MT copra equivalent)	APCC copra production (1,000 MT)	Copra production ratio (%)	Copra price* (US$/MT)
1969	4,264	3,010	70.6	
1970	4,525	3,251	71.8	225
1971	5,036	3,346	66.4	190
1972	5,555	3,515	63.3	142
1973	5,129	3,358	65.5	348
1974	4,539	3,360	74.0	670
1975	5,589	3,542	63.4	256
1976	6,073	3,681	60.6	275
1977	5,570	3,804	68.3	402
1978	5,796	3,910	67.5	471

* Philippine and Indonesian copra in bulk, CIF N.W. Europe price

Source: APCC

Table B-3 Copra Production by 3-Year Totals and Yearly Averages for 1979/80 - 1981/82 and 1972/73 - 1974/75

(1,000 MT, %)

	1979/80 - 1981/82			1972/73 - 1974/75		
	3-Year total	Yearly average	Share of world total	3-Year total	Yearly average	Share of world total
Philippines	7,370	2,475	50.3	5,466	1,822	45.7
Indonesia	3,375	1,125	22.9	2,400	800	20.1
India	1,123	374	7.6	1,061	354	8.9
Others	2,897	966	19.6	3,138	1,046	26.2
World	14,765	4,922	100.0	11,965	3,988	100.0

Source: Oil World

and Appendix Fig. 2. Each set of data uses a different base in fixing the yearly period, one uses calendar years, and the other crop years. Naturally, therefore, the figures contained in both data are not in agreement, but even if this fact is taken into consideration there is still a large difference. The same case applies between these sets of data and the APCC data. Since the FAO Production Yearbook does not give the production figures of coconut oil production, data obtained from Oil World are used here to show the trends in copra production, in order to see its relationship with the production of coconut oil, which is discussed in the following section. The world production of copra increased by 23.4% over a period of approximately 10 years, from 3.988 million tons (three-year average, 1972/73 - 1974/75) to 4.922 million tons (three-year average, 1979/80 - 1981/82); i.e., at an average annual growth rate of 2.7%. However, there is a large fluctuation of as much as 1.7 million tons on a yearly basis, e.g., from 3.538 million tons, the lowest level, in 1973/74 to 5.24 million tons, the peak level, in 1975/76.

This data shows that the Philippines accounts for about half of the world production, with Indonesia holding a share of about 20% and India about 9%. Both in the Philippines and Indonesia, the level of production fluctuates widely from year to year, and the decrease shown in 1973/74 was steep. In the Philippines, the production level in 1973/74, at 1.5 million tons, was only 54% of the level of production two years later in 1975/76, at 2.79 million tons. The Philippines is the largest producing country, with a share of more than half of world exports of copra and coconut oil. Fluctuations in production in the Philippines, mainly due to abnormal climatic conditions such as droughts and typhoons, cause great uncertainty of the world supply/demand balance of coconut oil in the world. The production level in Indonesia is on the increase, but there are also large fluctuations, although not as severe as in the Philippines, and domestic supply and demand is almost balanced. The production in India has remained at almost a constant level of 350,000 to 370,000 tons over this 10-year period.

Most of the other producing countries show a gradual increase, but Sri Lanka has shown a continuous decrease, although there are large fluctuations from year to year due to droughts, cyclones, and the reduced productivity of older trees. Production in Sri Lanka decreased from 248,000 tons in 1971/72 to about 100,000 tons in the late 1970s, and this level of production has been maintained.

5. Coconut Oil Production

The production of coconut oil, that is, the extraction of the oil from copra, is carried out in the major copra producing coun-

tries and copra importing countries. The data from Oil World are shown in Table B-4 and Appendix Table 9.

Table B-4 Coconut Oil Production by 3-Year Totals and Yearly Averages for 1979-1981 and 1972-1974

(1,000 MT, %)

	1979 - 1981			1972 - 1974		
	3-Year total	Yearly average	Share of world total	3-Year total	Yearly average	Share of world total
Philippines	3,695	1,232	44.8	1,893	631	26.8
Indonesia	1,875	625	22.7	1,026	342	14.5
India	722	241	8.8	n.a.	n.a.	n.a.
Germany, FR	111	37	1.3	490	163	6.9
Mexico	268	89	3.2	n.a.	n.a.	n.a.
Sri Lanka	181	60	2.2	n.a.	n.a.	n.a.
Others	1,402	467	17.0	3,355	1,118	47.5
World	8,254	2,751	100.0	7,064	2,355	100.0

n.a.: not available

Source: Oil World

World coconut oil production showed an increasing trend over the past 10 years, from 2.355 million tons in 1972-1974 to 2.751 million tons in 1979-1981 (both figures based on three-year averages). However, there were wide fluctuations of as much as 1 million tons, for example between the level of 3.131 million tons in 1976, the peak level in this 10-year period, and the lowest level, at 2.055 million tons in 1974. This corresponds to the fluctuations of copra production as mentioned before.

In terms of production by country, the level of production in the Philippines is overwhelmingly large and more than doubled in this 10-year period, from the 600,000 ton level in the early 1970s to more than 1 million tons in 1976, and further to 1.416 million tons in 1981, with current production accounting for almost half of the total world production. As a background to this was a policy of the country restricting the export of copra and promoting increased oil extraction in the country, coupled with a relatively smooth increase in copra production.

While coconut oil production in the Philippines increased, the countries which were importing copra and extracting the oil were

compelled to decrease their level of imports, and consequently their coconut oil production decreased. The largest copra importing and coconut oil extracting country, the Federal Republic of Germany, had been producing coconut oil at a level of 200,000 to 300,000 tons until 1977, but since then the level of production continuously decreased, and recently fell to the 40,000 ton level.

Indonesia, like the Philippines, has steadily increased oil production and achieved an average annual growth rate of a little less than 3.5% over these 10 years. The three-year average in 1979-1981 was 625,000 tons, a share of 23% of world production.

Production in India and Mexico has remained at almost the same level, while in Sri Lanka, the volume of oil production fluctuates greatly, reflecting instability in the level of copra production.

6. Outline of the Main Producing Countries

The coconut is deeply rooted in the eating habits of the indigenous peoples in many coastal regions in the tropics, and in most of these regions, copra has been a cash income source. This is an established part of their economic life, in a similar way to the case of rice for farmers in Asia and sheep for the nomads of the desert regions. For this reason, it can be taken as a premise that no significant decrease of the cultivated area will occur unless some drastic change occurs in the habits and way of thinking of the indigenous peoples who support the production of copra. It can be noted that in the APCC member countries, the quantity of production carried out by the farmers is far larger than that of the estate plantations.

Because of this background, all of the copra (coconut oil) producing and exporting countries are in fact the traditional coconut producing countries, and none of these countries have recently increased their production as sharply as in the case of oil palm production.

In this section we will review the conditions of production in the exporting countries which rank among the major producing countries, especially in those countries whose future outlook is of interest.

6.1 The Philippines

The coconut has been grown in this country from prehistoric times, but it was in the 17th century, when Spain established a policy for increasing the production in order to supply food for

the Spanish soldiers and to produce fiber for the ropes used in merchant vessels, that its cultivation was emphasized. The Spanish governor at that time issued an order to the farmers to cultivate coconut, resulting in a large-scale increase in production, and this is the distant cause which later made the Philippines the top ranking coconut producer in the world.

Ever since the Philippines had emphasized the production and export of coconut products, and before the onset of World War II, the coconut occupied an important position in the national economy and strengthened the foundations for its present position.

In the latter part of the 1960s, the Philippines held the position of the top producer, maintaining a level of copra production of more than 1.5 million tons, this being the result of its efforts to increase production on the basis of its traditional foundation. However, it should also be remembered that another background factor was the highly favorable customs tariff rate applied to agricultural products exported from the Philippines to the United States, based on the Laurel-Langley Agreement which remained in force until 1974.

The coconut is now an essential component of the economy of the Philippines. Some elements of this are as follows:

a. The cultivated area is 3 million ha, almost the same as for rice and maize, and as a commodity crop it is in the top position, far ahead of the second crop, sugar cane.

b. About 20% (430,000 households) of all the farming households are engaged in coconut cultivation. Most of the cultivation is conducted by these farmers.

c. In recent years, the export of coconut products has ranked in first or second position in terms of value among all exports from the Philippines.

As stated above, the coconut industry plays an important role not only in the domestic economic structure of this country but also in the supply and demand situation of the world coconut market. At the same time, however, there are many problems such as unstable production, fluctuating price, and surplus extraction capacity.

There are many difficulties in rectifying the problem of unstable production, which is often caused by typhoons and drought. Raising productivity by the introduction of high-yield varieties (hybrids) has been attemped to cope with the problems.

Specifically, as described above, the hybrid variety MAWA was introduced and disseminated, but in 1982 its diffusion had to be stopped. At present, the direction of emphasis is being placed on improving the overall profitability of plantations through the improvement of cultivation management, and mixed cropping and the grazing of animals among the trees.

The stabilization of prices and the problem of surplus extraction capacity [1] are being dealt with by means of a policy for the vertical integration of the coconut industry.

The function of this vertical integration is to unify the coconut oil extraction industries using a private firm, United Coconut Oil Mills, Inc., supported by the national policy, as the main body for performing the domestic distribution of copra, to develop the coconut oil market and to control the export price. As of 1981, about 80% of the coconut oil extraction capacity was held by enterprises affiliated with the United Coconut Oil Mills, Inc.

Accompanying this vertical integration policy, a levy system was started in 1973 imposing surcharges on the domestic distribution of copra and on exports of coconut oil, in order to provide subsidies to the coconut product manufacturers for the purpose of stabilizing the domestic sales prices of coconut products. However, this system has now been suspended.

The above measures constitute a movement to stabilize the selling price of the copra producers and the domestic selling price and export price of coconut products, together with a series of measures such as export controls on coconut oil and an export ban on copra imposed in September 1982, which is discussed later. This policy clearly shows the country's desire to reinforce its ability to influence the international price.

The conversion from the export of copra to the export of coconut oil with its higher added value is proceeding, and the development of the coco-chemial industry for processing coconut oil further into higher alcohols is also under way.

6.2 Malaysia

In Malaysia the coconut has flourished since long ago in the

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1) As of August 1981, the coconut oil extraction capacity is 3.55 million tons/year with 64 factories. The volume of oil extracted is 2.2 million tons, and only 62% of the total capacity is in operation.

coastal areas which are suitable for its growth, and it was in the early 1900s that the coconut began to be grown as a commercial crop. Coconut was one of the crops grown in the plantations operated along the west coast of the Malay Peninsula chiefly by the British settlers, and the cultivation of this tree by farmers was also accelerated during this period. In the 1940s, the cultivated area in the Peninsula alone reached 240,000 ha.

The cultivation of coconut as a commercial crop did not increase in the plantation sector as rapidly as rubber and oil palm, and in the smallholder sector also, the rate of growth was considerably smaller than that of rubber. In the cultivation of coconut by small-scale farmers, its use as a food source has traditionally been strong, and the wide dispersion of the small-scale cultivated lands has impeded progress in processing and distribution. For these reasons, coconut cultivation by smallholders did not form an industry of the type seen in the case of rubber.

The area under coconut cultivation has recently recovered to its prewar level, and on the whole it is gradually increasing, but the increase is in smallholders cultivation and that of estate plantation is decreasing. Since the cultivation of coconut on plantations in the Peninsula is low in profitability, many estates were converted to oil palm plantation, and the cultivated area of coconut estate decreased from 30,000 ha level in the early 1960s to 15,000 ha by the end of the 1970s. Cultivation by smallholders is showing continued growth, encouraged by the financial incentives established in 1963 for replanting, new planting and supplementary planting.

The increase in the cultivated area has not been accompanied by an increase in copra production. This is mainly due to the decrease in the cultivated area in the plantation sector, where all of the coconut production is processed into copra. In 1975/76, the production of copra reached a peak of 230,000 tons according to FAO data, but since then it has been declining, and the oil extraction industry is facing difficulties of a shortage in the supply of copra. Many of the oil extraction enterprises are small-scale enterprises, and recently some companies have been closing down, while the stronger enterprises are extracting oil from palm kernel in combination with copra and some others are importing copra and palm kernel. The copra extraction yield in this country is about 56% on the average, which is considerably lower than in other countries, and this is one of the reasons for the low profitability of the extraction industry.

The Government is taking the following measures as a promotion policy for the coconut industry:

a. An increase in copra production through the increase of yield per unit area by introducing high-yield varieties,

b. Tax measure to discourage the export of copra and palm kernel to secure material for extraction industry and to ease the import thereof.[1)]

In the past, the coconut oil produced was sold mainly in the domestic market, but in 1979 and 1980 more than half was exported. This is presumably because palm oil entered the domestic edible oil market.

6.3 Indonesia

In Indonesia the coconut is chiefly grown in the coastal regions, and unlike the case with oil palm, it is mostly grown by smallholders.

In the 1960s, this country was the second largest exporter next to the Philippines. The export was mainly in the form of copra. In the 1970s, however, the level of domestic consumption increased, and despite the fact that the production of copra was also increasing, Indonesia was obliged to become an importer in 1977. The reasons for this increase in domestic demand were an increase in population, raised living standards, and an easing of the pressure to export due to the improved foreign currency situation. Imports were mainly from the Philippines, with barter trade sometimes being carried out using urea for which Indonesia had an exportable surplus.

Returning to production again, FAO data shows that copra production in the 1970s followed a rising trend, with the exception of 1973 when production decreased due to drought. In 1974 and 1975 in particular, when the international price increased, copra production increased remarkably. Subsequently, production was maintained at a level of more than 900,000 tons, and it further increased to 1.25 - 1.30 million tons in 1980 and 1981. The reason seems to be that although the coconut trees in the country were aging, the efforts made to increase production through new planting and replanting met with success, and in addition, more coconuts became to be made into copra by smallholders.

If the production of copra continues to increase at the same pace as it has recently shown, it is expected that self-sufficiency can be attained even though its export may not be realized.

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1) The export duties are 15% for copra and 20% for palm kernel, while no import duty is levied for either commodity.

6.4 South Pacific Countries

The South Pacific countries are traditional coconut producing regions, and the largest producing country is Papua New Guinea, with the others including Western Samoa, the Solomon Islands and Micronesia. The production of copra by the farmers in this region, except for the plantations in Papua New Guinea and the Solomon Islands, is characterized as the so-called gathering method, i.e., the fruits dropping from randomly-planted coconut trees are collected, when the price of copra is favorable, and processed to copra.

The countries of the South Pacific are drawing the attention of the extractors in the developed countries because of their export capacity. In the late 1970s, when the Philippines strongly restricted the exportation of copra, Western Europe and Japan, which had relied heavily on the Philippines for their supply of copra, turned toward the South Pacific countries as an alternative source.

The export of copra from the South Pacific countries to the oil extracting countries such as Japan and the European countries made smooth progress, but some countries in the region, Western Samoa and the Trust Territory of the Pacific Islands, are expanding oil extraction within the countries. The enterprise within the region whose oil extraction operation is most smoothly performed is a private enterprise named Coconut Products Ltd. in Papua New Guinea, whose oil mill with a capacity of 55,000 tons per year began operation immediately after the war. At present, since the initial investment for the facilities has already been redeemed, it is considered that the operation is rather sound, although it is dependent on the trends of the international price.

The oil extraction operations in other countries in the region have problems with regard to collection of copra and shipping facilities. For example, the Micronesia Industrial Corp., in Palau (T.T.P.I.), with a capacity of 4,200 tons/month, must import copra from other countries, and generally speaking it is difficult to collect copra from scattered islands in the South Pacific region where transportation costs are very high.

The low price of copra in the 1980s had adversely affected the willingness to produce this commodity in the South Pacific region, and it is said that the largest producing country, Papua New Guinea, is finding it difficult to maintain its price support system, and that the low price is cooling enthusiasm for the distribution of hybrid seeds which has only recently commenced.

With the limited amount of arable land available in the South Pacific region, the area under coconut cultivation cannot be

expected to increase significantly in the future even if the copra market situation improves, and consequently the production increase will have to rely on raising productivity.

II. Palm Kernel and Palm Kernel Oil

According to FAO data, world production of palm kernel stood at a level of 1.3 to 1.4 million tons from 1974 to 1978, representing about 650,000 tons in terms of palm kernel oil equivalent. However, during this period, the production of palm kernel has been stagnant, while the production of palm oil showed an average annual growth rate of 7.9%. One of the reasons for this is that the kernel of the Tenera variety, the cultivation of which accounted for much of the increased production of palm oil in the 1970s, is smaller. In 1980, however, world palm kernel production increased by about 9% over the preceding year. This reflected an increase in palm oil production in Malaysia, comprising an 18.1% increase in palm oil production and a 17.5% increase in the production of palm kernel.

The largest palm kernel producing country in the world is Malaysia, with a combined volume of production in the Peninsular Malaysia, Sabah and Sarawak of about 560,000 tons in 1980, about 30% of total world production. Most of the palm kernel produced is processed into oil domestically and the oil exported. The export volume of palm kernel oil in Malaysia accounts for almost 60% of the world volume of trade in this commodity.

Indonesia is the third-largest producer of palm kernel after Malaysia and Nigeria, and this country produced about 120,000 tons in 1980, of which about one-third was exported and about 80,000 tons were used for oil extraction. However, the export of palm kernel oil has been halted since September 1978, with the entire amount produced being used as an edible oil for domestic consumption.

Nigeria is the second-largest producer of palm kernel after Malaysia, but it is thought that there is little possibility of exports increasing significantly in the future because the production of palm oil is leveling off, and in addition, palm kernel oil, like palm oil, is increasingly being consumed domestically.

The production in the Ivory Coast, Papua New Guinea and the Solomon Islands are all gradually increasing, but not sufficiently to influence the international market. On the other hand, the world supply of palm kernel and palm kernel oil will be affected by the production situation in Malaysia, as in the case of palm oil (Tables B-5, B-6, Appendix Tables 10 to 12, and Appendix Fig. 3).

Table B-5 Palm Kernel Production by Yearly Averages

(1,000 MT, %)

	1979/80 - 1981/82		1972/73 - 1974/75	
	Yearly average	Share of world total	Yearly average	Share of world total
West Malaysia	523	36.3	184	18.3
Nigeria	267	18.5	262	26.1
Indonesia	118	8.2	71	7.1
China	34	2.4	38	3.8
Others	499	34.6	1,450	44.8
World	1,441	100.0	1,005	100.0

Source: Oil World

Table B-6 Palm Kernel Oil Production by Yearly Averages

(1,000 MT, %)

	1979 - 1981		1972 - 1974	
	Yearly average	Share of world total	Yearly average	Share of world total
West Malaysia	228	38.0	74	16.8
Nigeria	82	13.7	20	4.5
Indonesia	41	6.8	17	3.9
UK	28	4.7		
Zaire	23	3.8		
Netherlands			75	17.0
Germany, FR			19	4.3
Others	197	32.8	236	53.5
World	600	100.0	441	100.0

Source: Oil World

III. Babassu Kernel and Babassu Kernel Oil

Babassu drew an attention in the 1970s as a future oil source because of the vastness of the area under wild babassu palm, the similarity of babassu kernel oil to the coconut oil which is marketed worldwide, and the possibility of using the fruits not only for oil but also other uses.

As shown in Table B-7, the level of production of babassu kernel and oil in Brazil showed an average annual growth rate of 3% over the 12 years up to 1980. Babassu is harvested by collecting the fruit after they have dropped from the wild grown palm. And, as the babassu grown areas in Brazil are free from tropical cyclones, yearly fluctuations as seen in the case of coconut do not occur. Hence the production has been able to increase gradually and steadily. Recently, production has been maintained at a level of 250,000 tons.

Table B-7 Babassu Kernel and Babassu Kernel Oil Production (Estimated) in Brazil, 1969 - 1980

(MT)

	Babassu kernel	Babassu kernel oil (Estimated)
1969	180,417	104,642
1970	180,897	104,920
1971	193,346	112,141
1972	198,479	115,118
1973	212,196	123,074
1974	222,097	128,816
1975	212,723	123,379
1976	225,925	131,037
1977	236,755	137,318
1978	234,343	135,919
1979	250,913	145,530
1980	250,949	145,550

Sources: Babassu kernel ——
Instituto Brasileiro de Geografia e Estatistica
Babassu kernel oil ——
Obtained by multiplying the volume of kernel production by the extraction yield ratio of 58%.

The problems facing expansion of the production of babassu kernel oil, however, are shown below;

a. improvements of infrastructure for the expansion of the area of nut collection,[1] the establishment of oil extraction mills, the mechanization of nut cracking, or the cost involved in starting new plantations;

b. the acquisition of a labor force for nut collection and cracking; and

c. the complete development and full utilization of nuts in order to improve competitiveness with other crops.[2]

In addition to this, the production of other crops providing raw materials for oil during the off-season of babassu production may need to be considered in order to raise the rate of operation of the mills.

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1) Although the area of collection has been expanded as a result of the collection of nuts of babassu growing wild in up-country districts, the limit of the distance from oil extraction mills is said to be 250 to 300 km.

2) The major part which is now utilized is the seed, which provided oil; and there is little commercialization of the skin (exocarp) as raw material for cellulose, of the pulp (mesocarp) for starch, or of the flesh (endocarp) providing methyl alcohol, cork and charcoal.