Kimbell acquires Anderson

Kimbell interests of Fort Worth, Texas, have acquired ownership of Anderson International Corp's non-management shareholders.

Anderson officials foresee that the transaction will strengthen the company's capital base and enable greater attention to developing new products and serving customers. Anderson manufactures equipment for the vegetable oil, rendering and synthetic rubber industries.

Anderson Clayton leases TankTrain

General American Transportation Corporation (GATZ) has leased three 23,150 gallon interconnected TankTrain cars to Anderson Clayton to transport refined vegetable oil.

According to GATZ officials, this is the first application of the TankTrain in the food industry. The system has a pumping rate of 1,500 gallons per minute, enabling two men to load 69,000 gallons of vegetable oil in 45 minutes.

The TankTrain system, introduced in 1974, carries chemical, food and petroleum products over the railways. Anderson Clayton, a diversified food producer headquartered in Houston, Texas, processes and markets consumer and institutional foods, oilseed products, and animal and poultry feeds.

Sandoz moves to Charlotte

Sandoz Colors and Chemicals, a division of Sandoz Inc., is relocating its units serving the textile, paper, coatings, plastics, metals, inks, household and personal products industries from New Jersey to Charlotte, North Carolina. The move, which began this summer, is projected to be completed by late 1983. The unit which provides dyes and softening agents to the leather industry, meanwhile, is moving to the division's chemical production facility in Fair Lawn, New Jersey.

Europe syn lube market to grow

The market for synthetic lubricants in European Economic Community countries is expected to more than double during this decade.

According to the marketing research firm Frost & Sullivan Inc., volume of synthetic lubricants is projected to grow from 81,000 tons in 1980 to 197,000 tons by 1990, with sales, in constant 1980 dollars, climbing from $211 million to $495 million. West Germany, France and the United Kingdom, accounting for over 70% of sales in 1980, are the leading markets.

Growth is expected to be particularly strong in the automotive area, the marketing research firm observes in its new study, "The Market for Synthetic Lubricants in the EEC." Meanwhile, below-average expansion is anticipated for industrial applications such as hydraulic fluids, fire resistant fluids, metal working lubricants and industrial gear lubricants.

Moscow soy meal seminar set

The National Soybean Processors Association will conduct a seminar on soybean meal during mid-October in Moscow under the sponsorship of the Soviet Union's Ministry of Agriculture.

Topics will include nutritional characteristics; use in broiler, layer and hog production; and improvements in techniques for transportation, storage and handling of soybean meal. Seminar dean will be Dr. A.R. Baldwin, vice president of Research for Cargill Inc. and AOCS' director of publications. Approximately 18 persons are expected to comprise the faculty for the two-day seminar.

The seminar is a result of NSPA efforts following a visit by NSPA officials to the Soviet Union in December 1981.

Rau installs heat recovery unit

Walter Rau's Neusser Oel & Fett AG hardening facilities, Neuss, Germany, has installed a new heat recovery system to its Buss-Loop reactor unit.

The system recovers heat from one batch to preheat the next. Heat recovered is also used to generate low pressure steam for other purposes. In this manner, the plant is almost completely independent from outside steam sources and cooling water consumption is nearly eliminated. The new method raises the capacity of the loop unit by 40%.

International

New Zealand deadline Oct. 31

Oct. 31 is the preregistration deadline for the International Conference on Oils, Fats and Waxes to be held Feb. 13-17, 1983, at the University of Auckland in New Zealand.

Papers will be presented by scientists from more than 15 nations on various aspects of fats and oils, including industrial technology, analytical chemistry, nutritional and physiological role of lipids, and lipid biochemistry.

Persons who wish to present a contributed paper or a poster session must notify conference organizers by Oct. 31.

Registration materials are available in the United States from the AOCS, 508 S. Sixth St., Champaign, IL 61820; in England from Dr. P.J. Barnes, RHM Research Ltd., Lincoln Road, High Wycombe, Bucks. HP12 3QR; and from The Secretariat, International Conference on Oils, Fats and Waxes, Chemistry Department of the University of Auckland, Auckland, New Zealand. Group travel from the United States is being arranged through Travel Planners Inc., PO Box 32366, 350 GPM Building, San Antonio, TX 78216. In England, group travel is being coordinated by Ashley Adams Travel Ltd., 15 Micklegate, York, YO1 1JH, England.

Oilseeds to replace opium?

The U.S. Department of Agriculture is aiding the government in Thailand in teaching northern Thai tribesmen to grow alternate crops—including vegetable oil producing plants—instead of opium poppies. Among the other suggested cash crops being touted are flower seeds, bulbs, cut flowers, coffee, upland rice, fruits, and teas.

1982/83: 185 million metric tons

Increased soybean and sunflower production may push the world's 1982/83 oilseed production to a record 185.1 million metric tons, according to U.S. Department of Agriculture analysts. USDA estimated 1981/82 oilseed production at approximately 175 million metric tons.

World soybean production for 1982/83 is forecast at a record 99+ million metric tons, including increases of six million and three million metric tons, respectively, in the US crop being harvested this fall and the Brazilian crop now being planted. The U.S. soybean harvest this fall is estimated at nearly 63 million metric tons; the 1983 Brazilian crop at 15.5 million metric tons. *Oil World*, the German weekly newsletter on world fats and oils supplies, said earlier this year that Brazilian production may fall, not increase, because the Brazilian government is not providing the financial incentives to growers that are needed to spur more production. USDA analysts expect a sharp jump in acreage.

World sunflowerseed production is forecast at 15.9 million metric tons for 1982/83, compared to 14.2 million metric tons in 1981/82. The increases are expected primarily in the United States, Western Europe, and China. U.S. sunflowerseed acreage this year is about 4.9 million acres compared to 3.9 million acres the previous year; production is forecast to rise to 2.96 million metric tons from 2.1 million metric tons. In Western Europe, production is forecast at 1.18 million metric tons compared to 800,000 metric tons the previous year. China's production is forecast at 1.35 million metric tons for 1982/83 compared to 1.20 million metric tons the previous season.

Table 1

Major Oilseeds by Main Products (1,000 MT)

	Soybean		Cottonseed		Peanuts		Sunflower		Rapeseed		Flaxseed		Palm oil	
	80/81	81/82	80/81	81/82	80/81	81/82	80/81	81/82	80/81	81/82	80/81	82/83	80/81	81/82
United States	48,772	58,650	4,060	5,800	1,040	1,810	1,750	2,098			200	198		
Brazil	15,200	12,800	1,120	1,070	310	350	40	50	10	20				
China (mainland)	7,880	9,245	5,414	5,936	3,600	3,800	910	1,200	2,384	4,065				
Argentina	3,500	4,300	170	290	240	220	1,260	1,750			580	600		
Paraguay	600	625	190	190	20	20								
USSR	450	550	4,950	5,519			4,600	4,800	50	50	196	165	525	535
India	450	500	2,700	2,750	5,020	6,200	170	160	2,250	2,500	430	475	2,750	3,150
Pakistan			1,370	1,470	60	60			260	270	10	10	684	801
Senegal			20	20	500	900							149	170
Sudan						1,000								
S. Africa	26	24	105	85	215	132	513	290						
Romania							817	806						
Hungary							454	581						
Canada	710	630					170	180	2,480	1,794	460	427		
Poland									572	486				
France									1,091	1,023				
Nigeria													525	535
Malaysia													2,750	3,150
Indonesia													684	801
Ivory Coast													149	170
Mexico		680	534	490										
Totals*	81,476	87,170	25,525	27,770	10,734	12,480	13,119	14,228	11,445	12,775	2,300	2,080	4,656	5,258

Source: USDA, *Oil World*, other reports.
*World totals include production in other nations not listed on chart.

Table 2

World Production of Oilseeds, Fats and Oils (1,000 MT)

	Oilseeds		Fats and oils	
	1981/82	1982/83	1981/82	1982/83
Soybeans	87,313	98,900	13,109	14,500+
Cottonseed	27,766	25,566	3,542	3,171
Peanuts	18,709	18,699	3,228	3,143
Sunflower	14,268	15,978	5,129	5,694
Rapeseed	12,503	13,291	4,174	4,446
Sesame	1,905	1,956	678	703
Safflower	895	757	275	234
Flaxseed	2,086	2,230	640	685
Castor beans	836	866	357	370
Copra	4,842	4,988	3,099	3,192
Palm kernel	1,688	1,772	793	833
Palm			5,537	5,748
Babassu			130	140
Olive			1,036	1,738
Corn			525	600
Olive residue			135	139
Otticica			14	15
Tung			90	100
Fish			1,160	1,155
Whale			10	10
Sperm whale			58	58
Butter (fat content)			4,782	4,782
Lard			3,804	3,804
Tallow & grease			6,038	6,038

Source: USDA Foreign Agricultural Circular FOP 9-82.
Split year indicates Northern Hemisphere crop harvested in final months of first year; Southern Hemisphere and some Northern Hemisphere harvested in first months of second year shown. 1981/82 data is preliminary; 1982/83 figures are forecasts.

World rapeseed production for 1982/83 may set a record, according to *Oil World*, which estimates a crop of 13.6 million metric tons, up a million metric tons over 1981/82. Western Europe has become self-sufficient in rapeseed, or even a net exporter, *Oil World* says in forecasting a 2.4 million metric tons crop there, up 400,000 tons from the previous season. China's production is forecast by *Oil World* at 4.4 million tons for 1982/83, up 400,000 tons. Canada's crop is forecast at 2.1 million metric tons, up about 300,000 tons, but still below the 3.4 million metric ton harvests of the late 1970s. Europe's self-sufficiency has reduced Canadian rapeseed exports to Europe. In the late 1970s, Europe was producing about a million metric tons of rapeseed annually.

World cottonseed production may drop to 25.57 million metric tons for 1982/83 from 27.77 million metric tons, according to the U.S. Department of Agriculture. Almost all the decline is attributable to the United States where reduced acreage may mean a crop of about 4.03 million metric tons, compared to 5.8 million metric tons for the previous season. A hailstorm that devastated two million acres of Texas' 5.7 million acres of cotton will also hurt production.

World peanut production is expected to be about 18.7 million metric tons for 1982/83 by the U.S. Department of Agriculture analysts. United States production is expected to decline to 1.56 million metric tons from 1.81 million metric tons, but increases in other nations will offset the U.S. drop in peanut acreage.

Increases in U.S. and Canadian production is expected to move flaxseed production to 2.09 million metric tons for 1982/83, compared to 2.08 million tons for 1981/82.

The following articles are based primarily upon U.S. Department of Agricultural reports from embassy employees, but also incorporate data from other USDA reports, overseas publications, and conversations with persons from some of these nations.

MEXICO

Mexico's 1982/83 soybean crop is forecast at 730,000 metric tons by U.S. Department of Agriculture observers, about 7% above 1981/82's estimated 680,000 metric tons.

Soybean is grown under irrigation in Mexico and reservoir water levels are sufficient to support additional acreage, USDA says. The rising production has enabled Mexico to reduce soybean imports in recent years, with 1981/82 imports estimated at 800,000 tons, compared to 1.3 million a few years ago.

Sunflower imports are rising, forecast at 700,000 metric tons for 1982/83, compared to about 300,000 tons a few years ago. Sunflower production remains about 25,000 to 30,000 tons a year.

Cottonseed production, estimated at 525,000 tons for 1981/82, is forecast at 350,000 tons for 1982/83. Imports, primarily from the United States, are expected to rise to 150,000 tons for 1982/83, compared to an estimated 50,000 tons during 1981/82.

Safflower production is estimated at 200,000 tons for 1981/82 and 1982/83. With ample irrigation water available, Mexican farmers are expected to reduce safflower acreage to grow more wheat. Reduced water supplies in 1983/84 might spur more safflower acreage as farmers would not have enough water to irrigate both wheat and soybean crops.

EL SALVADOR

Internal economic and political problems continue to complicate El Salvador's efforts to regain self-sufficiency in production of fats and oils.

The nation once produced enough cottonseed to meet domestic cooking oil needs, plus some product for use in margarine, but again in 1982/83 it appears about 20,000 metric tons of vegetable oils will be imported. This will be primarily cottonseed oil from the United States. Various U.S. programs will provide financial aid.

High interest rates discourage growers from borrowing funds to plant crops. A former regulation transferring land title to renters discouraged land owners from renting cotton land, but a later decree exempted cotton land from that program. Even so, harvested acreage for 1982/83 is expected to be about 24,000 hectares, compared to 52,500 for 1981/82 and 77,000 hectares, compared to 52,500 for 1981/82 and 77,000 hectares as recently as 1979/80. Cottonseed oil production is expected to be 3,900 metric tons compared to 17,200 tons in 1979/80.

BRAZIL

Brazil's soybean acreage is expected to rise in 1983 following two consecutive years of reduced acreage and reduced production. U.S. Department of Agriculture observers expect a record nine million hectares to be planted in soybeans as corn prices have been relatively lower and as new land is brought into production.

Oil World, however, said in July that Brazilian acreage might decline again unless government financial incentives to grow soybeans are improved. Unless price support levels are raised, *Oil World* said Brazilian acreage could be 8.1 to 8.2 million hectares. Planting begins in Brazil this month.

The 1982 soybean crop is estimated at 12.8 million tons from 8.4 million hectares. The 1981 crop was about 15.2 million tons from 8.5 million hectares. The USDA expects production in 1983 to be between 15.5 and 16 million tons, if weather is favorable.

To meet its needs, Brazil is expected to import about 1.3 million tons of soybeans in the current marketing year. Soybean exports are expected to be about 750,000 tons and total crush about 12.5 million tons yielding 9.5 million tons of meal (about 70% of which is exported) and 2.3 million tons of oil (with 1.1 million tons to be exported).

Cottonseed production for 1983 is estimated at 1.07 million tons and forecast for 1983 at 1.16 million tons. Cottonseed oil exports for 1982 and 1983 are pegged at 80,000 tons and 100,000 tons, respectively; cottonseed meal exports are estimated at 40,000 tons in both years.

Castor bean production is estimated at 280,000 tons for 1982 and forecast at 320,000 tons for 1983. For 1982, castor oil exports are estimated at 85,000 tons of the 123,000 tons produced; for 1983, the forecast is for exports of 100,000 tons based on 140,000 tons production.

Peanut production is estimated at 360,000 tons for 1982 and 350,000 tons for 1983 (on slightly reduced acreage). Peanut exports are expected to be about 30,000 tons (in shell basis) both years. Peanut oil production is estimated at 71,000 tons and 69,000 tons for 1982 and 1983, respectively, with exports of 65,000 tons and 63,000 tons.

Brazil's soybean exports during the current marketing year are expected to come predominantly from Argentina (600,000 tons), with the rest from Paraguay (450,000) and the United States (300,000 tons). The 1983 soybean production goal is 18 million metric tons, but as of late June the govenment had not announced what credit terms will be available for production of various crops.

PERU

Peru's 1982 fats and oils production jumped 52% because of an expected increase in the fish catch. Whereas 1981 fish oil production was about 82,000 tons, the 1982 and 1983 production are forecast at 150,000 tons for each year, increasing total fats and oils production from 128,000 tons in 1981 to 193,000 for 1982 and 1983.

Cottonseed oil production, which was 24,000 tons in 1981, is estimated at 22,000 tons for 1982 and expected to stay at that level for 1983, according to U.S. Department of Agriculture observers.

Expansion of palm oil acreage continues, with palm oil production increasing about 1,000 tons per year to 9,000 tons total forecast for 1983. By 1986-87, Peruvian planners expect the expanded acreage to be producing up to 20,000 tons of palm oil annually.

WEST GERMANY

Germany's 1982 rapeseed crop is estimated at 465,000 metric tons by the U.S. Department of Agriculture, about 25% above the previous year. *Oil World*, the German weekly fats and oils newsletter, says the crop could be as large as 490,000 metric tons.

Germany will import about another 470,000 metric tons, for a total crush of 835,000 metric tons, during the 1982/83 marketing year. About half the oil produced is exported while most of the meal is consumed domestically.

Soybean imports and crushings are expected to increase. Imports for 1981 are estimated at 3.6 million tons, and 1982 marketing year imports may total 3.75 million tons. About a fourth of the meal and a third of the oil produced in 1982 will be exported, slightly below the previous marketing year.

Sunflowerseed imports are forecast to total 750,000 tons for the current marketing year, compared to 647,000 the previous year. Crushing is expected to yield 420,000 tons of meal and 275,000 tons of oil, with an additional import of 130,000 tons of meal and 35,000 tons of oil. Exports will be about 100,000 tons of meal and 155,000 tons of oil.

Germany is expected to import approximately 5.37 million tons of oilseeds, 3.8 million tons of meal and 945,000 tons of oils. Exports are forecast at 103,000 tons of oilseeds, 1.7 million tons of meal and 705,000 tons of oil.

THE NETHERLANDS

Oilseed crushings in The Netherlands during the early part of 1982 were below those for the same period in 1981, mainly because of declines in soybean crushings. Rapeseed and sunflowerseed crushings increased during the first third of the year.

The reduced crushings reflect reduced trade, according to U.S. Department of Agriculture reports. Dutch trade to Iraq and Iran, for example, fell to virtually nothing.

During the January-April 1982 period, soybean crushings fell about 10.5%, while rapeseed and sunflower rose 22% and 13%, respectively, with a 20% increase in sunflower seed imports, primarily from France and South Africa.

The general trend for the start of 1982 may last through 1983, with anticipated increased demands for soybean meal expected to be met by import of U.S.-origin meal. Soybean demand is expected to remain about the same.

ENGLAND

The soybean crushing facility in Erith, one of two in England, was slated to close during July 1982, but the other facility, at Liverpool, was gearing up to expand, according to reports from U.S. Department of Agriculture observers.

The net effect, the report said, may be to reduce U.K. soybean imports from the U.S. by about 100,000 metric tons, to about 950,000 metric tons annually. Cross-channel imports of soybean oil and meal are expected to rise to meet demand for southern England.

Fish oils are the major edible oil, accounting for one-fourth to one-third of U.K. consumption, with soybean oil and palm oil ranking second and third. Rapeseed production in the U.K. is estimated by *Oil World* at 420,000 tons up 100,000 tons from the previous season.

DENMARK

A crushing facility for Denmark's double-zero rapeseed varieties is scheduled to become operational late this year. Denmark grows primarily spring rapeseed, compared to winter rapeseed throughout the rest of Europe, and its double-zero crop has been shipped to Germany for processing where it is mixed with winter rapeseed (which is not low in erucic acid or glucosinolates). No premium price was received by growers.

With the new crushing facilities, the double-zero rapeseed products can be marketed separately.

Denmark's rapeseed acreage continues to expand, estimated at 150,000 hectares yielding 320,000 metric tons for 1982. U.S. Department of Agriculture observers estimate about 200,000 hectares represents the maximum potential for rapeseed in Denmark. Farmers have realized that barley yields improve if they follow rapeseed in a crop rotation and this has helped increase acreage from the 61,000 hectares planted in 1979.

The new rapeseed facility, which will reduce demand for soybean meal, may

mean lower soybean imports from the United States. A crushing plant destroyed by explosion in June 1980 is expected to be rebuilt only to process protein for human consumption, not for animal feed. There is one other facility in Denmark processing oilseed for animal feed.

SPAIN

Spain solidified its position as the world's third leading exporter of soybean oil behind the United States and Brazil, during the past yea, exporting more than 425,000 tons of soy oil.

The trend continued into 1982 with soy oil exports for the first calendar quarter being nearly 200,000 metric tons, up nearly 50% over the same period in 1981, according to *Oil World.*

Spain imports soybeans to crush for meal, but restricts the amount of soy oil that may be consumed within Spain in an attempt to protect its olive oil industry. Nearly 3.2 million metric tons of soybeans were imported during 1981/82 according to U.S. Department of Agriculture figures.

Spain's major domestically grown oilseed is sunflower seed. While the drought-reduced 1981 crop was about 298,000 metric tons, the 1982 crop is officially estimated at a record 581,000 metric tons.

Olive oil production, for the year ending October 1982, is estimated at 272,000 metric tons, but for the coming year is forecast at 350,000 metric tons.

Spain's oilseed processing capacity is approximately 4.5 million metric tons annually, of which about 3.3 million tons are for soybeans, 700,000 tons for sunflower and the rest for other oilseeds. Soybean extraction is all solvent equipment; high-oil seeds, such as sunflower, are frequently processed through continuous expellers. Rising costs for fuel, power and hexane had reduced crushing margins this past year.

FRANCE

Sunflower oil surpassed peanut oil in use in France during 1981 largely because of increased sunflower oil supplies at lower prices, according to U.S. Department of Agriculture observers.

Sunflower oil's market share in 1981 rose to 26% from 22%, while peanut oil declined to 23% from 31%. Sunflower oil supplies have been rising, because of increasing domestic production. Approximately 211,000 metric tons of sunflower oil will be used in 1981/82 and 1982/83. Peanut oil supplies, on the other hand, have dropped because of decreasing exports. Peanut oil supplies that totaled 309,000 metric tons in 1980 fell to 216,900 metric tons (190,000 for food use) in 1981, but are expected to be about 221,000 for 1982. Peanuts are imported for crushing and concern about aflatoxins has been one factor in reduced imports in recent years.

Oilseed acreage in France continues to rise. Sunflower acreage has risen from 83,000 hectares in 1980 to a forecasted 270,000 hectares for 1983. Rapeseed acreage at 223,000 hectares in 1980, is forecast at 475,000 hectares for 1983. Edible consumption of rapeseed oil is not rising, however. The vast majority of rapeseed grown is exported.

Soja France has completed studies on building a second crushing facility in St. Nazaire. No definite plans had been announced by early summer.

NORWAY

Norway's per capita consumption of edible fats and oils was estimated at 23.7 kilograms during 1981 compared to 26.0 in 1980, 24.2 in 1969, and 25.7 in 1959. Total consumption for the same years was 96,800 metric tons in 1981; 106,200 in

Dutch Oilseed Production

				1,000 metric tons				
Soybeans								
1981	–	3,119	184	2,686	492	56	118	387
1982	–	2,976	100	2,650	460	50	115	350
Rapeseed								
1981	37	184	23	118	46	69	47	55
1982	45	151	30	200	64	65	50	70
Sunflower								
1981	–	214	2	193	76	25	17	77
1982	–	262	5	230	97	24	17	100
Palm kernel oil								
1981	–	–	–	–	–	82	22	47
Palm oil								
1981	–	–	–	–	–	182	32	125
Coconut oil								
1981	–	–	–	–	–	90	16	44
Fish oil								
1981	–	–	–	–	–	162	65	66
1982	–	–	–	–	–	178	70	70

1980; 93,200 in 1969; and 91,300 in 1959.

Part of the decline in 1981, however, may reflect consumer stockpiling in 1980 before new pricing policies took effect on Jan. 1, 1981.

Soybean imports from the U.S. are expected to total about 300,000 metric tons during 1982, compared to 345,000 tons for 1981. Norway's fish oil exports for 1982 will be approximately 137,000 tons of the 150,000 tons it produces. Norway also exports surplus soybean oil and meal to neighboring nations.

FINLAND

Price incentives to farmers for producing rapeseed, Finland's only domestic oilseed crop, probably have not been raised enough to move acreage above the 55,000 hectare level where it has been the past few years, according to U.S. Department of Agriculture observers.

The net result means that Finland will produce an estimated 69,000 tons of rapeseed, sufficient to meet about one-third its domestic fats and oils needs. The remainder will be met by imports of soybeans and sunflower, predominantly from the United States.

The government goal was to have 65,000 hectares in rapeseed for 1982. The forecast for 1983 is that Finland may produce as much as 80,000 tons of rapeseed, which would mean a decrease to 96,000 tons from 106,000 tons of soybean imports from the United States.

POLAND

Poland will need to import 200,000 metric tons of oilseeds to meet demand, according to U.S. Department of Agriculture observers, who estimate the 1982 rapeseed harvest at 491,000 tons, of which 422,000 tons will be processed to produce 173,000 tons of oil and 249,000 tons of meal.

Per capita consumption of vegetable oils and fats in 1981 was 3.4 kilograms. Rationing instituted in February 1982 allowed 375 grams of margarine per month per person and one-half liter of vegetable oil per person per month. However, supplies were not necessarily matching needs. In June, for example, the margarine ration would total 13,500 metric tons, but only 6,000 metric tons were available.

The rapeseed crop was hurt by winterkill that led to 26% of planted acreage being plowed under. The government had aimed at planting of 550,000 hectares, but only 340,000 hectares were planted, of which 249,000 eventually were harvested.

YUGOSLAVIA

Yugoslavia's production and use of soybeans continues to increase. USDA observers estimated 1982 production at 150,000 tons plus imports of 230,000 tons to provide 360,000 tons for crushing.

For 1983, the forecast is that production may rise to 180,000 tons while imports remain steady and the crush rises to 410,000 metric tons. The rise in production reflects an expected increase in acreage from 75,000 hectares for 1982 to 90,000 hectares for 1983.

Sunflower acreage for 1982 is estimated at 150,000 hectares, compared to a goal of 200,000 hectares. That could mean a 1982 crop of less than 300,000 tons.

A second soybean crushing plant was scheduled to begin operations this month. The plant will be equipped with extruders to produce large quantities of soy protein for human consumption. Observers say Yugoslavia may have to increase soybean imports to keep both plants operating at efficient levels and definitely will import more if both plants are to be kept operating near capacity.

SOVIET UNION

The Soviet Union has announced production targets for oilseeds through the year 1990, but is having trouble in 1982 keeping production up to 1981's harvest.

The production targets announced were to produce 7.2 to 7.5 million metric tons of sunflower during the 1986-90 period, compared to 5.3 million metric tons for 1976-80; for soybean, the goal is 2.2 million to 2.3 million metric tons compared to an average of 530,000 metric tons for 1976-80; and for rapeseed, 1.5 million metric tons by 1990 compared to less than 50,000 metric tons annually at present.

For 1982, Soviet oilseed acreage is about the same, if not smaller, than 1981. USDA rough estimates are for total oilseed production of about 10.7 million tons, compared to 10.2 million tons for 1981. Because of

Soviet Oilseed Production

	1978	1981	1982
	1,000 metric tons		
Sunflower	5,333	4,600	4,800
Soybeans	634	450	550
Mustard	121	60	60
Rapeseed	15	50	50
Safflower	6	3	3
Cottonseed	4,804	4,950	5,519

the various oilseeds involved and other factors, vegetable oil production for 1982, estimated at 2.5 million metric tons, may be below the 2.6 million metric tons of 1981. Soviet vegetable oil production was 3.3 million metric tons in 1975, but has not been that high since, reaching 2.07 million metric tons in 1978.

Oil World is estimating the 1981/82 Soviet oilseed crop at 10.7 million metric tons, but puts the 1980/81 harvest at 10.97 million metric tons.

Oil yield rates in the Soviet Union for 1981 were published in *Oil World* at 17.42% for soybeans, 46.1% for sunflower, and 16.33% for cottonseed.

TURKEY

Oil yield from sunflower seed is declining because growers do not want to pay extra cost to acquire registered or certified seed when planting crops, according to U.S. Department of Agriculture reports.

The extraction rate was about 43% in 1980/81, declined to 41% for 1981/82, and is expected to be no higher than 40% in 1982/83, the report said. Combined with reduced acreages, this has meant a drop in sunflower oil production from 250,000 tons in 1980/81 to an estimated 206,000 tons for 1982/83.

Turkey's other major domestic seed oil is cottonseed oil, which is expected to import about 100,000 metric tons for 1981/82 and for 1982/83. Turkey is expected to import about 100,000 metric tons of vegetable oil in 1981/82 and as much as 140,000 metric tons in 1982/83 to meet consumer demand.

Turkey's olive oil crop is estimated at 60,000 metric tons for 1981/82 and 170,000 metric tons for 1982/83. About two-thirds of the crop is consumed domestically, the rest exported.

ISRAEL

Cottonseed production reached a record 135,000 metric tons during 1981 because of uncommonly good growing conditions, but production for 1982 is expected to be about 125,000 tons and is forecast at 120,000 tons for 1983.

About half the crop is fed directly to cattle, the other half is crushed. Soybeans imported from the United States are the major source of edible oils, with 1982 imports estimated at 462,000 tons, yielding 80,000 tons of oil. The 1983 forecast is for imports totalling 464,000 tons yielding 82,000 tons of oil. Israel's soy oil imports are declining as the crushing industry grows.

A sunflower oil margarine was marketed in Israel this past year for the first time in more than 10 years, being manufactured domestically from imported oil. Domestically grown sunflower is used for food purposes almost exclusively.

EGYPT

Egypt's vegetable oil consumption and imports are expected to continue to grow with consumption currently estimated at 460,000 tons annually and imports for 1982 estimated at 335,000 tons and forecast for 1983 at 355,000 tons.

Cottonseed is the primary domestic oilseed crop, but soybean production is rising. In 1981, Egypt produced about 844,000 tons of cottonseed, but for 1982 the estimated crop is 805,000 tons and for 1983, 718,000 tons. Cottonseed oil production for the same years is estimated at 130,000, 126,000 and 111,000 tons, respectively. Soybean acreage has expanded from 35,000 hectares in 1981 to 63,000 hectares for 1983, with soybean imports rising from 18,000 tons to 55,000 tons.

Egypt's 1983 vegetable oil imports are forecast to consist of 210,000 tons of cottonseed oil, 100,000 tons of soybean oil (shipped in drums and requiring no further processing after import), and 45,000 tons of sunflower oil. Palm oil may become an imported oil as plans materialize to build import facilities on the Red Sea. Brazil and Spain are major soybean oil suppliers, while the United States is the primary source of cottonseed oil and recently supplanted Europe as the major source for sunflower oil imports.

SYRIA

Olives are the dominant oil crop in Syria with production ranging from 44,000 to 100,000 metric tons of oil per year, depending on whether it's an "on" of "off" year for olive trees.

Cottonseed oil production in 1982 was approximately 34,000 metric tons and is forecast at 35,300 tons for 1983, based on anticipated larger plantings of cotton. Soybean oil imports are expected to total about 18,000 metric tons during 1982.

Syria also grows peanuts, sesame and sunflower. A peanut crushing venture failed to extract more than 20% oil and was abandoned. Sesame oil production was 5,632 metric tons for 1982 and is forecast at 6,580 tons

for 1983; sunflower oil production for 1982 and 1983 is estimated at 1,800 tons annually.

ZIMBABWE

For the 1982/83 marketing years, Zimbabwe will produce about 40,000 metric tons of vegetable oil, which U.S. Department of Agriculture observers say may be about 40% less than is needed to meet demand.

Cottonseed and soybean are the primary domestic commercial oilseed crops. Price incentives to cotton producers should spur increased production. In 1982, about 87,000 metric tons of cottonseed were produced, about 80,000 of that for crushing. For 1983, the forecast is that 135,000 metric tons may be produced, about 127,000 for crushing. Price incentives for soybeans have not been as attractive. About 91,000 metric tons were produced during 1982, but no forecast has been made for 1983.

Peanuts are grown primarily for subsistence purposes, but commercial plantings will provide about 15,000 metric tons to processors for 1982/83.

SENEGAL

Senegal's peanut production in the 1982/83 year may reach one million metric tons compared to 900,000 metric tons for 1981/82 and 489,000 metric tons for 1980/81.

The government price for peanuts was raised approximately 52% for the 1981/82 season. Acreage may increase in 1982/83 because of a switch from millet. An unusually large 1981/82 millet harvest means the government probably will not be willing to purchase as much of that crop as in the past, according to U.S. Department of Agriculture observers.

LIBERIA

Liberia's palm oil industry increased production during 1981 by 25% to 25,000 metric tons and is expected to increase to 30,000 metric tons for 1982. Exports were 5,000 tons for 1981 and may total 6,000 tons for 1982.

The government-sponsored Liberian Palm Products Corporation has announced plans to develop two palm oil plantations and a coconut oil plantation. The first palm oil plantation is planned for 7,500 acres with 7,000 acres planted and 2,200 already in production. The second palm plantation would cover 10,000 acres, with 2,500 acres planted thus far. The coconut plantation has 774 acres of a planned 20,000 acres planted to coconut, but the trees are not yet of bearing age.

SIERRA LEONE

Sierra Leone produces about 48,000 metric tons of palm oil annually which is used for domestic consumption, some blended with about 500 tons of imported soybean oil.

Palm kernel is the nation's primary export oilseed crop, but since reaching 51,000 metric tons in 1975, production has fallen to an estimated 15,000 metric tons.

NIGERIA

Nigeria's 1982/83 vegetable oil consumption is expected to be slightly over one million metric tons including 351,000 tons of imported vegetable oils.

Palm oil is the primary domestic oil, expected to total about 535,000 metric tons during 1982/83. Nigeria's climate is less suited to palm than such nations as Malaysia, with the result that annual fresh fruit bunch production under ideal conditions is about 22 tons per hectares in Nigeria compared to yields of up to 30 tons per hectare in Malaysia.

Most imported oils arrive in bulk tankers as mixtures of fully refined oils (rapeseed, soybean, palm, cottonseed and sunflower) of no specific ratio. Importers estimate blended shipments are about 30% soy oil, 40% rapeseed oil and the rest a mixture.

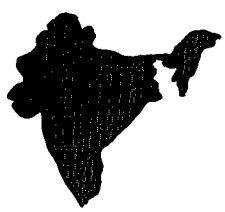
SOUTH AFRICA

South Africa's 1982 oilseed crop was only about half of 1981's crop because of a severe drought. The 1981 crops, however, were larger than normal because of good growing conditions.

Commercial production of peanuts for 1982 is estimated at 92,000 metric tons compared to 1981's 215,000 tons; for sunflower, 290,000 tons compared to 513,000 tons; soybeans, 24,000 tons production compared to 26,000; and cottonseed, 85,000 tons compared to 105,000 tons.

U.S. Department of Agriculture observers expect South Africa to import about 5,000 tons of soybeans and 20,000 tons of soybean oil.

South Africa's vegetable oil supplies are expected to total about 189,000 metric tons, including 20,000 tons of imported soybean oil and 7,000 tons of peanut oil expected to be exported. In 1981, South Africa exported about 31,000 tons of sunflower oil, but no exports are anticipated for 1982.



INDIA

India's oilseed production improved for 1982, but the country still will be importing more than one million tons of vegetable oils during

1983 to meet consumer demand. Per capita fats and oils consumption rose to an estimated 6.5 kilograms in 1982 compared to 6.2 kilograms for 1981, according to USDA estimates.

Oilseed production for 1982 was approximately 14.02 million tons compared to 12.38 million tons for 1981. Production for 1983 is forecast at 13.5 million to 14.5 million tons, which would yield 3 million to 3.3 million tons of vegetable oil.

In mid-summer, delayed rains in main peanut-producing areas were creating doubts production would be near the potential maximum. India is trying to increase peanut production in prime areas by improving seed quality, expanding irrigated acreage and improving cultural practices. In other region, India hopes to expand soybean production by 1985/86 to 1.8 million hectares yielding 1.44 million tons from the present 450,000 hectares yielding 350,000 tons.

India's vegetable oil imports were about 1.07 million tons for 1980/81, with about 640,000 tons of soybean oil, about 90% of which came from Brazil. Another 158,000 tons were rapeseed oil from Canada, the rest being palm oil from Malaysia. For 1981/82, total vegetable oil imports are expected to be 1.2 million tons, including 650,000 tons of soybean oil, 350,000 tons of palm product, and 150,000 tons of rapeseed oil, plus some coconut oil from the Philippines. Imports for 1982/83 could be as much as 1.5 million tons, depending on domestic oil production.

PAKISTAN

Imported palm oil and soybean oil are Pakistan's main

Indian Oilseed Production

	Area harvested (1,000 ha)	Estimated production (1,000 MT)	Exports (1,000 MT)	Crush & domestic consumption (1,000 MT)	Oil			
					Domestic production (1,000 MT)	Imports (1,000 MT)	Domestic food consumption (1,000 MT)	Exports (1,000 MT)
Peanut[a]								
1981-82	7,250	6,200	46	6,104	1,430		1,361	
1982-83	7,300	5,500	60	5,440	1,250		1,175	
Sesame[a]								
1981-82	2,450	500	5	495	151		139	
1982-83	2,450	475	5	470	144		133	
Rapeseed/mustard[b]								
1981-82	4,063	2,247		2,247	674	150	780	
1982-83	4,050	2,500		2,500	753	150	867	
Flaxseed[b]								
1981-82	1,710	428		408	117		35	
1982-83	1,800	475		475	137		40	
Castor[b]								
1981-82	501	210		205	89			50
1982-83	500	250		240	90			50
Copra[c]								
1982	1,080	340	5	345	214	50	229	
1983	1,082	342	5	347	215	50	225	
Cottonseed[a]								
1981-82	8,300	2,700		2,700	230		195	
1982-83	8,350	2,750		2,700	235		195	
Safflower[b]								
1981-82	726	340		340	73		68	
1982-83	730	340		340	73		68	
Soybean[a]								
1981-82	500	500		500	78	650	725	
1982-83	525	550		550	86	700	786	
Sunflower[a]								
1981-82	115	70		70	24		24	
1982-83	120	75		75	26		26	
Nigerseed[a]								
1981-82	600	145	5	140	42		37	
1982-83	610	150	5	145	43		38	
Palm oil								
1981-82						350	350	
1982-83						450	450	

[a]Crop year Oct.-Sept.
[b]Crop year Jan.-Dec.
[c]Crop year Feb.-Jan.

source of vegetable oils. Palm oil imports have grown from 237,000 metric tons in 1980/81 to an estimated 270,000 tons for 1982/83. Soybean oil imports for 1982/83 are estimated at 240,000 metric tons compared to 232,000 metric tons in 1980/81.

Pakistan does grow some soybeans, sunflower and safflower, with 1981/82 production estimated at 3,000, 7,000 and 5,000 metric tons, respectively. Pakistan's only export is about 7,000 metric tons of castor beans from an estimated 1983 crop of 35,000 metric tons.

PEOPLE'S REPUBLIC OF CHINA

China's oilseed production has improved rapidly in the past five years. Initial U.S. Department of Agriculture estimates are that 1982 oilseed production will be more than 28 million tons (compared to 25.3 million in 1981, 20.9 million in 1980).

During 1977, China imported about 217,000 tons of edible oils and exported about 23,000 tons, according to the weekly *Oil World*. For 1982, the estimates are for imports of 194,000 tons and exports of 109,000 tons.

Rapeseed oil has become the dominant domestic oil after four straight years of production increases. Rapeseed oil now constitutes 36% of vegetable oils consumed followed by soybean, cottonseed, peanut and sunflower.

USDA estimates on production tend to be slightly higher than those of *Oil World*, but both show continued increases.

China reportedly is working to increase soybean production and use. The American Soybean Association now has an office in China.

Chinese Oilseed Production

	1980	1981	1982
	---------- 1,000 tons ----------		
Peanuts	3,600	3,826	3,830
Rapeseed	2,384	4,065	4,300
Sesame	259	510	480
Soybeans	7,880	9,245	9,800
Cottonseed	5,414	5,936	6,200
Other	1,448	1,804	N/A

THAILAND

Thailand's vegetable oil industry shows 170 oil extracting plants registered with the Ministry of Industry, but only 10 have annual capacities of more than 1,200 metric tons, with the largest being 6,000 tons. Per capita consumption of edible oils has been about 2.8 kilograms the past few years, according to U.S. Department of Agriculture reports. Palm oil accounts for about 50,000 metric tons of the 125,000 metric tons consumed annually, with about half the palm oil from domestic production. Palm oil production has risen from 10,000 metric tons in 1979 to 25,000 metric tons in 1982. Coconut oil production has risen from 14,000 tons to 20,000 tons in the same period. Thailand produces about 10,000 metric tons of soy oil annually from domestic soybeans and imports about the same amount of soy oil.

MALAYSIA

Malaysia's palm oil production continues upward, but for several months earlier this spring the question was whether the over-capacity palm crushing industry in Malaysia could obtain enough crude palm oil to remain economically healthy.

For a brief period, the government of Malaysia refused to license any new exports, although existing contracts for shipments apparently were honored, according to USDA reports.

Palm oil production for 1982 is estimated at 3.15 million metric tons and for 1983 at 3.35 million metric tons by USDA observers. Refined oil exports for 1983 are forecast at 2.82 million metric tons compared to an estimated 2.63 million metric tons for 1982.

One newspaper report estimated 1981 processing capacity at 4.1 million tons compared to a production of an estimated 2.8 million tons of crude palm oil. By 1983, the report said, capacity could be about 5 million tons. For a while, one source said, Malaysian refineries were having to pay $100 per ton above the world price for crude palm oil. That was one reason for the three-month limitation on crude palm oil exports.

New agronomic practices are increasing yield. A weevil (*Elaeidobius kamerunicus*) has been introduced to palm plantations to reduce dependency on honey bee pollination. Initial reports say fresh fruit bunch weights have risen as much as 20%, but USDA observers report yield in oil per ton of fresh fruit bunches has not been that high. How long trees could sustain the increased production also was being questioned. The first tissue culture trees have been planted and the practice is expected to expand rapidly by the end of the decade, perhaps increasing yield 30% as new trees are cloned from the highest yielding existing trees.

A new non-peninsular refinery, in Sabah, is expected to come on stream during 1983, raising capacity there from 60,000 metric tons to 150,000 metric tons. There are approximately three dozen refineries in Malaysia.

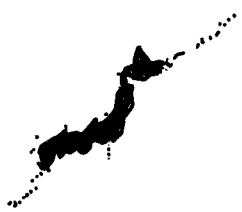
Palm kernel oil production is rising approximately in line with palm oil production.

Malaysia's trade in other oilseeds, meanwhile, is also rising. *Oil World* estimates Malaysia's 1981 imports of oilseeds, meals and oils and fats at 335,000 metric tons, with oilseeds accounting for two-thirds of that. Exports of oilseeds and oilseed products, exclusive of palm and palm kernel oil are between 300,000 and 350,000 metric tons.

KOREA

Korea's production of sesame seed and peanuts is expected to continue to increase for the 1982/83 season while imports of palm oil, which have largely displaced animal fats, also will continue upward, according to reports from USDA officials. Soybean production and imports are expected to remain at about the 1981/82 levels of 258,000 and 600,000 metric tons, respectively.

Korea's sesame seed production is forecast to rise to 25,000 metric tons, from 18,000, and peanut production is forecast at 30,000 metric tons, compared to 23,000 metric tons. Palm oil imports are expected to rise during calendar year 1983 to 70,000 metric tons from 65,000 metric tons. All the palm oil imports will go into food use, as will about 70,000 metric tons of soybean oil from domestic soy crushing operations.



JAPAN

Japan's imports and use of oilseeds and vegetable oils are expected to increase slightly during 1983, according to reports from the U.S. Department of Agriculture.

Total oilseed imports are expected to be slightly more than 7 million metric tons, compared to slightly under that figure for 1982. Soybeans, primarily from the United States, and rapeseed, from Canada and Europe, are the primary oilseed imports. If Japan's economy requires reduced meal production, the Japanese may lower oilseed imports and import vegetable oil instead. For 1983, total vegetable oil use is forecast at 1.81 million tons, compared to 1.79 million for 1982. Japan is expected to import about 354,000 tons of vegetable oil in 1983.

INDONESIA

Indonesia's exports of oil and oil-bearing materials may decline in the future as a surplus of production over domestic production continues to narrow, according to U.S. Department of Agriculture reports.

In 1979, surpluses available for export amounted to about one-third of Indonesia's total supply, but in 1983, that available surplus may amount to one-fifth of total production.

Crude palm oil production continues to rise, but exports of crude palm oil are falling as more domestic processing is developed. In 1982, crude palm oil production should be about 801,000 tons, with 150,000 tons exported; for 1983, the production forecast is for 875,000 tons with 100,000 tons of exports. Processed palm oil and products are expected to be about 150,000 tons in 1982 and forecast at 230,000 tons for 1983.

Coconut oil production for 1983 is forecast at 730,000 tons compared to 698,000 for 1982. All will be consumed domestically. As recently as 1979, coconut oil production was 624,000, with about 63,000 tons being exported. Palm oil production was 600,000 tons in 1979, surpassing that of coconut oil in 1981.

Total edible oil production for 1983 is forecast at 1.7 million tons, with exports of 353,000 tons. In 1979, production was 1.2 million tons with exports of 474,000 tons.

PHILIPPINES

A coconut tree disease earlier this year was less severe than initially feared, a Philippine Coconut Authority spokesman has declared. The disease has killed or led to the destruction of 6,000 trees since 1976 on Mindoro. The disease, "Socorro wilt," apparently affects trees under 25 years old. USDA personnel report the disease is not expected to have any significant impact on coconut production or exports during 1983.

Despite a slight increase in coconut acreage from 2.8 million hectares to 2.9 million hectares, copra production is expected to decline by U.S. Department of Agriculture observers. Total 1981 production is estimated at 2.3 million tons, while 1982 production is expected to be 2.2 million tons.

Coconut oil exports, after reaching 1.04 million tons in 1981, are forecast at 956,000 million tons for 1982.

A government-subsidized program to promote use of coconut oil to extend diesel fuel also was initiated the second half of 1982.

AUSTRALIA

Australia's oilseed production is estimated at 487,000 tons for 1981/82 and forecast at 568,000 tons for 1982/83, following three consecutive years of relatively poor crops, according to U.S. Department of Agriculture observers.

Cottonseed production has been an exception to the general trend, with production rising steadily from 135,800 tons in 1979/80, to an estimated 188,000 tons in 1981/82 and a forecast of 200,000 tons in 1982/83.

Sunflower is the second leading oilseed crop, with 1981/82 production estimated at 122,000 tons from 160,000 hectares and 1982/83 production forecast at 169,000 tons from 235,000 hectares.

Since the 1979/80 season, Australia has been a net importer of oilseeds and of vegetable oils. In 1979/80, Australia imported about 14,000 tons of oilseed and exported about 120,000 tons; in 1981/82, imports were estimated at 52,000 tons and exports at 34,000 tons. Vegetable oil imports have been about 70,000 to 85,000 tons in recent years, primarily soybean, rapeseed and palm oil. JAOCS

PORIM research to expand palm oil markets

Former JAOCS assitant news editor Sara Arndt provided this report on Malaysia's palm oil industry and specifically the Palm Oil Research Institute of Malaysia (PORIM) where she visited earlier this year during an around-the-world trip.

In 1980, Malaysia produced about 2.8 million tons of palm oil, over half the world palm oil production figure of 4.84 million tons. The Malaysian industry expects to reach a total of 4 million tons in 1985 and 6 million tons by 1990. The oil palm, which is also grown commercially in Indonesia and its native West Africa, produces an edible oil which ranks second, after soybean, in the worldwide production of fats and oils. Malaysia's industry, geared almost exclusively to the export market, now claims almost 88% of total world palm oil exports.

In 1984, an AOCS World Conference on palm, palm kernel and coconut oils will be held. The conference is being cosponsored by the Palm Oil Research Institute of Malaysia (PORIM), three years old in May 1982, which is the country's first research organization to be devoted solely to the oil palm. As such, PORIM is one of the few research institutes in the world to study only one oil crop, and to perform all research experiments in its own laboratories. Established by an Act of Parliament (in 1979), PORIM receives strong encouragement from the Malaysian government which views the palm oil industry as one of the important pillars of the nation's economy. The institute is managed by a board comprised by government representatives and industry members, and financed partially by an industry levy on palm oil. PORIM was established to augment and complement agricultural research already underway and to initiate research into the chemistry and technology of the extraction, processing and end-use of palm oil. The institute provides an analytical service and a technical advisory service available to consumers and smaller industry members. PORIM is also responsible for the collection and dissemination of information relating to palm oil and palm oil products.

The oil palm, and oil palm research, are not new to Malaysia. The plant *E. Guineesis* was first brought from Nigeria as an ornamental tree in 1870, first cultivated for its oil in 1917, and became the subject of intensive research in the late 1950s when the Malaysian Government decided to concentrate on the oil palm as an alternative crop in a country whose industry had relied solely on the export of rubber, tin and timber for a long time.

Oil palm research in the 50s and 60s was shared by the country's large plantation agencies and the Malaysian Department of Agriculture. In 1971, this task passed into the hands of the Oil Palm Branch of the Malaysian Agricultural Research and Development Institute (MARDI). Research was concentrated on agronomy and breeding, with little emphasis on the chemistry and technology relating to the edible oil product.

By the late 1970s, the phenomenal development of Malaysia's oil palm industry—which increased production from 92,000 tons in 1960 to 2.8 million tons in 1980—had made it clear that Malaysia would be a key factor in a stiffly competitive fats and oils market with large amounts of edible oil for sale. The need to broaden the export potential of palm oil, and the search for new markets, provided the impetus for the creation of PORIM, an organization which, for the first time, concentrated on palm oil. Although research programs initiated by PORIM investigate all aspects of the oil palm from agonomy to end-use, the highest priority is given to studies on the physical properties and applications of palm oil with a view to the marketing of palm oil products.

PORIM's first director-general in 1978, Dr. C.C. Webster, was an expatriate who had been director of the rubber research institute in Malaysia. Initially, he supervised PORIM's four senior officers and 12 junior staff. After two years, Webster was succeeded by Tau Sri Datuk Dr. Anvwar B. Mahmud, former vice chancellor of the national university and previously director of MARDI. Most of the staff of MARDI's oil palm branch also opted to join PORIM. By the end of 1981, PORIM's staff comprised 200 people working in seven sites.

But the Palm Oil Research Institute of Malaysia is still in its infancy. There are no permanent headquarters or laboratories. The head office is at the Angkasa-raya Building, Jalan Ampang, Kuala Lumpur, while the Techno-Economic and Information Division is housed at another building, 400 meters away. PORIM's research laboratories, investigating the chemistry and physics of palm oil, is 6 km out of the city in temporary quarters at Ampang Taya. Here, two rented,

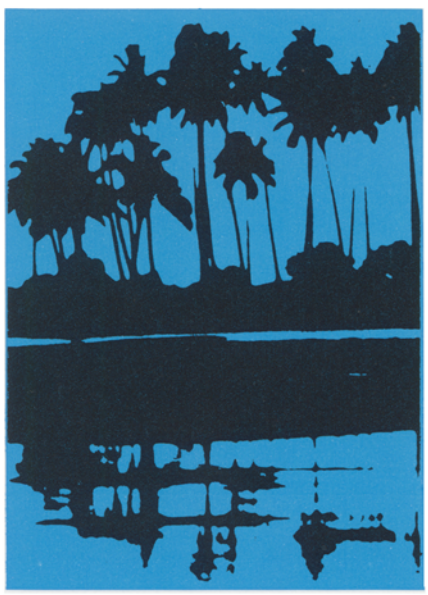
Malaysian-style "shophouses," adapted for the purpose, sport an unassuming exterior, yet house some extemely sophisticated technological equipment. The institute has just completed the renovation of a factory building which contains a pilot plant and other facilities for end-use research. PORIM's biology research stations are on land leased from MARDI, since PORIM has no land of its own for experimental plantings. These stations and their activities had previously been under the jurisdiction of MARDI and were handed over to PORIM in 1979, on a temporary basis, together with a considerable amount of laboratory equipment, until PORIM could acquire its own resources.

PORIM operations initially were financed by a voluntary contribution from members of the Malaysian Oil Palm Growers Council (MOPGC). Since January 1, 1980, income has been collected from an industry levy of $4 (Malaysian) per ton of palm oil. Financing by the mills, rather than by general taxes, ensures the close interest of the palm oil industry in PORIM's activities.

By 1985, PORIM hopes to be operating as a full-fledged institute, with an expected staff of 400, headquarters and laboratories at a permanent site and its own land for agricultural research stations. Construction has already begun on a new, centralized institute building at Bangi, 16 miles from the center of Kuala Lumpur, on a 25-acre site. A modern and integrated research area, the new center will combine headquarters, laboratories and the biology division in three separate wings, each of three stories, with a hexagonal lecture theater and ancillary buildings, including a pilot plant hall and "hazards" laboratory. The building is scheduled for completion in November 1983.

At the same time, PORIM is negotiating for the acquisition of 2,000 acres of jungle land at Ketengah for its East Coast Regional Station, and for another 1,000-acre jungle site in Kejora for the West Coast Regional Station. Here, and at the 1,200-acre MARD plantation (which has been transferred to PORIM), research on the biology of the oil palm is directed toward minimizing production costs by increasing yields and improving agronomic practices.

Malaysia's palm oil is the product of about 120 million palms, mostly of the African *E. Guineesis* type, planted in large estate holdings (each with areas of up to 50,000 ha of oil palms, much of which was previously rubber land, converted to oil palm during the 1970's), or on land farmed cooperatively under a government scheme. About 52% of the 1,138,676 hectares are operated by the private large estates, 42% by government land schemes, and 6% by independent smallholders. The total exceeds 777 estates. Malaysia's main palm-growing area lies along the Western Coastal Belt of Peninsular Malaysia (the East Coast is too wet during the monsoon season), although some land development schemes exist in East Malaysia (Sabah and Sarawak).



Most of the palms are the *tenera* variety—the product of *dura* and *pisifera* crossing—and are able to produce about five tons of oil per hectare. The palm is immature for the first three years of growth but will produce oil for more than 25 years.

However, Malaysia's oil palm—being so predominantly of the West African vareity—has a very narrow genetic base for further breeding purposes. Plant breeders are currently engaged in a project to evaluate *E. Guineesis* materials collected from different locations in Nigeria and planted on Malaysian lands. Breeding efforts underway at PORIM stations aim to modify the composition of palm oil by the development of hybrid varieties. The cross of the two species of palm, the West African *E. Guineesis* and the South American *E. Oleifera*, is expected to create a hybrid producing a more unsaturated oil. Breeding programs also hope to produce a lower-height palm (easier for harvesting) and a hybrid with greater resistance to disease. Further trials include the testing of *dura, tenera* and *pisifera* palms for combining ability, inheritance studies and the influence and transmission of sterility factors and a study of the various hybrid varieties to determine the possibility to select, or breed, for palm oil with specified fatty acid composition.

The newest development in the palm oil industry has been tissue culture—or "cloning"—of high-yielding oil palm. The oil palm reproduces by pollination from the male flowers which sets fruit in the female flowers and produces fertile seed. The palm is insect-pollinated, a sometimes slow and inefficient process meaning that artificial pollination is widely practiced. Until recently, reproduction was dependent on this crossing process, often slow and producing varied offspring. The palm had always proved impossible to propagate by any vegetative process involving cuttings, marcots or grafting. Only in the last few years was Unilever, which had been researching the problem for 10 years, able to use an appropriate culture media to grow a mass of cells and thus generate plantlets of a seedling type. The process is still a lengthy one, needing 18 months to grow a plantlet, but these tissue-cultured palms have now been field-planted and reached the stage of early maturity. They show evidence of being more uniform and true to type and could possibly yield up to 50% more oil. The development is one of great significance in terms of palm oil production, especially since the oil palm is such a variable plant, but could cause some problems. Clones have synchronous sexual cycles—even after several years—making them immune to circumstances and environment. Since the genetic material is so exactly reproduced in each "cloned" palm, this homogeneity could mean a vastly increased susceptibility of the whole

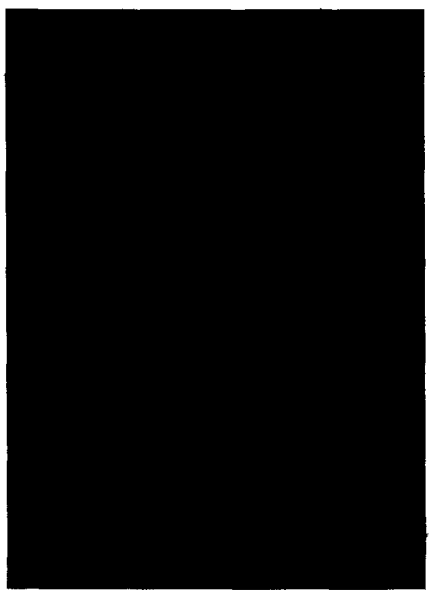
plantation to a particular insect or disease.

Palm oil is a semi-solid product, which finds its greatest use as a shortening and frying fat. Crude palm oil is bright orange in color and contains a total of 50% saturated fatty acids, the remainder being oleic acid and up to 10% linoleic acid. The oil displays good stability at high temperatures, due to the virtual absence of linoleic and other highly unsaturated fatty acids, and to the presence of natural antioxidants in the form of tocopherols. When refined, palm oil can be used in margarines (unlike soybean, palm oil needs no hydrogenation), vanaspati, shortenings, frying fats, bakery fats and ice cream. Palm oil is currently being marketed in Britain as a substitute for lard under the description of a "solid vegetable oil." After fractionation, the oil forms palm stearin and palm olein. The stearin after refining is a thick-textured, whitish solid having application in cocoa butter substitutes, bakery fats, soaps and oleo chemicals. The olein is a light-colored oil, the only palm oil product suitable for use as a cooking or salad oil (in hot climates). Palm kernel oil (crushed from the kernels of the fruit) is a much more liquid oil, of which the solid fraction is prized in confectionary and in soaps and detergents. The major problems limiting the use of palm oil in certain edible products are concerned with oxidation, bleachability and crystallization. The most desirable modification of palm oil composition would involve producing a more unsaturated and more liquid oil.

Dr. Pat Swoboda is Senior Research Fellow of PORIM's Chemistry and Technology Division, a department which he says operates with a mixture of sophisticated scientific equipment and "do-it-yourself." Prof. Augustine S.H. Ong has been director of the chemistry and technology division since June 1981. The new pilot plant laboratories, producing experimental shortenings and margarines, can handle any form of processing with any edible oil ingredient, and can formulate even products containing only a fraction of palm oil.

One of the teething problems of the institute was whether it should grow by diversification—small groups of people working on a great variety of projects—or by consolidation. Swoboda hopes PORIM will focus on defined projects of high priority. These include research on the factors affecting oil composition and quality, the efficiency of extraction, oil processing—including refining, fractionation and hydrogenation—efficient treatment and the development of adequate methods of analysis.

One of the most important studies involves researching the chemical changes that cause deterioration of palm oil quality. The rapid increase in free fatty acids, between harvesting and sterilization, is now prevented by immediate loading of fruit bunches onto railway carriages in which they are transported to the mills and sterilized. The crude oil is extracted from the fruit right on the plantations. Malaysian oil mills have a 2,000-ton storage tank at the end of the production line and the oil is refined within one to two months.



It is during transportation and storage that changes occur and, as Swoboda comments, delivery of a bad batch can hurt an established reputation. Deterioration of quality results from the attack of air and moisture on the oil. Hydrolic changes trigger the accumulation of free fatty acids, causing a lowering of the smoke point and problems with frying. Oxidative changes can result in poor bleachability and reduced stability of palm oil, often causing off-flavors in the food. PORIM programs are studying the loss and damage to natural antioxidants during processing which can later reduce the oxidative stability of palm oil, and the effects of various forms of iron in crude and refined palm oils. A study is also in progress to investigate pro-oxidant concentration in samples drawn from palm oil mills. The work has uncovered some unidentified components which may have antioxidant activity. With continued research and good relations with the industry, PORIM hopes to maintain codes of good commercial practice with respect to oil mills and refineries as well as to the storage and shipment of palm oil.

Although the crystallizing facet in palm oil is often used to create the desired texture in some fat products (for instance, shortening) this texture can inhibit its use in margarines and other "smooth"-textured products. A PORIM study of the physical behavior of palm oil is researching its unusually slow rate of crystallization and possible means of shortening it, as well as ways to modify the crystal size of palm oil. Even as a technical research institute, PORIM is export-based and outward-looking. In the commercial world, as Swoboda points out, "quality is what the customer wants." In order to comply with international practices, the orange color (and the Vitamin A) is removed from crude palm oil, yet in parts of Africa this quality has traditionally been seen as part of the distinctive nature of the oil. Palm cooking oil in Malaysia, which is sold door to door and poured into the housewife's jug from a large can, is flavored with a little peanut oil to attract the large number of Malaysian Chinese.

Kurt Berger, director of PORIM's End-Use and Technical Advisory Service Division, stresses that palm oil must meet the requirements of a widely diversified export market. PORIM, unique among fats and oils research institutes in the West, has scientists (under Senior Research officer, Dr. Shamsul Ansar Rheiri) devoting their research to the formulation and processing of "vanaspati," for which no scientific literature exists.

Vanaspati, a staple fat product in India, is the manufactured alternative to "ghee"—the granular form of melted butter. As such, the vanaspati

industry is the margarine industry of Asia, although the granular texture which is so desirable in vanaspati (and which palm oil can provide) could not be successfully marketed in the West. A group of officers from PORIM's Technical Advisory Service visited India in 1980 to discuss handling and transport facilities in India, visit vanaspati manufacturers and investigate palm oil use in vanaspati. A current PORIM project involving the formulation of vanaspati for the Indo-Pakistan Subcontinent is testing blends of hardened soybean and rapeseed oil to produce a consistency similar to vanaspati.

In 1980, the majority of Malaysia's exports of palm oil (396,300 MT) went to India, 316,600 MT to the E.E.C. and 142,200 MT to Japan. Pakistan bought 117,400 MT of Malaysian palm oil, and the U.S.A. 120,400 MT. A considerable amount of palm oil imports in England go to make ice cream (approximately 20,000 of about 100,000 tons). The United States, which six years ago was buying almost four times as much palm oil as an inexpensive source of good frying oil, has since been using palm oil mainly in shortening mixtures.

As Kurt Berger comments, there are still huge populations which have never tasted palm oil, a situation which PORIM hopes to change. Berger's department concentrates on ways to strengthen the potential of palm oil to face competition from other oils and fats. The study of market development in potential user countries, especially the Middle East, is being done jointly with the Techno-Economic and Information Division, whose director is Yusof B. Basiron.

Perhaps the most significant development in the Malaysian industry in recent years has been the move to export refined oil. Until 1970, when Malaysia's palm oil refining industry was established, almost all the palm oil produced was exported as crude oil. There are now 46 refineries in operation, and exports of processed palm oil have increased from less than 100,000 MT in 1975 to about 2.4 million MT in 1981. Berger points out that it should be much easier to find a market for refined oil—as a fully edible product—than for crude. Possible markets for the future include Egypt, Iran, China, Soviet Russia, and even Australia.

Since its introduction to Malaysia in 1870 and its establishment as a commercial oil-producing plant in 1917, the oil palm in Malaysia has outstripped traditional producers in Africa to become the source of quantities and qualities of palm oil never before available. The oil palm and its products are now Malaysia's fourth largest revenue earner. But, in 1981, only 100,000 MT of Malaysia's 2.8 million MT production total of palm oil was consumed domestically. The oil palm survives as an export crop and, in order to keep up with escalating production in Malaysia, PORIM must carve for palm oil a larger share in the world trade of fats and oils.

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