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THE WORLD VEGETABLE OIL OUTLOOK

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ABSTRACT

The world vegetable oil sector continues to be dynamic. Increased Soviet use of soybean meal will increase the supply of vegetable oils over time. India will have record vegetable oil imports in 1987/88 and will continue to be a large importer in future years. Malaysia and Indonesia, the two largest palm oil producers, will continue to increase output. These countries have very low production costs. They are also sensitive to the health issue centered on palm oil having a high saturated fat content. The world vegetable oil situation has tightened considerably in the past two years. For the next few years, vegetable oil prices will be higher and more volatile than they were in the recent past.

SUMMARY

Several developments will be important in shaping the world vegetable oil outlook over the next several years.

The Soviet Union is making a concerted effort to increase meat and poultry production. An important element of their strategy is a sharp increase in the use of soybean meal to improve the quality of feed rations and feeding efficiency. Since meal and oil are joint products from oilseeds, an increase in soybean meal demand on a sustained basis will also increase production of soybeans and soybean oil.

The failure of the Indian monsoon in 1987 resulted in that country's worst oilseed crop since 1982/83. As a result, India will achieve record levels of vegetable oil imports in the 1987/88 season. Over the long run, growth in oilseed consumption will about keep pace with growth in production and annual imports will remain fairly stable in the 1.2-1.4 mmt range, barring unfavorable weather and crop problems.

World palm oil production continues to grow at a healthy rate. Both Malaysia and Indonesia have low production costs with short-run variable costs of crude palm oil production at about 5.5¢-6.5¢/pound.

Consumers in a number of countries are becoming more health conscious and are showing concerns over the high saturated fat content of palm oil. Both Malaysia and Indonesia are sensitive to this concern and researchers are trying to develop palm varieties that have a lower saturated fat content.

The world oilseed and vegetable oil situations tightened considerably in the 1986/87 and 1987/88 crop years. It would not take much of a production problem to rally vegetable oil prices significantly above the levels of the past two years. And, vegetable oil prices could be quite volatile over the next few years.

I. Introduction

A paper prepared in September 1986 under the Agricultural Policy Analysis Project reviewed the past evolution and future outlook for the world oilseed sector.[1/] Its primary purpose was to provide a framework for addressing vegetable oil policy questions.

The main themes and conclusions of that paper were as follows:

- After grains, oilseeds are the world's next most important crop.
- Vegetable oil is an important component of developing country food supplies.
- Vegetable oil prices are expected to continue to decline in real terms over the coming years, although high prices are possible in any 1-2 year period.
- Reliance on imports is a reasonable strategy for many countries, but in some cases latent efficiency and the spillover effects of agro-industrial development may dictate an expansion in internal production and processing.

Since that time there have been a number of new developments with conflicting effects on the oilseed outlook generally and on vegetable oils in particular. The Soviet Union has made a major change in oilseed policy which is having important market impacts. India has experienced a major crop failure. New information has become available on the Malaysian and Indonesian palm oil industries. And capacity utilization has improved in oilseed crushing industries in a number of countries. For these reasons it is important to review and update the world vegetable oil outlook and its policy implications for developing countries.

1/ "The World Oilseed Market: Outlook and Implications For Developing Countries"; USAID, September 12, 1986.

II. The Joint Product Relationship

Economic relationships within what is loosely called the oilseed complex are very complicated. Varying proportions of meal and oil are obtained from different oilseeds (Table 1). The protein meal that is extracted cannot be stored for very long and competes with a host of other feedstuffs. The vegetable oil is quite storable and competes with palm oil and various animal fats. Therefore, to appreciate the implications of the developments discussed later in this paper, it is useful to review the dynamics and the scope of the joint product relationship. Soybeans are used as the example, but all oilseed product markets work in a similar fashion.

Table 1

Oil and Meal Content of Major Oilseeds[1/]

	Crude Oil	Meal
	- - - - percent - - - -	
Soybeans	18.3	80.0
Cottonseed	16.0	45.4
Peanuts	42.2	55.9
Sunflowerseed	40.0	55.0
Rapeseed	35.0	60.0
Copra	64.0	35.0
Palm kernel	47.0	51.0

1/ Oil and meal do not add to 100 percent because of losses in crushing due to unused hulls, etc.

As joint products, soybean oil and meal share an interdependent price relationship dictated by the relative supply-demand differences between the two co-products. Given stable soybean prices and adequate crushing capacity, soybean oil and meal prices typically vary inversely, with prices of the co-product in relatively short supply increasing while the price of the other product declines.

Only in the case of tight (excessive) supplies of soybeans and/or constrained (excess) crush capacity are these joint product prices likely to consistently rise (fall) in tandem.

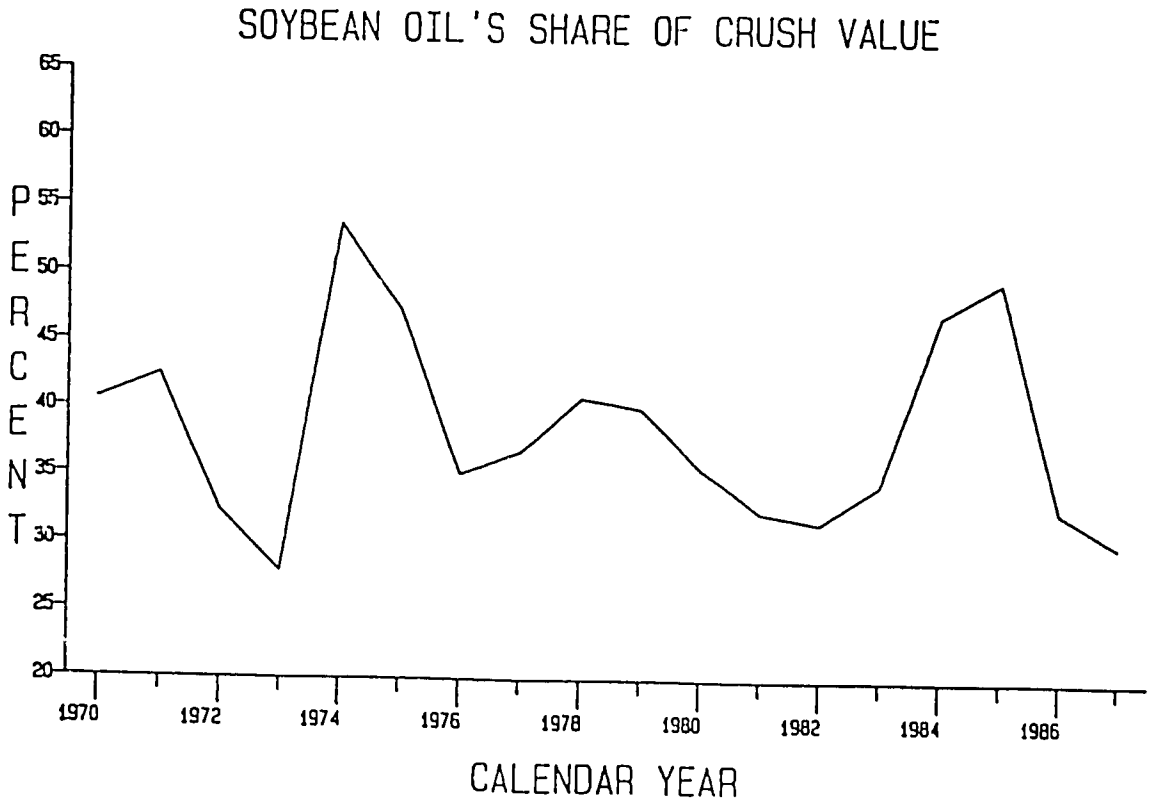
The soybean complex tends to be "soybean meal driven" for both technical and economic reasons. On the technical side, soybean meal cannot be stored for very long, while oil can. So current meal demand usually determines the pace of crushing and oil is stocked or destocked as needed. Secondly, one gets proportionately higher meal yields from soybeans relative to other oilseeds, and there are more substitutes available for soybean oil than for soybean meal.

On the economic side, when we say that soybean crushing and prices are generally meal driven we mean that most of the returns to crushing accrue from soybean meal output rather than from oil, and thus crushing activity is predominantly geared to meeting meal demand, with the disposal and price of the oil of only secondary concern to crushers. Recent large stocks of all vegetable oils and the low price and share of crush value attached to oil (below 35 percent) are characteristics of such a meal driven scenario.

Figure 1 shows the annual average share of crush value commanded by soybean oil in the United States since 1970. The average share for oil was 38 percent during the period, with the lowest share of less than 28 percent in 1973 immediately followed by the highest share of 54 percent in 1974.

As the chart indicates, the rise and fall of oil's share of value tends to be very abrupt, with abnormally high shares of crush value never being maintained for more than 2 consecutive years during the period from 1970-1987. Periods of high meal value have been comparatively long relative to the length of the surges in the relative value of oil.

Figure 1



As suggested by Figure 1, soybean complex markets have been predominantly meal driven since 1985 as large world vegetable oil stocks depressed soybean oil prices in absolute terms and relative to soybean meal prices. Oil stocks grew throughout the period, as rapid expansion of palm and other lauric oil production and heavy oilseed crushing for meal caused U.S. and world oil supplies to exceed demand.

The soybean meal driven situation has shown signs of abatement in recent months, as a severe crop failure in India, poor palm oil yields in Malaysia and Indonesia, and steadily increasing world demand for vegetable oils have raised expectations for significant reductions in world oil supplies in 1988. These expectations along with tightening supplies of soybeans have caused a sharp increase in soybean oil prices in the three months since October 1987. Soybean meal prices have maintained most of their share of crush value, however, as demand and prices for soybean meal have remained strong along with oil prices. The share of crush value has gradually risen to 36 percent for soybean oil, up from fall lows of 28 percent in October, but below the long term average of 38 percent. Where it will go from here depends on events that cannot be easily predicted. But any discussion of developments in the oilseed sector hinges on understanding the dynamics and scope of this joint product relationship.

III. Policy Changes in the Soviet Union

Under General Secretary Mikhail Gorbachev, the Soviet Union has begun instituting broad economic reforms which focus upon increasing economic incentives for gains in productivity and output in all sectors of the economy. Increasing productivity and output in agriculture is seen to be essential to the success of this program for two reasons. First, how agricultural productivity responds to the new incentives will be viewed as a strong indication of how the restructuring program is working. Secondly, increasing the quantity and quality of food is necessary to make good on the incentives given in the form of higher incomes. Higher incomes will be seen as having little benefit if increased consumer demands for basic commodities cannot be met.

Thus it appears that the success or failure of the new economic program rests heavily on the ability of agriculture to produce more efficiently and increase both the quantity and quality of food supplies.

Policy Implications

For the Soviet restructuring program to work, agricultural production in general, and poultry and meat production in particular, will need to respond rapidly to the new incentives. Persistent shortages of livestock and meat products have continued in the Soviet Union despite steadily increasing livestock inventories and production since the late 1970's. Gorbachev is presently opposed to significantly increasing livestock inventories to increase production, but is relying more heavily on increasing feeding efficiency which has historically been very poor. Apparently realizing the huge potential benefits from higher protein feed rations, the Soviets have opted to increase protein meal utilization to improve feeding efficiency rather than increase inventories. This increase in meal demand will tend to boost world vegetable oil production over time.

Table 2 shows livestock inventories in the U.S. and USSR since 1975. Despite having 30 percent more animal units in the USSR, meat production was 35 percent below U.S. production, while milk and egg output were 50 and 18 percent above U.S. output levels, respectively, in 1986. Slower inventory turnover in the USSR due to inefficient feeding programs and generally non-intensive livestock production practices has led to this difference in inventory productivity.

Table 3 illustrates the differences in the grain and protein meal feeding rates for the U.S. and USSR. Given that Soviet meal feeding rates are still only about one-fifth of the U.S. levels, Gorbachev would seem to be correct in assuming that huge efficiency gains could be had from increased protein feeding. Indeed this is not strictly a new idea in the Soviet Union. Policies in the late 1970's called for increased protein which accounted for the surge in protein feeding rates in the early 1980's. This surge was led by increasing domestic oilseed production as well as imports of soybeans and soybean meal. Then after large soybean meal equivalent imports of 3.8 mmt in 1982/83, imports abruptly declined to less than 1.5 mmt of soybean meal equivalent in 1983 and 1984. It is this abrupt decline that has most observers wondering whether the current Soviet import binge will be sustained.

Table 2
Livestock Inventories in the U.S. and USSR[1/]

	U.S.[2/]	USSR
	(million animal units)	
1975	121.7	134.2
1976	118.8	129.5
1977	117.9	131.9
1978	115.6	137.5
1979	114.9	140.7
1980	117.2	142.5
1981	118.9	143.2
1982	117.8	144.6
1983	115.8	147.2
1984	116.0	149.8
1985	112.7	150.6
1986	111.4	150.4
1987 Est.	110.8	151.0

1/ Animal units are calculated using the Soviet Union's conversion factors which are as follows: Cows = 1.0, Other Cattle = .6, Hogs = .3, Sheep = .1 and Poultry = .02.

2/ Average poultry inventory was derived by adding .2 (Broiler Slaughter) + .3 (Turkey Slaughter) + 1.0 (Chicken inventory).

Source: Economic Research Service, USDA, USSR Situation and Outlook Report various issues, and NASS, USDA data.

Table 3
Feed Grain and Protein Meal Feeding Rates in the U.S. and USSR

	U.S.		USSR	
	Feed Grain	Protein Meal	Feed Grain	Protein Meal
	tons/animal unit			
1975	.97	.136	.63	.025
1976	1.00	.127	.82	.025
1977	1.04	.146	.88	.031
1978	1.21	.160	.87	.027
1979	1.22	.174	.84	.029
1980	1.06	.158	.80	.029
1981	1.11	.158	.80	.030
1982	1.14	.170	.78	.037
1983	1.03	.155	.78	.040
1984	1.10	.177	.79	.025
1985	1.10	.177	.79	.026
1986	1.30	.186	.79	.033
1987	1.30	.195	.82	.041
1988 Forecast	1.28	.195	.82	.047

Given the circumstances of the current economic restructuring program, we are convinced that the Soviets will continue to increase protein feeding rates, albeit at a much slower pace than in 1986 and 1987. Protein meal use in the Soviet Union has increased an average of more than 20 percent per year since 1984/85. Imports have risen even more rapidly due to stagnating domestic oilseed production over the past several years.

Table 4 shows USSR protein meal consumption and imports since 1984/85. The protein meal deficiency in Soviet feeding rations has been estimated at between 3 and 12 mmt, depending on the source of the estimate. The Soviets have acknowledged in the past that there exists a protein meal deficiency of 3 mmt in their feeding rations. This may well be the maximum amount of additional protein meal that could easily be absorbed by the Soviets in the short run, given the transportation and feed mixing facilities that are currently available. Clearly, with absolute meal use in the Soviet Union 11-12 mmt below levels in the U.S. (not to mention Western Europe) and the significantly higher animal numbers in the USSR, much more than 3 mmt of additional meal will be needed to raise feeding efficiency levels up to the standards of the developed world.

Table 4

Soviet Soybean and Soybean Meal Imports and Use

	1984/85	1985/86	1986/87	1987/88
	mmt			
Imports				
Soybeans	.9	2.0	1.0	1.8
Soybean Meal	.6	.6	2.4	3.6
Total SBM equiv.	1.2	2.2	3.2	5.0
Oilseed Meal Use	5.8	7.0	8.2	10.0
Imported SBM Share	21	31	39	50

It is probably not likely, given differences in relative prices between the U.S. and USSR, that the currently high protein feeding rates in the U.S. would ever be profitable in the Soviet Union. It is, however, conceivable that given the proper infrastructure, feed mixing facilities, availability of complementary feedstuffs, and feeding practices that the Soviets could effectively double their protein meal utilization to nearly 20 mmt in the very long run, i.e., the end of the century. Table 5 suggests that Soviet feed conversion rates could move closer to U.S. rates, with less grain fed per unit of meat output as protein meal use rises.

Looking ahead to the more foreseeable future, Soviet oilmeal utilization rates will probably continue to increase for the remainder of the 1987/88 (October-September) year. If the large shipments of U.S. soybeans and soybean meal are handled efficiently this winter, we might expect soybean equivalent imports from South America to at least be equal to last springs's large imports of more than 2.5 mmt. If Soviet imports significantly exceed last year's levels during the April-September period, it will indicate that the Soviets have efficiently handled the large quantities imported in the past year and have not yet reached their limit on imports.

Table 5

Feed Conversion Coefficients for the U.S. and USSR
(kilogram of feed/kilogram of meat output)

	U.S.		USSR	
	Grain	Protein Meal	Grain	Protein Meal
1980	4.7	.70	7.9	.29
1981	4.9	.70	7.8	.29
1982	5.1	.73	7.7	.36
1983	4.3	.66	7.3	.45
1984	4.6	.74	7.2	.36
1985	4.6	.70	7.2	.40
1986	5.0	.71	7.6	.46
1987 Est.	4.8	.73	7.0	.54

It is more than likely that the rate of growth in Soviet oilmeal imports and utilization will reach a plateau in the coming year as occurred in the years following the last surge in oilmeal utilization in the early 1980's. Growth in imports and use will likely ease or grow only slowly in the very near term. Oilmeal utilization may even subside to some extent in the future although this will probably be induced by shorfalls in domestic oilseed production rather than declining imports. Similarly, imports will respond inversely although imperfectly to domestic production during the slow growth period. Gradual intensification of livestock production and/or diversion of livestock resources from dairy and egg production into meat production over the longer term could be the precursor for the next big surge in Soviet consumption of protein meals, but that is probably not on the near term horizon.

IV. India's Vegetable Oil Situation

The failure of the monsoon rains in India last summer has led to the worst oilseed crop there since 1982/83. Indian 1987/88 oilseed production is forecast at 11,300 tmt, 17 percent below the 1986/87 crop (Table 6). Already the world's leading importer of vegetable oils, India is expected to increase vegetable oil imports 45 percent from year earlier levels, to a record 2.0 mmt, in 1987/88 (Table 7). The coincidence of the Indian oilseed crop failure and disappointing Malaysian palm oil production this year has led to significantly tighter world vegetable oil supplies and higher world prices.

Worst hit by the drought was production of groundnuts, the primary oilseed grown in India. Groundnut production was reported to have suffered nearly a total loss in the major groundnut producing regions of Gujarat and Tamil Nadu, and total groundnut production is forecast to be 30 percent below year earlier levels at 2,800 tmt in 1987/88.

The pervasive drought adversely affected production of other major oilseeds to a lesser degree, with rapeseed, soybean and cottonseed production projected to decline 10, 30 and 7 percent, respectively, in 1987/88. The final verdict on total rapeseed production is still out as the fall planted rabi crop may be severely affected by lack of soil moisture during the planting period.

Stable domestic vegetable oil supplies and prices are crucial to the economic and political stability of India. When a drastic shortfall in oilseed production was seen as imminent last summer, Indian vegetable oil prices increased substantially. The Indian government immediately stepped up vegetable oil imports to stem the increase in vegetable oil prices at that time. Due to this rapid response, oil stocks and domestic prices stabilized. In addition to increasing oil imports, rapeseed and soybean imports have increased to support the domestic crushing industry.

The increased imports of vegetable oils and oilseeds will more than offset the decline in domestic vegetable oil production in 1987/88. While domestic oil production will likely decline 540 tmt to 2,650 tmt this year, oil imports are expected to increase 625 tmt. This will increase total vegetable oil supplies 85 tmt to 4,650 tmt, 1.8 percent above 1986/87. This is roughly equal to the rate of population growth in India and thus supplies should be adequate to almost maintain previous levels of per capita consumption.

Indian vegetable oil imports of 2 mmt will represent roughly 12 percent of total world imports in 1987/88, up from 8.5 percent in 1986/87. India will continue to be a major factor in world vegetable oil markets although imports of the present magnitude will only recur under similar crop failure circumstances.

Per capita consumption of vegetable oils will continue to steadily increase when domestic oilseed production allows for it. The economic stress of a major crop failure to an agrarian economy such as India's makes it unlikely that imports of oilseeds and products or any other food in short supply will be adequate to sustain per capita consumption at previous levels.

Over the long run, oil consumption increases in India will likely parallel increases in domestic oilseed production with imports remaining stable at 1.2-1.4 mmt for the foreseeable future. In the near term, only drastic oil crop shortfalls due to weather or other factors will cause oil imports to again approach this year's high level.

Table 6

India: Oilseed Production

	1982/83	1983/84	1984/85	1985/86	1986/87	ADE Forecast 1987/88
	tmt					
Groundnut (shelled)	3,697	4,960	4,720	3,850	4,130	2,800
Rapeseed	2,207	2,608	3,030	3,000	3,000	2,750
Soybean	400	583	934	1,100	1,100	800
Cottonseed	3,047	2,647	3,447	3,228	3,220	3,000
Total	10,385	11,875	14,400	13,070	13,550	11,300

Table 7

India: Vegetable Oil Production and Imports

	1982/83	1983/84	1984/85	1985/86	1986/87	ADE Forecast 1987/88
	tmt					
Production						
Groundnut oil	1,281	1,608	1,520	1,318	1,366	850
Rapeseed	600	683	955	856	900	950
Cottonseed	269	269	242	316	286	265
Soybean	76	95	149	154	172	120
Sunseed	78	102	124	135	152	160
Linseed	140	108	128	146	116	115
Copra	214	189	226	236	198	190
Total Production	2,658	3,054	3,344	3,161	3,190	2,650
Imports						
Palm oil	597	557	730	798	775	1,100
Soybean oil	540	810	420	250	325	500
Rape oil	115	268	229	137	275	400
Other	11	62	0	9	0	0
Total Imports	1,263	1,697	1,379	1,194	1,375	2,000
Total Supply	3,921	4,751	4,723	4,355	4,565	4,650

V. Developments in the Palm Oil Sector

World Production

World palm oil production stagnated at 7.6 mmt in 1986/87 after jumping 34 percent over the preceding two seasons as introduction of the weevil improved pollination (Table 8). The main reason was the 217,000 ton decline in Malaysian output. While weather conditions were partly to blame, it also appears that trees simply went into a period of recuperation from the high production after the weevil was introduced. The effect on monthly production levels in West Malaysia can be seen in Figure 2.

In the case of Indonesia, dry weather during critical periods 10 and 22 months before harvest held down production despite a big expansion in mature area. Elsewhere, there was continued output growth in Papua New Guinea, Thailand, Colombia, and Ecuador.

Production levels remained modest in the last calendar quarter of 1987. And with India importing record quantities of palm oil to make up for its shortfall in domestic vegetable oil production, stocks have been depleted. In Malaysia, for example, palm oil stocks fell to 508,000 tmt at the end of 1987, 10 percent below the year earlier level. Further declines are anticipated during the first quarter of 1988 as India continues to be a large importer.

For the balance of the 1987/88 season though, production is expected to run well ahead of year earlier levels due to favorable weather history and expanded mature area in the major producing countries. For the season as a whole, world palm oil production is therefore projected to increase 7.5 percent to almost 8.2 mmt.

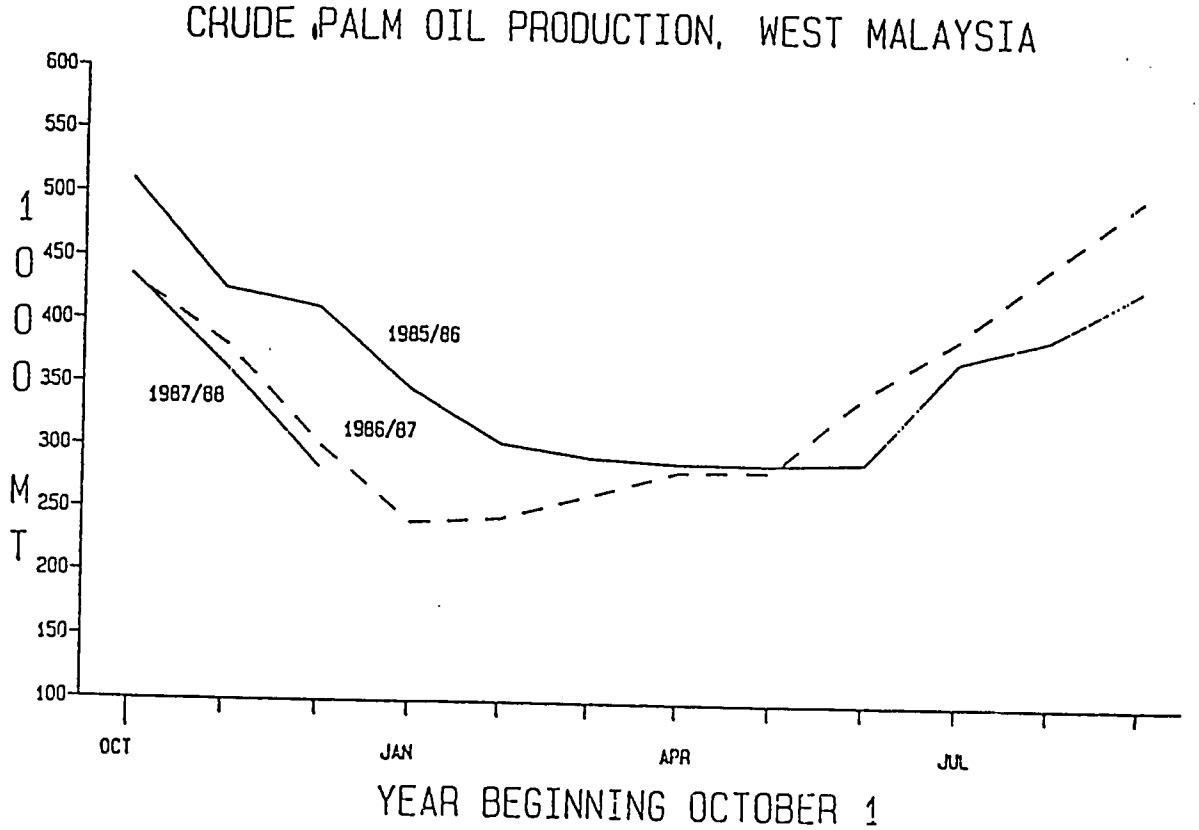
Table 8

Palm Oil Production

Oct.-Sep.	Malaysia	Indonesia	Other	World
	1,000 metric tons			
1981/82	3,352	822	1,361	5,535
1982/83	3,181	977	1,436	5,594
1983/84	3,325	1,077	1,363	5,765
1984/85	3,819	1,167	1,452	6,438
1985/86	4,778	1,286	1,660	7,724
1986/87	4,561	1,326	1,721	7,608
1987/88 est.	4,741	1,594	1,841	8,176

Source: Oil World.

Figure 2



Planted Area

Area planted continues to grow guite rapidly in Malaysia and Indonesia. Plantings in Malaysia were estimated at 70,000 ha. in 1987 compared to 55,000 ha. in 1986 and 100,000 ha. in 1985. In Indonesia, about 80,000 ha. were planted in 1987 compared to 43,000 ha. in 1986 and 72,000 ha. in 1985. Private estates seem to be taking the lead in the expansion. Estimates of planted and mature areas are shown in Table 9. Over the next few years, area in mature trees will increase at a faster rate than planted area.

Table 9

Oil Palm Area

	Malaysia		Indonesia	
	Planted	Mature	Planted	Mature
	1,000 hectares			
1980	1,024	715	295	204
1981	1,122	805	319	223
1982	1,183	868	330	239
1983	1,253	950	427	273
1984	1,331	1,051	485	312
1985	1,431	1,122	557	345
1986	1,485	1,205	600	440
1987	1,555	1,286	680	490
1988	1,610	1,363	740	550
1989	1,680	1,441	800	590

Other Developments

In June 1987 the Palm Oil Research Institute of Malaysia (PORIM) and the Incorporated Society of Planters (ISP) jointly sponsored a 4-day conference on the agricultural and milling aspects of palm oil production and a subsequent 3-day conference on refining, marketing and utilization of palm and palm kernel oil. The proceedings shed some additional light on developments in the sector.

The main themes that emerged in presentations, public discussion, and private conversations were the following:

1. Recognition of the need to further reduce production costs.

2. Optimism about their ability to reduce costs, about long-term prospects for palm oil, and about the pace of new plantings.

3. Concern over campaigns against palm oil in some countries on health grounds, and at protectionist practices in the E.C. and U.S.

4. Competition between Malaysia and Indonesia.

5. Awareness of the need to maintain product quality, relate better with end-users, and diversify products and markets.

Production Cost

Throughout the conference, quite a number of Malaysian speakers noted the need to continue to cut production costs (in real, if not nominal, terms) in order to remain competitive.

The data in Tables 10 and 11 are from a paper by Tan Bock Thiam and provide a good summary of available cost data.[1/] Malaysian production cost for crude palm oil (CPO) is put at $M 512/m. ton ($US 205), including capitalization of costs for land clearing, planting, and maintenance in the 2½ years before the trees begin to produce. (There are 2.5 Malaysian dollars per U.S. dollar.) Land costs are not included for two reasons. First, some of the land now being planted is either owned by the government, given away by the government, or leased at relatively low cost. Second, it is assumed that appreciation in land values provides the necessary return to land. This is not always true, as recent U.S. experience attests.

1/ Tan Bock Thiam, "Cost of Palm Oil Production in Major Producing Countries." June 1987.

Table 10

Cost Structure for Malaysian Palm Oil

Item	Plantation	Land Scheme	Smallholding	National
	(M$/ton CPO)			
Capital	121.9	201.3	89.8	154.1
Fertiliser	112.1	139.4	174.7	127.5
Labor	104.6	106.2	150.5	109.6
Other	83.4	66.9	31.8	73.4
Net processing	27.3	61.4	105.0	47.7
Long-run cost	449.3	575.2	551.8	512.3

Table 11

Cost Structure for Palm Oil in Major Producing Countries

Item	Malaysia	Indonesia	Thailand	Cote d'Ivoire
	(US$/ton CPO)			
Capital	61.7	125.6	81.4	88.7
Fertiliser	51.0	53.5	53.8	26.1
Labor	43.8	22.9	48.2	43.8
Other	29.3	19.0	22.2	42.0
Net processing	19.3	21.0	23.3	21.0
Long-run cost	205.1	242.0	228.9	221.6

Production costs in Indonesia are lower than in Malaysia. The consensus at the conference was that Tan Bock Thiam's estimate of capital costs was too high since planters can borrow at interest rates much lower than the 21.5 percent he used. Long run costs are probably about $US 180/m. ton, i.e. about 10 percent lower than in Malaysia. As indicated in the table, Indonesia's main advantage is a supply of cheap labor.

In terms of cents per pound, short-run costs, i.e., everything but capital, are very low for crude palm oil:

Malaysia:	6.5 cents
Indonesia:	5.3 cents

Moreover, the cost of harvesting and processing is so low -- about 2 cents per pound -- that world vegetable oil prices could probably never fall enough to cause fresh fruit bunches to be left unharvested.

Efforts to further reduce costs are underway. In Malaysia, one area where savings could still be achieved is in labor utilization. United Plantations, for

example, expects to cut its labor input per ton of oil in half over the next few years. Rising yields may also help. In Indonesia, plantings are increasingly in more remote areas like Kalimantan. Large investments in infrastructure are going to be necessary to process the oil and move it to domestic and export markets. The bulk of the cost will presumably be borne by the government, but private industry will also be paying part of the infrastructure bill. This could tend to reduce Indonesia's cost advantage in coming years.

Oil Palm Agronomy

The agriculture portion of the conference covered breeding and selection, plant nutrition, management practice, and similar topics. From the point of view of market analysts, much of this was not of immediate relevance. But there was one important conclusion with respect to breeding. Cloning techniques are not going to magically produce a quantum increase in oil yield per hectare. About 15 percent of the clones tested have had abnormal flowering, although the experts believe they have identified the cloning techniques that caused the problem. More importantly, extensive field-testing is still required before one knows whether a particular clone is appropriate for a particular location, soil type, etc. Plant material coming out of regular breeding programs is also improving all the time, so it is questionable whether yields from cloned material will rise any faster. Other disadvantages are that cloned plants cost more and a field of clones will have larger reactions to weather due to genetic uniformity.

Overall there was a noticeable lack of agreement over breeding objectives. Perhaps this is not surprising since oil palms are fairly complicated plants. Breeders are variously trying to mazimize total oil yield, increase oil content per bunch, increase production of fresh fruit bunches, change the fatty acid composition, reduce tree height for easier harvesting, increase or decrease palm kernel oil yield, etc.

Since heritability of various traits is not always very high, field testing takes several years, and annual plantings are small in relation to the existing stocks of trees. Progress on yields is likely to be slow and incremental.

With respect to the pollination issue, there is apparently still much to be learned. The weevil is now well-established throughout Malaysia and Indonesia as the primary pollinator. Populations vary widely from plantation to plantation but with no identifiable impact on yield. Trees have reacted to introduction of the weevil by producing fewer female infloresences. Whether oil palms' biological behavior has now stabilized is not entirely clear, but it seems likely. Introduction of the weevil raised both oil and kernel yields per hectare. These higher yields plus avoidance of pollination costs significantly increased profitability.

The fatty acid composition of palm oil could be altered through breeding, but at the expense of other objectives such as yield. For example, there is a central and south American palm variety, Elaeis Oleifera, whose oil contains 70-85 percent unsaturated fatty acids compared to the 50 percent typical in Malaysia. But hybridization efforts have not produced a commercially viable tree.

The Health Issue

There was a great deal of concern over the American Soybean Association's compaign against palm and coconut oil. Sensitivity has been further heightened by similar attacks on palm oil in Pakistan and India, two major export markets. The conference program included three papers directly bearing on health issues. Two reviewed research suggesting that palm oil may reduce susceptibility to certain cancers. The third was on palm oil and heart disease, and summarizes research indicating that palm oil does not behave like other saturated oils. Apparently the medical research that established the link between saturated fats and heart disease did not examine palm oil. Some studies suggest that palm oil may actually reduce plasma cholesterol levels and inhibit arterial thrombosis.

The Malaysian industry, via PORIM and other organizations, is commissioning further research by U.S., European, and South Asian specialists. This will of course take some time to complete.

It appears that the medical evidence is inconclusive and will probably remain so for several years while the reserachers battle it out. Palm oil demand will probably suffer in the interim. Consumer knowledge about fats and oils is generally poor, but there are two exceptions:

- Most consumers know cholesterol is bad; and

- Many consumers know that saturated fats are generally bad.

Palm oil will suffer from the stigma attached to other saturated fats until there is firm evidence showing that it does not pose a health risk.

Of course, consumers in developed countries do not directly purchase palm oil. They buy it incorporated in food products in the grocery store or foods prepared in restaurants or institutions. Therefore it is food manufacturers and preparers in those countries who decide whether or not to use palm oil.

Consumers in a number of countries show signs of becoming more concerned about health and diet. Whether consumer fears of palm oil rise to a level sufficient to cause food manufacturers and restaurants to switch away from palm to other vegetable oils remains to be seen. Consumers in Pakistan and India have shown some sensitivity on this score. If this sensitivity persists in these major import markets, palm oil could eventually sell at a bigger price discount to soybean and other oils.

Marketing Issues

A major European buyer of fats and oils gave the keynote address on the market outlook for palm oil. His main theme was that from the point of view of the European user, palm oil faces a number of disadvantages:

- Refined palm products face a 12% import duty compared to only 4% for crude oils;

- The long supply pipeline from Asia to Europe creates quality and price risks that do not exist with raw material from local oil mills or animal fat suppliers;

- Palm oil has technical limitations for use in margarine and salad oils -- two major outlets.

He concluded that to retain long-term competitiveness in Europe, palm oil has to be priced about 10 percent below crude soybean oil. In most of 1987, the two oils were priced about the same.

Palm oil marketing efforts will continue to suffer from the subsidized over-production of competing oils. But whereas Malaysian speakers tended to see developing countries as their major growth market, some others believe that rising world palm oil production will also require an increase in consumption in developed markets like the U.S., Japan, and Europe.

It is apparent that a greater range of palm oil products is becoming available to users. Most palm oil is now fractionated into olein and stearin. And the fractions are being further modified by hydrogenation and interesterification. There will probably be an increasing number of specialty products for both food and non-food applications.

One other change that could occur is a rebound in Malaysian exports of crude oil. One group of Malaysian producers is involved in a European refining venture that could take 100,000 m. tons of crude oil. The objective is to better serve end users by making available higher quality products on a more timely basis.

Finally, in Malaysia and Singapore there is a glut of refining capacity. Only two-thirds of the 50 or so refineries were operating in mid-1987 and many of those barely so. With refining margins actually below variable cost, major consolidation in the refining industry was anticipated.

VI. Outlook for World Oilseed Markets

The world oilseed and vegetable oil situations have tightened considerably during the past 18 months, due in large part to the special situations discussed above. The 1984/85 and 1985/86 seasons had brought a substantial buildup in world stocks of oilseeds and products. Oilseed stocks rose almost 11 mmt over the two seasons mostly in the form of soybeans in the U.S. Similarly, vegetable oil inventories rose by 1.5 mmt, but this was comprised of increases for a variety of oils in many different countries.

In 1986/87, the balance began to swing in the other direction. Oilseed stocks fell by 3.0 mmt, with 90 percent of the decline being in U.S. soybeans. Vegetable oil stocks increased slightly for the world as a whole, but a 350,000 mt buildup in the U.S. soybean oil carryover disguised a 210,000 mt decline in the rest of the world.

Taking into account the oil embedded in oilseed stocks, total world vegetable oil stocks declined slightly in 1986/87. During the current season, oil stocks measured in this way are projected to decline further, from about 23 percent of world oil consumption to 21 percent. This means that the buffer the world has had against a serious shortfall in oilseed or palm oil production is disappearing.

Table 12

World Summary Statistics

	October - September			
	1984/85	1985/86	1986/87	1987/88
	million metric tons			
Oilseed Production				
Soybean	93.1	96.9	98.0	101.0
Other	98.1	99.2	96.1	101.0
Total	191.2	196.1	194.1	202.0
Meal Consumption				
Soybean	58.8	61.0	65.7	68.1
Other	43.5	44.1	43.7	44.9
Total	102.3	105.1	109.4	113.0
Oil Disappearance				
Soybean	13.1	13.4	14.1	14.8
Palm	6.5	8.0	7.8	8.5
Other	25.6	26.4	26.9	27.5
Total	45.1	47.8	48.8	50.8
Change in Ending Stocks				
Oilseeds	+5.4	+5.5	-3.0	-2.0
Meal	-.3	+.2	-.1	-.1
Oil	+.4	+1.1	+.1	-.2

* Projection

Source: FAS, USDA; and Abel, Daft & Earley.

Vulnerability of Oil Markets

It would not take much of a shortfall to cause a major increase in prices. World vegetable oil consumption grew 20 percent over the past five years, i.e. a compound annual rate of 3.7 percent. When one includes animal fats (butter, lard, and tallow) the rate of growth has been about 3.5 percent, or more than 2 mmt per year. So each year we need to generate another 2 mmt of fats and oils. But in the case of the U.S., a yield decline of just 1 bushel per acre is equivalent to a loss of 300,000 mt of oils and it would not take unusually bad weather to cause a yield decline of 3 bu./acre.

To what extent should this increased vulnerability be a cause for concern among developing country policy makers? As intimated earlier, there have been a number of special circumstances at work. The combination of the poor Indian crops and the pause in the growth of world palm oil production has contributed to firmer vegetable oil prices. On the other hand, the jump in Soviet oilmeal demand has boosted oilseed crushings, generating more oil and preventing real tightness from developing.

One can imagine a scenario where the recent Soviet policy change remains in place, palm oil production resumes its normal climb, and Indian weather returns to normal. This would tend to take the pressure off of oil markets. But there are some other factors to consider. First a crop problem could develop in any of a number of other countries or regions and lead to an oil supply shortage. Besides the United States, other obvious candidates are Western Europe, China or the Soviet Union.

Second, it currently seems likely that U.S. soybean producers will not increase plantings in 1988 despite a significant improvement in prices. While there is no actual acreage idling program for soybeans, there is certainly a de facto one and it will continue to operate in 1988, i.e. it is difficult for beans to compete with crops that receive deficiency payments except at very high soybean price levels. As Table 13 indicates, soybean plantings have declined steadily since 1984, about in proportion to the overall decline in planted area. Since soybeans were in surplus, this was in fact an appropriate result up through 1987. But now that the situation is tightening, farmers have little incentive to increase soybean plantings.

Table 13

U.S. Area Planted

	1981	1982	1983	1984	1985	1986	1987
	million acres						
Corn	84.1	81.9	60.2	80.5	83.4	76.7	65.7
Sorghum	15.9	16.0	11.9	17.3	18.3	15.3	11.8
Oats	13.6	14.0	20.3	12.4	13.3	14.7	18.0
Barley	9.6	9.5	10.4	12.0	13.2	13.1	11.0
Wheat	88.3	86.2	76.4	79.2	75.6	72.0	65.8
Soybeans	67.5	70.9	63.8	67.8	63.1	60.4	57.4
Cotton	14.3	11.3	7.9	11.1	10.7	10.0	10.4
Rice	3.8	3.3	2.2	2.8	2.5	2.4	2.4
Other*	73.0	73.5	71.0	73.9	72.3	73.1	71.1
Total	370.1	366.6	324.1	357.0	352.4	337.7	313.6

* Flaxseed, peanuts, sunflower, dry edible beans, potatoes, sweet potatoes, and sugarbeets: Harvested acreage for rye, hay, tobacco, and sugarcane.

The reason for this is that USDA continues to idle acreage in 1988 under the Conservation Reserve Program (CRP) and the annual wheat, feed grain, cotton and rice programs. Annual program benefits are directly tied to the historical acreage base for each crop. If a farmer does not plant all the corn he is permitted to plant under the program, it adversely affects his base. So in order to be convinced to switch acreage into soybeans, the farmer has to see prospective returns for soybeans significantly above those for corn. This means that to get any swing at all, the farm price of beans has to be well over $7.00/bu.

The problem is accentuated by the fact that total acreage planted to major crops in 1988 is being held relatively constant by the Department of Agriculture. While there will be some loosening up on the 1988 feed grain, rice, and cotton programs, this will be offset by the additional acreage enrolled in the CRP last August and in the next round of bidding this winter.

There will probably be another attempt to get legislation allowing planting of soybeans on corn set-aside land without loss of corn base, but we do not expect the proponents to be successful. The outcome will be in doubt for the next couple of months though and this could add to market price volatility.

The one way we might get additional soybean acreage planted is if producers in the Delta and Souheast get enthusiastic and plant some of the non-program acreage in those regions that has simply been allowed to go back to grass. But with yields averaging only 22-23 bu./a. in those regions even a 20 percent expansion would add only 50 mil. bu. to U.S. production, equivalent to about 250,000 mt of soybean oil.

Many developing countries remain highly dependent on vegetable oil imports. During the current season, oil price strength has been moderated to some degree by U.S. and EC export subsidies. The U.S. for example will increase its sales of soybean, sunflower, and cottonseed oils under export enhancement and credit programs by 600,000 mt. As the oil trade tables at the end of this section indicate, during 1987 higher soybean and rapeseed oil exports offset declines in sunflower, palm and coconut oil. That pattern will continue for the first half of 1988, but will subsequently reverse itself.

Policy Implications

The broad policy conclusions outlined in our September 1986 paper cited earlier still apply. What has changed is that the period of moderate world vegetable oil prices may not last as long as expected. With the decline in stocks of oilseeds and vegetable oil, the world oil market is quite vulnerable to adverse weather. And even with good weather in 1988, we have had a reminder of the potential price volatility oil consumers face.

Given the developments described above and the long lead times required to accomplish changes in a country's vegetable oil production or processing facilities, it now appears that private and public sector planners have less time than we thought to reassess their oilseed and oilseed product strategies.

The world oilseed economy needs to be monitored closely over the next few years to see if recent trends stay in place or if new developments again alter the longer-term outlook.

World Oil Trade

Soybean Oil

	EC	Other W. Eur.	USSR	Canada	USA	Arg.	Brazil	PRC	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	241	68		23			5		118	5	652	1,112
1975	361	103		21			5	11	4	14	935	1,451
1980	477	123	83	12			50	120	668		1,816	3,349
1981	455	112	101	4				54	635	29	2,123	3,518
1982	509	113	201	4			22	43	438	38	2,270	3,638
1983	439	106	181	5			32	12	511	7	2,262	3,605
1984	520	96	120	13			123	5	752	9	2,427	4,065
1985	514	102	301	7	12		114	32	422	2	2,053	3,559
1986	485	92	56	8			190	197	241		1,827	3,096
1987	550	98	203	10			164	484	459		2,089	4,057
Exports												
1970	302	90		21	681		3	3		14	26	1,140
1975	695	48		2	356	21	265				8	1,395
1980	876	407		14	1,096	92	744			17	54	3,300
1981	855	481		11	[illegible]	70	1,281			1	56	3,574
1982	930	543		31	938	174	890	1		3	85	3,595
1983	927	536		12	786	293	960	11		4	107	3,636
1984	900	569		16	1,011	484	905	8		4	134	4,031
1985	924	434		7	587	551	963	7		2	98	3,573
1986	1,289	19		4	541	665	383	4		2	96	3,003
1987	1,451	26		10	751	807	900	13		2	172	4,132

Palm Oil

	EC	Other W. Eur.	USSR	Canada	USA	Indonesia	W. Malaysia	E. Malaysia	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	486	36		12	64		2			40	285	925
1975	744	53		41	442		1		51	108	620	2,060
1980	756	74	101	20	117		11		534	148	1,958	3,719
1981	659	60	181	15	122	33	16		475	141	1,881	3,583
1982	679	55	363	16	113		102		417	148	2,268	4,161
1983	808	51	316	19	149		107		647	162	2,064	4,323
1984	687	31	280	13	148	58	176		571	157	2,515	4,636
1985	794	34	237	26	213	37	276		637	161	3,305	5,720
1986	1,116	43	206	14	275	9	370		952	196	3,656	6,837
1987	1,102	44	241	14	212	126	323		1,034	200	3,289	6,585
Exports												
1970	54	1			5	223	373	29			237	922
1975	86	1			15	386	1,032	128			396	2,044
1980	121	2			9	511	2,108	169			871	3,791
1981	112	1			4	206	2,345	162			655	3,485
1982	93	1			5	302	2,693	249			837	4,180
1983	123					407	2,803	254			665	4,252
1984	130					247	2,858	290			1,136	4,661
1985	140					652	3,237	308			1,450	5,787
1986	167	1			6	683	4,446	435			1,266	7,004
1987	153	1			5	710	3,967	446			1,166	6,448

Source: Oil World

Sunflower Oil

	EC	Other W. Eur.	USSR	Canada	USA	Arg.	Brazil	PRC	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	324	74		5					4	1	363	771
1975	250	132									327	709
1980	243	88	52				3			6	677	1,069
1981	259	69	240				7			12	577	1,164
1982	434	87	277	2						13	427	1,240
1983	349	71	231	6						18	894	1,569
1984	462	65	311	6					49	17	798	1,708
1985	480	67	320	6					1	18	1,015	1,907
1986	488	67	173	7				1		19	1,362	2,117
1987	426	64	285	7				5		21	1,111	1,919
Exports												
1970	83	14	351			101					189	738
1975	70	2	388		10						201	671
1980	280	20	123	1	158	338	2				205	1,127
1981	259	15	112	10	257	212	6	2			241	1,114
1982	286	23	109	6	89	394	4	23			335	1,269
1983	298	18	103	1	281	615		25			288	1,629
1984	370	54	100	1	152	595		30			414	1,716
1985	451	5	130	2	133	863		39			273	1,896
1986	472	7	136	5	205	977		40			263	2,105
1987	619	4	134	3	188	706		6			303	1,963

Rapeseed Oil

	EC	Other W. Eur.	USSR	Canada	USA	Arg.	Brazil	PRC	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	67	12			4		2				87	172
1975	62	11			5				10	15	276	379
1980	178	24	17		6				145	8	315	693
1981	243	29	8		6			7	115	24	422	854
1982	294	24	11		7			4	60	19	425	844
1983	360	34	12		5			6	133	13	352	915
1984	326	25	17		5			3	201	23	399	999
1985	440	29	23		15			4	186	13	612	1,322
1986	470	34	17		54			19	173	5	593	1,365
1987	424	38	43		82			153	276	4	719	1,739
Exports												
1970	83	20						6		12	49	180
1975	218	41		20				13		2	61	355
1980	418	41		173		3	16	13		1	34	699
1981	584	34		191				9		1	43	862
1982	558	60		145				25		3	44	835
1983	615	67		94				34			36	846
1984	727	59		201				22		3	29	1,082
1985	967	50		245			1	7			55	1,325
1986	1,005	63		229				11			101	1,409
1987	1,146	75		328				17			193	1,759

Source: Oil World

World Oil Trade

Palm Kernel Oil

	EC	Other W. Eur.	USSR	Canada	USA	Indonesia	W. Malaysia	E. Malaysia	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	105	4		5	37						15	166
1975	160	6		5	72					4	39	286
1980	215	18	12	9	83				1	8	54	400
1981	184	21	13	9	69				18	9	56	379
1982	250	15	13	11	96			3	1	11	53	453
1983	304	16	10	10	107				4	12	81	544
1984	285	15		11	92					13	88	504
1985	320	16	4	11	141					14	118	624
1986	327	4	5	11	170				16	17	159	709
1987	353	5	5	10	155				4	26	135	693
Exports												
1970	37	1					2			5	115	160
1975	40	1				25	110				99	275
1980	30	2				6	219	4			126	387
1981	28					5	242				113	388
1982	28	1				3	334				96	462
1983	37	5				3	370				81	496
1984	46	9				15	377	14			70	531
1985	35					98	419	15			73	640
1986	28					42	525	3			69	667
1987	34					72	537	6			59	708

Coconut Oil

	EC	Other W. Eur.	USSR	Canada	USA	Indonesia	Philippines	PRC	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	148	14	23	22	270			17	1	2	102	599
1975	251	28	20	26	409			40		21	213	1,008
1980	377	35	79	20	399			26	5	35	136	1,112
1981	518	39	66	23	470	1		24	64	36	170	1,411
1982	496	38	89	20	404	1		27	14	32	182	1,303
1983	475	34	70	22	449			20	9	43	162	1,291
1984	344	24	64	20	378			28	2	21	163	1,058
1985	388	28	58	23	450			27	2	19	217	1,213
1986	575	10	25	24	534			51	11	16	362	1,608
1987	576	10	22	22	440			46	8	15	298	1,437
Exports												
1970	50	2			5	6	334			1	210	608
1975	192	10			8	27	592			3	190	1,022
1980	40	3			19	41	914				201	1,218
1981	55	3			14	4	1,047				264	1,387
1982	81	6			13		949				245	1,294
1983	57	3			11	8	1,020				248	1,347
1984	48	6			22	35	586				299	996
1985	44	6			19	192	652	2			315	1,230
1986	54	3				6	1,238				329	1,630
1987	60	3				31	1,095				277	1,466

Source: Oil World

Cottonseed Oil

	EC	Other W. Eur.	USSR	Canada	USA	Arg.	Brazil	PRC	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	78	6		14						4	175	277
1975	23	11		11						10	333	391
1980	17	6		5						32	383	443
1981	9	8	2	3					28	43	368	461
1982	13	7	4	5						40	459	528
1983	13	7		4	9					34	277	344
1984	12	5		3						12	283	315
1985	10	7		3						26	334	380
1986	9	5		4						30	270	318
1987	9	8		4	5					36	161	295
Exports												
1970	2		21		170	1	1	8			40	243
1975	1		29		298		9	5			41	383
1980	3				356	19	50	1			19	448
1981	2				319	10	104	1			28	464
1982	4	1			388	14	84	23			28	542
1983	1		1		195	17	78	34			17	343
1984	7				171	14	98	23			23	336
1985	5				191	28	105	25			14	368
1986	10				174	9	93	7			18	311
1987	10				140	9	98	6			25	288

Groundnut Oil

	EC	Other W. Eur.	Senegal	Canada	USA	Arg.	Brazil	PRC	India	Japan	Other	Total
	1,000 mt											
Imports												
1970	333	21		9							51	414
1975	305	33		7					1		86	432
1980	421	25		5							63	514
1981	276	21		4							53	354
1982	333	19		4					1		73	430
1983	381	15		4	2			8			98	508
1984	235	13		4	1			1			83	337
1985	245	13		4							72	334
1986	242	17		5	1			1			78	344
1987	242	13		4				2			82	343
Exports												
1970	33	2	146		15	43	32	10			155	436
1975	72	1	209		12		38	20			88	440
1980	79	1	74		18	85	122	20			98	497
1981	67	1	19		20	35	46	64			95	347
1982	68	3	152		10	35	78	55			50	451
1983	82	9	178		2	47	57	84			43	502
1984	49	1	107		7	30	26	65			42	327
1985	44	1	67		17	29	79	58			44	339
1986	42	1	81		35	27	14	101			36	337
1987	44	1	99		10	48	34	68			42	346

Source: Oil World