U.S. GLOBAL COMPETITIVENESS: OILSEEDS AND OILSEED PRODUCTS

Report to the Committee on Finance, U.S. Senate, Investigation No. 332-240, Under Section 332(g) of the Tariff Act of 1930

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Preface

On December 1, 1986, at the request of the Committee on Finance of the U.S. Senate 1/ and in accordance with section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), the U.S. International Trade Commission instituted investigation No. 332-240, U.S. Global Competitiveness: Oilseeds and Oilseed Products Industry. The Commission was asked to provide information on, and analyze, measures of the current competitiveness of the U.S. industry in domestic and foreign markets; the competitive strengths of U.S. and major foreign competitors in these markets; the nature of the main competitive problems facing the U.S. industry; the sources of these problems and to what extent they are transitory or reversible situations as opposed to fundamental or structural problems; and the competitive strategies of U.S. and foreign industries and the importance of global markets to future competitiveness. The Committee selected the oilseeds and oilseed products industry for analysis "because of its status as our second largest agricultural industry and export, and its importance in a wide variety of commercial uses." 2/

Notice of the investigation was given by posting copies of the notice of investigation at the Office of the Secretary, U.S. International Trade Commission, Washington, D.C., and by publishing the notice in the Federal Register (51 F.R. 46947, Dec. 29, 1986). 3/

The Commission held a public hearing on this investigation as well as the five others in this series (investigation Nos. 332-229 through 332-233) at the U.S. International Trade Commission Building in Washington, D.C., on February 24, 1987. The National Soybean Processors Association testified at the hearing. 4/ The American Soybean Association submitted a written statement.

In the course of this investigation the Commission collected data and information from questionnaires sent to the 9 largest U.S. soybean processors. In addition, information was gathered from various public and private sources, industry meetings, foreign fieldwork in Argentina, Brazil, and Malaysia, and public data gathered in other Commission studies and from other sources.

1/ The request from the Committee on Finance is reproduced in App. A.
2/ The specific request for a study on oilseeds and products from the Committee on Finance is reproduced in App. B.
3/ A copy of the Commission's Notice of Investigation is reproduced in App. C.
4/ A list of witnesses appearing at the public hearing is shown in App. D.

CONTENTS

Appendixes

Figures

Tables

Tables--Continued

Tables--Continued

Tables--Continued

Tables--Continued

EXECUTIVE SUMMARY

Oilseeds (particularly soybeans) are the second most important field crop grown in the United States. In 1986, soybeans were raised on about 460,000 U.S. farms, with a farm value of nearly $10 billion. Industrial processing of soybeans and other oilseeds into vegetable oil and oilseed meal, and from there into various consumer products, is also important to the U.S. economy, with 1986 shipments of oil and meal valued at about $22 billion, and with total employment in the entire fats and oils industry of 34,000 persons. In 1986, U.S. exports of oilseeds and oilseed products totaled $6.3 billion, about 20 percent of total U.S. agricultural exports and 3 percent of all U.S. merchandise exports. The downstream impact of the industry on U.S. consumers is also important: vegetable oil is a primary ingredient in such important food products as margarine, cooking and salad oils, and baking and frying fats; and oilseed meal, which is used in animal feed, is a major source of nutrients for poultry, hogs, cattle, and other livestock. Table A presents an industry and market profile for 1982-86.

The U.S. oilseeds and oilseed products industry is an important case study of U.S. competitiveness not only because of its importance in U.S. agriculture and U.S. trade. In addition to its size, the industry has important structural characteristics that may give insight into factors affecting the competitiveness of many U.S. industries. Such structural characteristics include a high degree of concentration, especially by conglomerate firms; the importance of multinational enterprises; the influence on production and trade from both domestic and foreign government policies and programs; and, the sensitivity of U.S. exports to exchange rates and economic conditions in foreign markets. Moreover, the U.S. industry is facing aggressive new competition from producers and exporters abroad that are expanding with the aid of government support, low costs of labor and other inputs, and technology transferred from U.S. sources, including the U.S. Government.

The principal findings of this investigation are as follows:

1. World markets for oilseeds and oilseed products

   o <u>World markets for oilseeds and oilseed products have grown significantly in recent years.</u>

Worldwide consumption of oilseed products has increased significantly in the last several years in response to rising consumption of meat- and vegetable-oil-based food products. Apparent consumption of oilseed meal grew rapidly between 1980 and 1986 in response to growing demand for and production of meat products, peaking at nearly 100 million metric tons in 1986. Worldwide apparent consumption of vegetable oil followed a similar rising trend between 1980 and 1986. Vegetable oil consumption peaked at nearly 47 million metric tons in 1986, up from the 36 million metric tons consumed in 1980. Globally, vegetable oil consumption is more widespread than meal, with significant growing markets in developing countries.

Table A
Profile of U.S. oilseed industry and market, 1982-86

Item	1982	1983	1984	1985	1986	Absolute change, 1986 from 1982	Percentage change, 1986 from 1982
Net sales (million dollars):							
Farm sales of soybeans	12,400	12,800	10,800	10,600	9,600	(2,800)	(23)
Shipments of soybean processors	8,600	9,060	10,000	10,800	11,300	2,700	31
Shipments of fats and oils industry	16,800	17,100	19,600	21,000	21,900	5,100	30
Profits (soybean processors):							
Gross profits (crushing margin) per bushel crushed (in cents per bushel) 1/	28	27	37	35	32	4	14
Net profits of 9-leading processors (million dollars)	63	29	39	111	73	10	16
Ratio of net profits of 9-leading processors to net sales (percent)	.9	.4	.4	1.4	.9	0	0
Capital expenditures (9-leading soybean processors):							
Total (million dollars)	61	52	61	87	72	11	18
Ratio of domestic capital expenditures to net sales (percent)	.9	.8	.7	1.1	.9	0	0
Soybean farms (thousands) 2/	511	498	485	472	460	(51)	(10)
Soybean harvested acreage (million acres)	69	63	66	62	59	(10)	(14)
Soybean mills:							
Actual number 2/	80	78	76	74	73	(7)	(9)
Crushing capacity 2/ (million bushels per year)	1,550	1,550	1,550	1,550	1,550	0	0
Capacity utilization (percent) 2/	71	63	66	68	75	4	-
Industrial employment:							
Total employees engaged in production of—							
Soybean meal and oil (1,000) 2/	9	8	8	8	8	(1)	(11)
All fats and oils (do)	39	38	36	35	34	(5)	(13)
Production and related workers engaged in the production of—							
Soybean meal and oil (do) 2/	6	6	6	5	5	(1)	(17)
All fats and oils products (do)	29	29	27	26	25	(4)	(14)
Production:							
Soybeans harvested (million bushels)	2,190	1,636	1,861	2,099	2,007	(183)	(8)
Soybean oil (million pounds) 1/	12,040	10,872	11,468	11,617	12,703	663	6
Soybean meal (1,000 tons) 1/	26,714	22,756	24,529	24,951	27,553	839	3
Exports:							
Soybeans (million pounds)	56,163	50,054	42,955	38,640	47,053	(9,110)	(16)
Soybeans (million dollars)	6,218	5,913	5,419	3,889	4,316	(1,902)	(31)
Soybean meal (1,000 short tons)	6,847	7,152	4,927	5,198	6,568	(279)	(4)
Soybean meal (million dollars)	1,411	1,527	1,019	871	1,224	(187)	(13)
Soybean oil (million pounds)	2,057	1,732	2,279	1,293	1,190	(867)	(42)
Soybean oil (million dollars)	486	424	742	431	253	(233)	(48)
Subtotal of soybeans and products (million dollars)	8,115	7,864	7,180	5,191	5,793	(2,322)	(29)
Total of all oilseeds and products (million dollars)	9,015	8,574	8,258	5,826	6,335	(2,680)	(30)
Imports:							
Vegetable oils (million pounds)	1,555	1,802	1,617	2,104	2,568	1,013	65
Vegetable oils (million dollars)	386	462	672	630	487	101	26
Total of all oilseeds and products (million dollars)	456	559	764	722	554	98	21
Apparent consumption:							
Soybean crush (million bushels) 1/	1,108	983	1,030	1,053	1,165	57	5
Food fats and oils (million pounds) 1/	12,500	12,500	13,800	14,000	14,000	1,500	12
Protein meal (million tons) 1/	22,100	19,800	22,700	22,000	22,200	100	3/
Trade balance:							
Oilseeds (million dollars)	6,598	6,082	5,915	4,022	4,408	(2,190)	(33)
Vegetable oils (million dollars)	524	382	590	208	150	(374)	(71)
Protein meal (million dollars)	1,436	1,550	1,031	873	1,224	(212)	(15)
Total (million dollars)	8,559	8,015	7,494	5,105	5,781	2,778	(32)
Imports to consumption ratio:							
Oilseeds (percent)	3/	3/	3/	3/	3/	3/	-
Protein meal (percent)	1	1	2	2	2	3/	-
Food fats and oils (percent)	12	14	12	15	18	6	-

1/ Crop year basis, beginning in October of the year shown; data for 1986/87 are preliminary estimates of the U.S. Department of Agriculture in August 1987.
2/ Estimated by staff of the U.S. International Trade Commission.
3/ Less than 0.5 percent.

The major factors driving increased worldwide demand for oilseeds and oilseed products are real income levels and population growth. Rising per capita incomes around the world have stimulated consumer demand for meat and other food products such as margarine and cooking oil, which in turn has boosted the demand for oilseed meal and vegetable oils.

- o <u>Soybean products have declined in importance in world markets for oilseed products</u>.

World consumption of soybean meal increased at an annual rate of 0.8 percent between 1980 and 1986, while overall oilseed meal consumption increased by 2.5 percent annually. As a result, the share of world oilseed meal consumption accounted for by soybean meal fell from 68 to 62 percent during this period. At the same time, world consumption of soybean oil grew by 1.4 percent per year, compared with an annual growth rate of 4.5 percent for all vegetable oils. Consequently, the share of world oil consumption accounted for by soybean oil fell from 34 percent in 1980 to 29 percent in 1986.

Soybeans, soybean meal, and soybean oil all lost market share in world export trade. Between 1980 and 1986, world exports of soybeans declined by 10 percent and their share of world oilseed exports fell from 82 to 76 percent. World soybean meal exports increased by 21 percent during this period, but their share of world exports of oilseed meals declined from 81 to 74 percent. A decline in world soybean oil exports of 11 percent during 1980-86 contributed to its loss of export market share for vegetable oil, dropping from 31 percent to 21 percent.

- o <u>Future demand for oilseeds and oilseed products is likely to grow; the growth rate in vegetable oil demand will probably surpass that in meal demand</u>.

As the world's population becomes not only more affluent but larger, food demand increases. The world's population has grown significantly in recent years, especially in developing economies, continuing a historic trend. As a result, income and consumption growth rates in developing countries currently exceed those in developed countries and will probably continue to do so. Vegetable oil demand is relatively high in developing countries, where it is a supplement to other food staples as incomes rise; meal demand is strong in developed countries where meat demand is high. Thus, oil demand is likely to continue to grow faster than meal demand, which has implications for oilseed markets. Historically, oilseed markets have been fueled by meal demand, and vegetable oil demand has had a secondary effect on such markets. The relatively high growth of oil demand will benefit U.S. soybean producers less than European rapeseed and sunflowerseed producers, because soybeans have a proportionately smaller oil content and a higher meal content than either rapeseed or sunflowerseed. Most affected will be palm oil producers such as Malaysia, for which oil markets are paramount and meal markets are inconsequential.

2. World suppliers of oilseeds and oilseed products

- <u>The United States is the world's largest producer and exporter of oilseeds and oilseed products. Other important suppliers include Brazil, Argentina, the European Community, and Malaysia</u>.

The United States has long been the largest oilseed producer and exporter, concentrating its production and trade in soybeans. U.S. exports of oilseeds (principally soybeans) accounted for 74 percent of world trade in oilseeds in 1986. Other important suppliers of soybeans are Brazil (4 percent of world trade) and Argentina (11 percent). Most exports from Brazil and Argentina are in the form of processed soybean products, particularly soybean meal. In 1986, Brazil supplied 39 percent of world trade in oilseed meals, the United States supplied 31 percent, and Argentina, 22 percent. The European Community (EC) is another important oilseed producer, but concentrates its production on rapeseed and sunflowerseed, not on soybeans. The EC is also a major oilseed product consumer and the major importer of oilseeds and oilseed meals, but accounts for a small share of world exports in such products. An important producer and exporter is Malaysia, which dominates world output and trade in palm oil, a major competitor for vegetable oils made from soybeans and other oilseeds. Malaysian palm oil exports accounted for 45 percent of world vegetable oil trade in 1986.

3. U.S. industry profile

- <u>The U.S. oilseed product industry includes 460,000 soybean farmers in nearly 30 States, and 13 firms operating over 70 soybean processing plants</u>.

Because soybeans are the principal oilseed produced in the United States, accounting for nearly 90 percent of U.S. oilseed production, the Commission focused its investigation on soybean farmers and processors. Other U.S.-produced oilseeds, such as peanuts and cottonseed, are not examined in detail in this investigation.

The soybean farm sector consists of several hundred thousand farmers each producing soybeans and, typically, a variety of other crops such as wheat and corn. Soybean production takes place in nearly 30 States, mostly in the Great Lakes region and the Northern Plains, with additional production in the Mississippi delta and southeastern United States. All soybean farmers are small in relation to the U.S. market, but many farms have joined cooperatives to market their soybeans more effectively. Cooperatives in some States also own and operate processing plants and directly export both unprocessed soybeans and soybean meal and oil.

Soybean processing is undertaken by 13 firms operating over 70 plants. U.S. soybean processing plants are among the most modern and efficient in the world. It is a capital-intensive process, utilizing large machines and requiring large quantities of input (in turn requiring rail or other bulk-transport facilities) to keep plants operating efficiently. The principal variable cost (other than soybeans) is energy; labor is not a significant expense. Processors operate on small gross margins; soybeans are typically 90 percent or more of the ex-plant value of the processed meal and oil.

- <u>Several U.S. processors are vertically integrated upstream into soybean farming and downstream into processed consumer products. Most are also diversified into a variety of agricultural products</u>.

Several processors are directly involved in soybean farming or have invested in joint ventures with farm cooperatives. This ensures supplies of soybeans in tight markets and in some cases allows processors to share in the exporting of soybeans overseas, including to U.S.-owned processing plants abroad. Some large firms also produce and market livestock feed and pet food produced from soybean meal and further process margarine and other consumer food products from soybean oil. Most such products are marketed either to institutions or to other food companies for the latter's brands; few soybean processors package consumer products under their own brand labels.

Most soybean processors are highly diversified agricultural concerns. Some of the world's largest agricultural conglomerates are involved in U.S. soybean processing, including (in alphabetical order) Archer Daniels Midland, Bunge, Cargill, and Continental Grain. Internationally, other firms enter the soybean-processing picture, most importantly the Europe-based Unilever, which also markets food products in the United States through its Lever Brothers subsidiary. Few soybean-processing firms view their soybean operations as pivotal to their existence; many entered the business after developing in size and experience in processing and marketing other commodities.

- <u>The larger U.S. soybean processors are also multinational enterprises operating oilseed processing and marketing facilities in several EC and South American countries</u>.

A central characteristic of the structure of the U.S. soybean-processing industry is the dominant position of multinational firms, including the above-mentioned conglomerates. These firms play important roles in foreign oilseed processing and marketing; indeed, by some reports, the influence these firms have over U.S. processing and trade is surpassed by their influence over world trade, since they have easy access to international transporation and marketing channels and, through their diversification and overseas operations, to vital market information that smaller domestic rivals are unable to obtain.

4. U.S. market

- <u>U.S. markets for soybeans and soybean products have undergone a variety of changes in recent years</u>.

The rapid growth of foreign markets has increased the importance of exports in U.S. shipments and reduced the influence U.S. firms have over prices. Following several years of strong markets and rising prices prior to 1981, export markets in the 1980's have softened as foreign production and trade has expanded. Faced with declining prices, the U.S. Department of Agriculture (USDA) has drawn soybean supplies out of the market to prop up U.S. prices; this has served to maintain farm incomes, but it has also raised soybean costs for soybean crushers and exporters faced with declining prices in export markets. As a result, many U.S. plants are operating at reduced capacity or not at all, and U.S.-based processors are expanding their foreign investments in an attempt to escape relatively high U.S. soybean prices as well as circumvent foreign trade barriers. Despite declining U.S. soybean prices since 1983, the share of world markets held by the U.S. industry has declined.

- Following rapid increases in the 1970's, U.S. prices for soybeans, soybean meal, and soybean oil have declined during the 1980's.

Average annual soybean prices (undeflated) at the farm level rose rapidly during the early and mid-1970's from under $3.00 per bushel to nearly $7.00 per bushel. Prices continued to rise, but more slowly, in the late 1970's, reaching highs in 1979 of $7.57 per bushel and in 1983 of $7.81 per bushel. Prices dropped sharply after 1983; by 1986, the average price was $4.80 per bushel, and the forecast average price for 1987 is $4.85 per bushel, less than two-thirds the record 1983 level.

Average annual prices for soybean meal and oil have followed a similar trend, rising rapidly in the 1970's to peaks in 1980 for meal and 1983 for oil. Since those peak years, average prices fell by 27 percent for meal and by 50 percent for oil in 1986.

5. Levels and trends in U.S. trade

- Exports are an important market for U.S. soybean producers and processors.

Over the past decade, approximately 40 percent of the U.S. soybean crop has been exported as beans, while soybean processors have exported about 26 percent of their soybean meal and 17 percent of their soybean oil. When these quantities of meal and oil exports are converted into soybean-equivalent measures, the share of the U.S. soybean crop sold abroad increases to approximately 55 percent. U.S. exports of soybeans, soybean meal, and soybean oil compete in world markets with a large number of other oilseeds, meals, and fats and oils from other countries, largely on the basis of price, although real or perceived qualitative differences are sometimes important factors.

There have been few or no U.S. imports of soybean products in most years. However, U.S. imports of a significant competing product, palm oil, rose from between 1.7 and 3.5 percent of the total U.S. vegetable oil supply between 1978 and 1985, to 4.3 percent in 1986.

- U.S. exports of soybeans, soybean meal, and soybean oil have declined from their 1979-81 record levels.

U.S. soybean exports climbed from a range of 200 to 300 million bushels per year in the 1960's to a record 929 million bushels in 1981. However, such exports plummeted shortly thereafter to 598 million bushels in 1984, recovering partially by 1987 to a forecast 650 million bushels, or 70 percent of the 1981 peak. As a share of production, U.S. exports increased from a range of 35 to 40 percent during the 1970's to 47 percent in 1981, and then dropped to 34 percent in 1987.

Exports of soybean meal followed a trend similar to that of exports of soybeans, rising from 2 to 4 million short tons in the 1960's to a record 7.9 million short tons in 1979. Since then, exports have fallen to as low as 4.9 million short tons in 1984 and are forecast at 6.7 million short tons in 1987, or 85 percent of the 1979 peak. As a share of production, meal exports rose from 25 to 27 percent during most of the 1970's to a peak of 29 percent in 1979. By 1984, this share had fallen to 20 percent, and in 1987 is forecast at 24 percent.

Soybean oil exports have been even more volatile than meal exports in recent years. Oil exports increased from around 1 billion pounds in the mid-1970's to a record 2.7 billion pounds in 1979 but dropped sharply during the next 7 years to 1.1 billion pounds in 1986. Such exports are forecast to recover in 1987 to 1.5 billion pounds, just over half the 1979 peak. The share of oil production destined for export peaked at 22 percent in 1979, fell to 9 percent by 1986, and is expected to rise to 12 percent in 1987. Exports of soybean oil to less-developed countries, particularly those burdened with external debt, have declined sharply, down by 64 percent between 1980-81 and 1985-86, a decline that accounted for about one-seventh of the overall decline in such exports.

6. Leading competitive factors

- Oilseeds and oilseed products are homogeneous commodities, and price is the principal competitive factor in domestic and world trade. The joint-product nature of meal and oil production can create complex price relationships.

The homogeneous nature of oilseeds and the high substitutability between different oilseed types make their markets highly price-competitive. Within countries, there are no appreciable differences in the quality of soybeans produced by different farmers, and between countries (e.g., the United States versus Argentina) weather- or soil-imparted quality differences are effectively discounted by prices in international markets. For different oilseeds (e.g., soybeans versus sunflowerseed), their meal or oil is highly substitutable in most meal or oil uses, and so their principal competitive difference lies in relative meal/oil content. For given meal and oil prices (and differences in processing costs), such meal/oil content differences are reflected in differences in market prices for the oilseeds themselves. These price differences are generally constant; therefore, a change in soybean prices will cause a corresponding change in sunflowerseed or other oilseed prices, and vice versa. As a result, U.S. soybean exporters face direct competition not simply from other world soybean exporters but from world exporters of many substitutable oilseeds as well.

The same high degree of price competitiveness is true for world trade in oilseed meal and oil, which are also homogeneous products. The price relationships between meal and oil of different oilseeds are generally less complex than for oilseeds themselves because of the single-product nature of these commodities; meal demand is unaffected by demand for vegetable oil, and vice versa. However, supply-side market fluctuations can be complex, such as when rising oil prices induce increased supply of oil and of its joint product, meal, which would in turn tend to depress meal prices.

- <u>Favorable transportation costs and infrastructure development increase the global competitiveness of the U.S. industry</u>.

The United States has an advantage over its major soybean rivals, Brazil and Argentina, in the cost of shipping soybeans to major markets in Europe and Japan. For example, the freight cost for U.S. soybeans shipped to Rotterdam in 1986 was $12.62 per metric ton, compared with $16.50 for Brazil and $18.50 for Argentina. The U.S. advantage in transportation cost can be explained by the shorter ocean distances between these importing areas and U.S. ports, by depressed barge rates on the Mississippi River, and by the higher transportation costs that Argentina and Brazil incur in getting soybeans from the farm gate to the port, the result mainly of the lack of a low-cost inland transportation system in these countries. In contrast, U.S. soybeans can be shipped from any major producing State to port by truck, barge, or train.

However, although the United States maintains a transportation cost advantage over Brazil and Argentina, the f.o.b. cost of soybeans in the United States is higher because the fixed costs of soybean production are higher in the United States than in either Brazil or Argentina. The f.o.b. cost of U.S. soybeans in 1986 was about $268 per metric ton, compared with $242 in Brazil and $185 in Argentina. Thus, the U.S. transportation cost advantage is more than offset by its fixed cost disadvantage.

- <u>Government intervention in the United States and in other countries has contributed to the decline in U.S. shares of world markets</u>.

The USDA operates a loan-support program for soybean farmers, triggered by domestic prices falling below an annually adjusted price floor. A major purpose of this program is to stabilize and support U.S. soybean prices by inducing farmers to default on the loan and surrender their crop to USDA inventory when prices reach the price floor, thus forcing a withdrawal by the USDA of soybeans from the market. Only occasionally necessary in the past because of strong markets, the program has become important in recent years as export prices have fallen. However, by supporting U.S. soybean prices, the loan-support program has caused U.S. exports of soybeans to be less competitive with less-regulated foreign supplies. In addition, it keeps U.S. processors' soybean costs artificially high, preventing them from competing as effectively in world meal and oil markets. As a result, U.S. shares of world export markets for soybeans and soybean products have declined in recent years.

Foreign government practices also adversely affect U.S. exports. An important example is the EC Common Agricultural Policy, which has boosted domestic oilseed output in this important U.S. export market, causing a decline in EC demand for oilseed imports. The program keeps imported oilseeds from being price competitive with local supplies, and by encouraging the growth of the local processing sector, also reduces the EC demand for imported meal and oil.

- <u>Global economic conditions and trends in exchange rates contribute to declining U.S. export performance</u>.

The worldwide recession of the early 1980's and the foreign-debt crisis suffered by many developing countries have slowed demand for U.S. exports of oilseed products in several important markets. Demand in developing countries depends on rising incomes; the combination of recession, foreign debt, and a strong U.S. dollar prior to 1985 dampened such demand, and, in some cases, encouraged foreign production to reduce dependence on U.S. exports.

Developing country debt problems have persisted to the point that they are now a medium- to long-term phenomenon. Contiuned slow growth of the world economy precludes easy opportunities to work off debt, so that, absent other breakthroughs in easing their debt burden, incentives remain high for such soybean competitors as Argentina and Brazil to continue government programs to enhance and expand exports of oilseeds and their products.

While recent depreciation of the dollar may benefit some sectors of the U.S. economy, that prospect is not so clear for oilseeds. Because major export producers include developing countries with debt problems, their currencies have continued to depreciate against the dollar through mid-1987. Most growth in demand for oil is in developing countries which are expanding their own sources, protecting their markets, and permitting little if any appreciation against the dollar. Thus two of what might be considered transitory aspects of the present outlook appear unlikely to reverse patterns and will probably continue to adversely affect U.S. producers and exporters of oilseeds and oilseed products.

7. Outlook for 1988 and beyond

- <u>The U.S. industry has built up several competitive strengths in international trade that will continue to be important in the future</u>.

The competitive strengths of the U.S. industry include high crop yields and soil productivity, efficient transportation systems and other infrastructure, and sophisticated marketing abilities, both domestic and global. These strengths are largely the result of industry efforts, the success of which has come about in part from experience in the production, processing, and marketing of other agricultural products. Also significant, particularly for crop yields, is government-sponsored research and development, especially that of the USDA.

- <u>Despite these competitive strengths, the U.S. industry faces numerous external impediments to international growth</u>.

Such impediments include barriers to foreign markets, foreign and domestic government policies and programs, slow and irregular world economic growth, debt problems in developing countries, and fluctuating exchange rates, and--most important--the technological capability for significant expansion of soybean and palm oil production in several competing countries, expansion that only needs the right global market conditions to come on line and further erode U.S. market shares. These impediments, unlike the competitive strengths, are largely outside the industry's control. Some, like market barriers, have been dealt with by multinational expansion, particularly the acquisition by U.S. oilseed crushers of processing facilities located within important foreign markets.

Other impediments are medium- to long-term in nature, and may prove difficult to counteract. One such impediment is developing-country debt, which boosts oilseed production and export in some countries (for example, Argentina) and reduces import demand in others (such as Venezuela). Another is government intervention; both U.S. and foreign government policies relating to oilseed production and/or markets are pervasive and well-entrenched, their importance is not likely to be reduced in the near future. Thus, they will probably continue to have detrimental effects on U.S. oilseed trade in the future.

CHAPTER 1. INTRODUCTION

General

This is a report on an investigation of the global competitiveness of the U.S. oilseeds and oilseed products industry. The investigation was instituted on December 1, 1986, at the request of the U.S. Senate Committee on Finance, which requested the Commission to undertake a series of competitiveness studies (of which this is one) on "the competitive strengths and viability of [the oilseeds and oilseed products industry], the extent and nature of competition facing [this industry] in foreign and domestic markets, and the extent to which any current trade problems result from special situations ... or from more fundamental competitive problems." The Committee selected the oilseeds and oilseed products industry for analysis "because of its status as our second largest agricultural industry and export, and its importance in a wide variety of commercial uses."

Scope of the Investigation

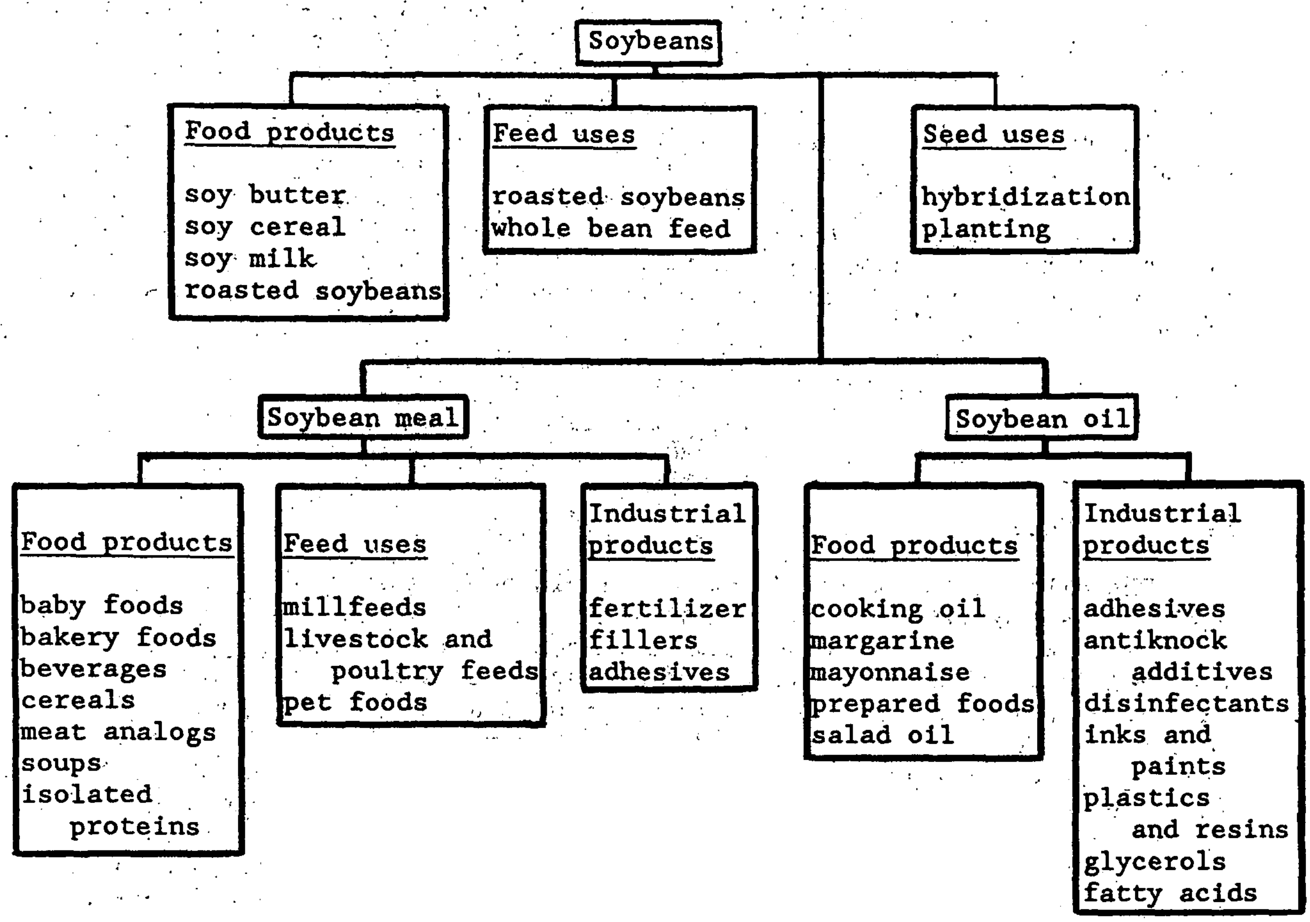
Product coverage

The oilseeds and oilseed products included here encompass a large group of agricultural commodities. Virtually all plant seeds contain some vegetable oil. Included here are those seeds with a high oil content from which vegetable oil is commercially extracted. Also included are vegetable oils extracted from oleaginous (oil bearing) fruits and other plant parts (e.g., palm oil). Not included are edible nuts, other than peanuts, even though they are high in oil content, since their oil is typically not extracted. Also not included is cocoa butter, the oil expressed from cocoa beans and used primarily in the manufacture of chocolate, for which use it has no competitors. The most commercially important vegetable oil sources are soybeans, oil palm, rapeseed, sunflowerseed, copra, cottonseed, peanuts, and flaxseed. Other sources include olives, corn, castor beans, and safflowerseeds.

Most oil-bearing crops are produced specifically to obtain the oilseed or oleaginous fruit. In other instances, the oilseed is produced as a byproduct of the production of something else; e.g., cotton is grown to produce the fiber and cottonseed is obtained as a byproduct, and corn oil is produced from corn germs obtained as byproducts in the corn wet-milling process that produces starch and sweeteners (high fructose corn sirup).

Oilseeds are processed into vegetable oil and meal by pressing (squeezing) the oilseed or, more typically in modern mills, through solvent extraction of the oil. (See fig. 1-1 for the major products and uses of an important oilseed, the soybean, and its products, soybean meal and oil.) Vegetable oils are typically refined (bleached, deodorized, and, in some cases, hydrogenated) into cooking oils, margarine, shortening, mayonnaise, salad dressings, and other consumer products. For many of these uses the vegetable oils compete with each other and, for certain uses, they compete with animal fats and oils. For example, several vegetable oils compete with each other in the

Figure 1-1.--Principal uses for soybeans, soybean meal, and soybean oil



production of margarine, which in turn competes with butter. Similarly, vegetable oils compete with each other in the production of cooking oils and shortening, which in turn compete with lard. These oilseed products are an important part of the diet of developed country populations, and in developing countries they serve as a common "step up" from the staple grains on which millions depend.

Oilseed meal is an important component of animal feed, providing much of the protein in the diets of poultry, livestock, and other animals on which people around the world depend for meat products. Oilseed meals vary in protein content and protein quality depending on the oilseed from which they were processed. However, the oilseed meal from each type of oilseed has a typical standard protein content. Oilseed meals compete with each other and with other protein-rich feeds (e.g., corn gluten feed, corn gluten meal, fish meal, and tankage) principally on the basis of price per unit of protein; however, certain oilseed meals are better suited than others for use in feeding particular classes of livestock.

<u>Time frame</u>

Generally, the period covered in this study is 1979-1986. For some purposes, data for earlier years are presented, and preliminary data for 1987, when available, are also presented. This period was chosen because 1979-81 marked a major turning point for the U.S. oilseeds and oilseed product industry; it was the peak of decades of U.S. industry growth and gains in world market shares, after which prices, market shares, and export volumes began to decline. The succeeding period, through 1986, represents a reversal of the industry's expansion, and must be examined in its entirety. However, the industry's decline in the 1980's cannot be understood without an examination also of the preceding growth years; thus, where appropriate, discussion of the factors propelling the industry in the 1970's is also included.

Background of the Investigation

<u>World trade in oilseeds and products</u>

World trade in oilseeds is highly complex for several reasons. First, it is an immense trade, involving all major economies and many minor ones. World oilseed exports in 1986 totaled an estimated $9 billion, vegetable oil exports $7 billion, and oilseed meal exports about $4 billion. Second, virtually all oilseed products fall into one of two product groups, oil or meal, that are joint products; the output level of each depends on that of the other since they are produced in fixed proportions from a common raw material, the soybean or other oilseed. Particularly for soybeans, which are about 80 percent meal, meal demand is the driving force in production; hence, the world's supply of vegetable oil depends more on meal prices than on oil prices. Third, oilseeds and oilseed products trade is carried out by only a handful of firms--large multinational agricultural conglomerates, most of which operate marketing and processing facilities in several countries. These trading companies are with only a few exceptions privately held, and their actions and strategies do not yield easily to outside examination; additionally, they deal in many cases with government trading agencies, further confounding analysis of the economics of oilseed trading. Fourth, the world oilseed market is politically charged, focused as it is on the trading of large volumes of vital food products. In the early to mid-1970's, and again in 1980, oilseeds (and grains) have been the subject of a number of politically and economically motivated U.S. export trade embargoes and, by one characterization, a "great grain robbery," 1/ a reference to the heavy purchases by the Soviet Union of U.S. grain and oilseeds in the early 1970's, an action which pushed up prices of bread and other products in the United States.

Oilseeds have been cultivated and consumed in various forms for centuries, but only in this century have world production and demand grown large enough to justify significant world trade in oilseed products. This lag represents the time it took to develop significant livestock industries that required prepared feed (as opposed to pastureland) and to shift demand from animal fats and oils to vegetable fats and oils. During this century, in fact, mostly since World War II, these two factors have become very important in shaping food consumption in the world generally and in the developed countries in particular. As a result, oilseeds, especially the soybean, have grown in stature in U.S. agriculture. Previously considered a minor forage crop, oilseeds now enjoy the status of being one of the two or three commercially most important agricultural crops in the world.

The U.S. role in world oilseed trade

The United States has long been the largest producer and exporter of oilseeds and oilseed products. U.S. oilseed farmers and processors have concentrated their production in soybeans, by far the world's most important oilseed. Following a period of several decades of continually rising oilseed demand and prices, U.S. exports of oilseeds and oilseed products peaked in 1981 at $10.2 billion, or almost 50 percent of world oilseeds and oilseed product exports. In that year, such U.S. exports accounted for 24 percent of all U.S. agricultural exports and 4 percent of all U.S. merchandise exports.

Emerging competitors

Since the peak in U.S. oilseed exports in the early 1980's, oilseed prices have declined significantly in the United States and in markets abroad. The value of U.S. exports has likewise fallen, owing to declining volume more than to declining prices. Meanwhile, foreign oilseed output has increased, forcing the United States to accept a shrinking share of world oilseed trade, down from 82 percent in 1982 to 74 percent in 1986. Once the unchallenged dominant force in world oilseed trade, the United States now faces new and vigorous competition from an array of traditional suppliers,

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1/ James Trager, The Great Grain Robbery, New York: Ballentine Books, 1975.

most importantly soybeans and soybean products from Brazil and Argentina and palm oil from Malaysia, as well as emerging producers within the European Community (EC) and other net importers such as India. In addition, trade barriers are being strengthened in important markets, including the EC.

Important issues in oilseed trade

Atypically for the U.S. agricultural farming and processing sectors, there is general agreement in the industry on which domestic and international factors are affecting world oilseed trade patterns and the U.S. role in such trade. The major issues center on the broad category of government trade practices, those of the U.S. Government as well as foreign governments. Other significant issues include the inroads in world markets made by Southeast Asian palm oil, assisted by production cost advantages. However, some U.S. consumer groups view the growth of palm oil production and consumption as potentially damaging to consumer health because of palm oil's relatively high saturated fat content. There are related industry concerns about consumer awareness (or lack thereof) of differences between various vegetable oils.

With respect to government trade policies, the Commission has examined in this report many U.S. and foreign government policies, both export-inhibiting and export-enhancing policies, that directly concern U.S. oilseed interests. There are many reasons why agriculture is an economic sector that is almost universally supported by industrialized-country governments; two of the most important are the generally weak market power of individual farmers, and the inelastic demand for and supply of many agricultural products and the resulting wide price swings such products experience.

To counter these problems, government intervention in the form of price-support programs and import quotas or other market protection policies is commonly used to stabilize domestic markets. However, the relatively high domestic prices that result tend to stimulate more domestic output, and may also attract imports into the market and/or boost the costs incurred by exporters of the domestic products. Both results appear to have taken place in world oilseed trade; price-support programs in the EC, for example, raise prices in that market and attract imports, putting pressure on the EC to block import competition, much of which comes from the United States. In the U.S. market, soybean price supports often raise the costs incurred by soybean exporters and by processors and exporters of soybean oil and meal; this gives U.S. exporters a competitive disadvantage when competing with foreign rivals that are not subject to similar home-country price supports.

Another important government policy is preferential tax treatment; an example is that found in Argentina, which is alleged by U.S. oilseed interests to promote the export of Argentine soybean meal and oil at prices less than the market value of the soybeans from which they were processed. Such government policies alter the composition, and possibly the total volume, of oilseed product trade, in this case by restricting the world's export supply of beans and increasing that of oil and meal. The effects (real or alleged) on U.S. competitiveness of such policies are clear: U.S. exporters of oil and meal have difficulty competing with foreign rivals that enjoy such discounted soybean costs; the increased supply of oil and meal depresses their world prices, which is transferred by exporters back to soybean farmers in the form of lower soybean prices, or increased government soybean inventories if prices fall to the loan support level.

A similar cost advantage is enjoyed by Malaysian exporters of palm oil, although there is less clear evidence that this advantage results from government policies rather than simple cost differentials in farming and processing.

These and other trade issues point to one main fact: the structure of the world oilseed market is rapidly changing. New producing regions are emerging and new products are being introduced; producers and consumers must deal with government policies in some countries that are designed to promote production and exports and in others to block imports and protect domestic producers; and, trade is carried out by a complex network of multinational grain trading companies and State trading agencies that themselves impart distortions in world oilseed trade from the economist's ideal of "pure" competition.

Investigation Methods

Analyzing the myriad technological, geographical, political, and economic factors that shape world oilseed trade requires an appropriate analytical framework in which all such factors can fit. For this investigation, the Commission has taken the approach of emphasizing the role played by industry structure in influencing firm and industry performance (or, in an international context, competitiveness). Factors in an industry's structure include industry concentration, relative cost levels and size economies, vertical integration, diversification into other product lines, and government support or other involvement, among others. Examining industry structure can shed light on the important elements of domestic and foreign markets that have either enhanced or diminished U.S. competitiveness.

The effect industry structure has on competitiveness can be seen in an example, such as size economies. This is a major component of industry structure, because it influences firm size and industry concentration and, of course, average costs of production or processing. Firm size and concentration, in turn, affect firm behavior and the nature and degree of competition in the industry, which largely determines the competitiveness of the industry in international markets.

An obvious question in a study of "competitiveness" is the definition of this slippery concept. 1/ Competitiveness is not easily defined, least of all by a simple ratio or other single measure. Rather, it is a combination of

1/ For an extended discussion of the definition of competitiveness, see U.S. International Trade Commission, "Review of Literature on Competitiveness and Methodological Concerns," App. D of U.S. Global Competitiveness: Building-Block Petrochemicals and Competitive Implications for Construction, Automobiles, and Other Major Consuming Industries (investigation No. 332-230), USITC Pub. 2005, Aug. 1987.

measures and indicators. As the international-trade counterpart of domestic industry performance, it includes at a minimum such domestic industry measures as efficiency in production (that is, production at minimum average cost) and social equity in resource allocation (that is, pricing at marginal cost), research and development (R&D) as a source of continued technological progress, labor productivity, and return on investment.

Extended to the global sphere, the concept of competitiveness changes somewhat. Now, instead of an industry-wide concept, it refers to the relative performance of a nation's industry vis-a-vis foreign rivals competing in the same world market, similar to the way a single firm may be competitive compared with its domestic rivals. Relative-performance measures are now included in the definition of competitiveness: comparisons of share of world consumption or exports, relative input cost levels, profit rates, labor productivity, and R&D rates, among others, with the corresponding measures for rival producers. Not all these measures can be quantified, mainly because sufficient data do not exist, particularly for foreign industries. To the extent possible, however, the Commission has assembled information on the structures of both the U.S. industry and its major foreign competitors, and examined them for their possible effects on U.S. competitiveness.

It is clear that this approach is suitable for analysis of the oilseed industry, particularly the processing sector. Most of the firms involved are very large: of those whose shares are traded on U.S. securities exchanges, five were listed among the 1986 "Fortune 500"; in addition to these firms, there are a number of other (similarly large) privately owned or foreign firms operating in the industry. Many of these firms own and operate oilseed facilities worldwide, a characteristic that significantly shapes the structure of the industry. Despite several oligopolistic characteristics, the industry deals in notably homogeneous products, including soybeans and soybean meal and oil, which face numerous substitutes. The fungibility of these products helps maintain price competition as an important form of rivalry among firms and between national industries.

Equally important in influencing the structure and competitiveness of the U.S. oilseeds and oilseed product industry is the pervasive impact of government involvement, both domestically and worldwide. This involvement affects critical aspects of the firms' operations, including the prices and available quantities of inputs and outputs, and the decision-making with respect to overseas operations. Although it is only one factor affecting industry structure, government involvement (and public policy) must be carefully analyzed for its impact on industry competitiveness. Much of this report focuses on the programs and policies of the U.S. Government and foreign governments as they relate to oilseed product markets and producers.

The investigation of the soybean processing industry was carried out through the combined analysis of information from published sources, as well as information obtained through staff interviews with company representatives, government agency officials, and academic researchers, both in the United States and abroad, and data obtained from oilseed processors from Commission questionnaires. Much of the information sought in this investigation has been the focus of earlier or narrower studies in other government agencies or other institutions; these studies were consulted and integrated in the current investigation to avoid duplication of effort.

Objectives of the Investigation

The objective of this study is to determine those factors that have important impacts on U.S. competitiveness in world oilseed trade and assess what those impacts are. No prescriptions are made or implied, but the findings are intended to be useful in objective analysis and policymaking in regard to the U.S. response to recent changes in the world oilseed product market.

CHAPTER 2. GLOBAL MARKET DIMENSIONS

Overview

Global markets for oilseeds and oilseed products, like those of many other primary commodity markets, have generally experienced slower growth in recent years than during the boom period of the late 1970's and early 1980's. While world demand for oilseed meals and vegetable oils has risen steadily since 1980, world supply of these commodities has risen even faster. Thus, although the volume of trade has increased, and trade as a percent of world production has increased, world prices have generally been falling as global markets are adjusting to these excess supplies. In addition, these markets have also been adjusting to changing patterns of consumption, production, and trade.

Consumption

World consumption of all oilseed products has increased steadily over the last several years (table 2-1). 1/ The best way to examine this increase is to examine the increases in consumption of the two primary oilseed products, meal and oil. Consumption of oilseed meals, essentially the result of increasing production of meat products, reached a record 98.9 million metric tons in 1985/86 (table 2-2). This increase of slightly less than 14 million metric tons represents a 2.5 percent average annual growth rate since 1979/80. Oil consumption rose to 47 million metric tons in 1985/86, a 4.5 percent annual increase since 1979/80 (table 2-3).

World consumption of soybean meal and oil increased at slower rates over this period than consumption of all oilseed meals and oils, and exhibited different trends. Soybean meal consumption increased erratically and reached 61.0 million metric tons in 1985/86 for a 0.8 percent annual increase. Soybean oil consumption also increased erratically over the period reaching 13.5 million metric tons in 1982/83 and the same level in 1985/86, for an overall annual growth rate of 1.4 percent.

Since soybean products are the dominant U.S. products in world markets, these differences in rates of growth in consumption are one indicator of the potential loss of competitiveness of soybean products in these markets. Viewed in terms of market share, soybean meal accounted for 68 percent of world oilseed meal consumption in 1979/80 and 62 percent in 1985/86 (table 2-2). Other oilseed meals increased their respective shares of world consumption, with rapeseed meal and sunflowerseed meal showing the largest gains. The share of world vegetable oil consumption accounted for by soybean oil also showed a significant loss over the period. The share held by soybean oil fell from 34 percent to 29 percent, as palm oil, sunflowerseed oil, and rapeseed oil all increased their shares of world consumption (table 2-3).

1/ Although tables 2-1, 2, and 3 list figures for 1986/87, these figures are preliminary and shown only for the information of the reader. The firmer figures for 1985/86 are used as the period-ending figures for this chapter.

The patterns of consumption of meals and oils can be described either geographically or by degree of economic development. As expected, the major developed countries account for the largest share of meal consumption, with the European Community (EC), the United States, and Japan combined consuming more than one-half of the total in 1985/86 (fig. 2-1). The EC was the largest consumer of oilseed meals, with 31 percent of world consumption. The United States was a distant second with a 17-percent share, and Japan followed with 5 percent. Eastern Europe, the USSR, and China accounted for another 20 percent of world consumption.

By contrast the EC, the United States, and Japan accounted for only 40 percent of world vegetable oil consumption, while all the other areas consumed proportionately more oil than meal. For example, India and Pakistan accounted for 6 percent of world meal consumption and 9 percent of world oil consumption.

Factors determining world consumption

The factors affecting worldwide demand for and the increase in consumption of oilseeds and oilseed products include rising world population, changes in real incomes, prices, and government programs. These factors affect not only total world demand for these products but also the distribution of consumption according to geography and income.

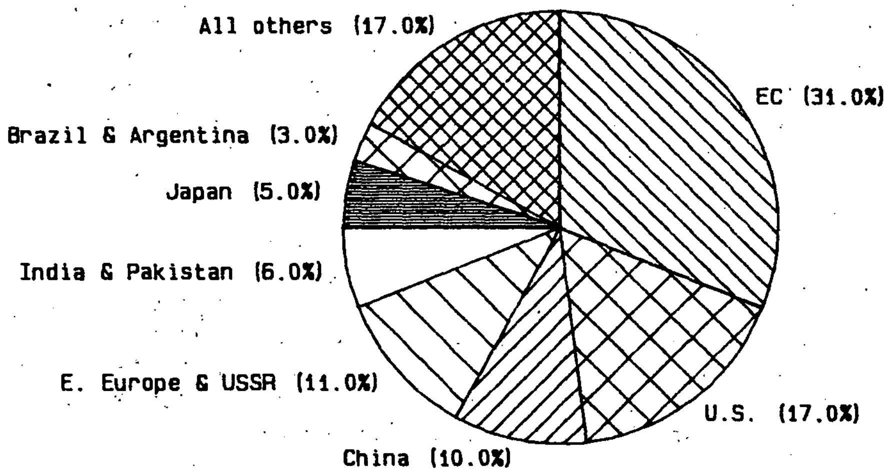
Population growth.--As the world's population increases, demand for food increases. Since the products of the oilseeds industry are primarily either staples in human diets (oils) or inputs for the production of other basic foods (meals for livestock), population growth directly affects demand for these basic commodities. The world's population continues to grow, especially in developing countries. The population in industrial market economies grew by 0.9 percent annually between 1965 and 1980, by 0.6 percent annually between 1980 and 1985, and is projected to grow by 0.4 percent annually between 1985 and 2000. 1/ In low-income developing economies, the corresponding annual growth rates are 2.3, 1.9, and 1.9, and these rates are approximately the same in middle-income developing economies. 2/ These rates, taken by themselves, suggest a continuation of the long-run growth in food demand, particularly for the dietary staples provided by oilseed products.

Reduced growth in real incomes.--Although long-term rising per capita income around the world has stimulated consumer demand for meat and other food products such as margarine and cooking oil, in turn boosting the demand for oilseed meals and oils, slower economic growth in this decade has dampened growth in world demand. Since 1979, growth in real gross national product (GNP) in both industrial and developing countries has slowed in comparison to the rapid growth in the previous decade. During 1969-78, real GNP rose by an average 3.4 percent annually in industrial market economies and by 6.1 percent in developing countries. 3/ However, during 1979-86, these rates fell to 2.6 and 3.0 percent, respectively. This relatively slower economic growth in the 1980's, particularly in developing countries, has affected oilseed product demand.

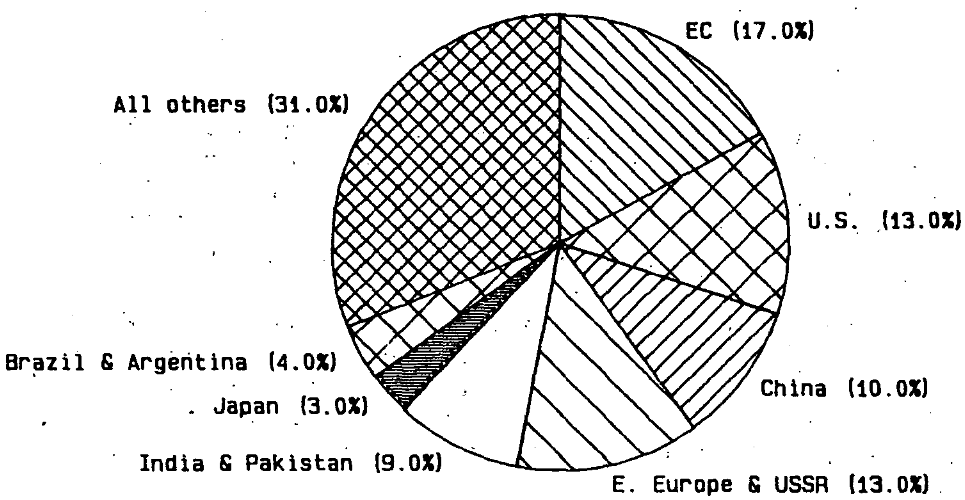
1/ The World Bank, World Development Report 1987, New York: Oxford University Press, 1987, pp. 254-255.
2/ Ibid.
3/ International Monetary Fund (IMF), World Economic Outlook, Apr. 1987.

Figure 2-1: World Consumption in 1985/86, by Region

Meal



Oil



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

As noted above, demand for oilseed products is asymmetrical across income levels: high-income economies support markets for meat, thereby creating a demand for protein-rich oilseed meals, while low-income economies consume proportionately less meat and more high-calorie vegetable oil. Thus, while increasing real incomes in general would suggest increasing meat (and oilseed meal) consumption, the relatively faster economic and population growth in developing countries suggest a continuation of the recent global trend of oil consumption to grow more rapidly than meal consumption.

Declining prices.--While changes in prices do not technically change the demand for oilseed products, they do affect the quantity demanded, and consumption of oilseed products does tend to respond to changes in prices. Thus, the absolute and relative price movements during the 1980's have affected the quantities, patterns, and value measures of consumption. The general decline in prices in recent years has offset some of the dampening effect of reduced income growth and contributed to increased consumption. These price changes are discussed later in this chapter.

Government programs and other factors.--Government programs, particularly those that affect the price of either substitutes for oilseed products, or the prices of the products such as meat products that are produced from oilseed products, affect the demand for oilseed products. For example, high internal prices for grains in the EC, coupled with high internal prices for meat products, serve to increase the demand for oilseed meals.

The demand for industrial products, such as resins, paints and varnishes, plastics, and fatty acids, has a minor effect on consumption of oilseeds. Only a small, low-valued share of oilseed output is destined for such uses.

Production

World production of major oilseeds rose during 1979/80 to 1985/86 by 28.6 million metric tons, from 167.5 million metric tons to 196.1 million metric tons or by an average 2.7 percent annually (table 2-1). The five primary oilseeds, soybeans, cottonseed, sunflowerseed, rapeseed, and peanuts, account for approximately 95 percent of world production.

While production of each of the primary oilseeds increased, the differences in production growth rates illustrate the challenges to the competitive position of the long dominant soybean. The following tabulation shows the increase in production and average annual growth rates during 1979/80-1985/86 for the primary oilseeds:

Oilseed	Increase in production	Average annual growth rate
	(Million metric tons)	(Percent)
Rapeseed	8.5	10.7
Cottonseed	5.4	3.3
Sunflowerseed	4.2	4.1
Peanuts	3.3	3.0
Soybeans	3.2	.6

Rapeseed, cottonseed, sunflowerseed, and peanuts accounted for nearly 75 percent of the growth in world oilseed production. Over this period, soybeans fell from 56 to 51 percent of world production, while the other four oilseeds together grew from 40 to 44 percent.

The increase in oilseed meal production over this period essentially paralleled that of oilseeds (table 2-2). Total meal production increased from 85.9 million metric tons to 97.9 million metric tons, or by 2.2 percent annually. Rapeseed meal, cottonseed meal, and sunflowerseed meal accounted for more than 70 percent of the total increase, while soybean meal and peanut meal each accounted for less than 1 percent of the growth. Soybean meal still dominates meal production, although its share fell from 69 to 61 percent over the period.

World vegetable oil production increased from 37.5 million metric tons to 47.8 million metric tons over the period, or by 4.1 percent annually. The following tabulation shows the increase in production and average annual growth rates during 1979/80-1985/86 for the primary vegetable oils:

Vegetable oil	Increase in production	Average annual growth rate
	(Million metric tons)	(Percent)
Palm oil	3.3	9.1
Rapeseed oil	2.8	10.5
Sunflowerseed oil	1.6	4.7
Cottonseed oil	.3	1.5
Soybean oil	.4	.5
Peanut oil	.0	.0

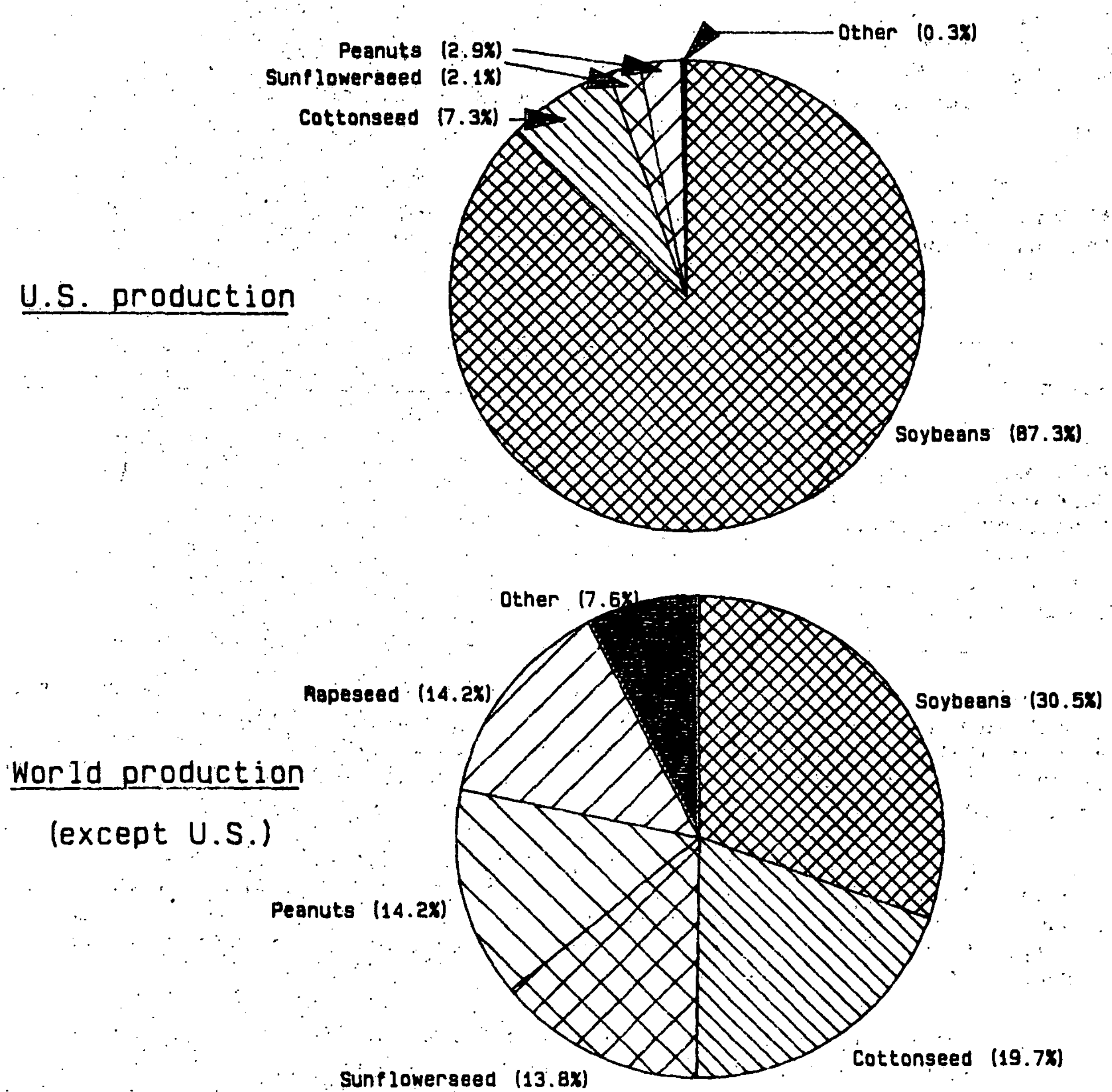
Palm oil, rapeseed oil, and sunflowerseed oil accounted for 75 percent of the growth in world vegetable oil production. Soybean oil, which accounted for approximately 35 percent of world production in 1979/80, dropped to 30 percent in 1985/86, as the others, particularly rapeseed oil and palm oil, posted large production increases.

The relative decline of soybean products is of particular importance to the United States since soybeans account for nearly 90 percent of U.S. oilseed production and the U.S. contributes nearly 60 percent of the world soybean supply. As fig. 2-2 illustrates, this concentration in soybeans is markedly different from the rest of the world.

The largest producers of oilseeds are the United States, China, Brazil, Argentina, USSR, India, and the EC. Together, they produced about three-fourths of the world's supply in 1985/86 (table 2-4). Only Brazil shows a concentration in soybeans like the United States. The other major producers have their production more evenly distributed across two or more of the primary oilseeds.

Oilseed meal is produced primarily by those countries producing the oilseeds. The United States produces about one-fourth of the world total. Brazil and Argentina combined produce about one-sixth and China accounts for nearly one-sixth. The EC also supplies about one-sixth of the world meal production, however most of this production comes from crushing imported oilseeds.

Figure 2-2: Oilseed production by type, 1985/86



Source: Official statistics of the U.S. Department of Agriculture

World production of vegetable oils from oilseeds naturally follows the distribution of the crush of the oilseeds. The major producers of these oils are China, the United States, and the EC. Malaysia, by virtue of its palm oil production, is the fourth largest producer.

Factors determining world production

The factors affecting world supply and the increase in world production of oilseeds and oilseed products include increasing acreage and/or yields, prices, and government programs. These factors, acting together, have kept supply ahead of demand during this decade.

Area and yields.--World area planted to the five primary oilseeds increased during the 1980's reaching 132.3 million hectares in 1985/86 after averaging 127.3 million hectares annually for the previous five years. 1/ Soybean area, at 51.7 million hectares in 1985/86 was up only slightly. Cottonseed area, at 32.0 million hectares was down slightly, while the area planted to peanuts rose slightly to 18.3 million hectares. Rapeseed area and sunflowerseed area each increased more than 2 million hectares to 15.0 and 15.3 million hectares, respectively.

In contrast to the trend in the rest of the world, oilseed area in the United States has fallen to 31.0 million hectares in 1985/86, after peaking at 36.8 million hectares in 1979/80. The area planted to soybean, sunflowerseed, and cottonseed have all decreased, while the area in peanuts has remained essentially unchanged.

Yields have increased since the late 1970's as well, with the average yield for 1985/86 about 10 percent greater than the average yield of the previous five years. Yields are by no means equal throughout the world. For example, soybean yields in the United States and Argentina exceeded 2.1 metric tons per hectare in 1985/86 while those in Brazil and China were less than 1.5 metric tons per hectare. Rapeseed yields in Europe are far higher than in other areas, over 2.5 metric tons per hectare in the EC compared to 1.2 metric tons per hectare in China and Canada and less than 0.7 metric ton per hectare in India. 2/

Both area and yield increases have contributed to the rising oilseed production in the 1980's. The increase in resources allocated to oilseed production has occurred despite falling prices for oilseed products in world markets.

Government programs.--As with many agricultural commodities, governments play a significant role in stimulating the production of oilseeds and oilseed products. The programs of the major competitors and markets are described in the following chapters. It is sufficient to note here that such programs have been a major factor in this industry and may well be the dominant factor determining the competitiveness of the various countries' industries in world markets.

1/ USDA/FAS, World Oilseed Situation, Dec. 1986, (FOP 12-86).
2/ Ibid.

<u>Trade</u>

World trade in oilseeds and oilseed products is an important component of world agricultural trade. From 1979 through 1984, trade in oilseeds and oilseed products ranged from $20.0 billion to $22.7 billion and accounted for approximately 10 percent of total agricultural trade. 1/ Although complete data are not yet available for 1985 and 1986, it is believed that falling prices have offset the increased volume of oilseed product trade with the result that both its value and share of all agricultural trade have fallen significantly.

On a volume basis, world exports of oilseeds remained largely unchanged from 1979/80 through 1985/86 ranging from 33.0 to 36.0 million metric tons except for 1980/81 (table 2-1). However, given the production increases, exports as a percent of production have fallen from 21 to 19 percent. Soybeans dominate oilseed trade, accounting for more than 75 percent of world exports.

Oilseed meal exports meanwhile rose by more than 30 percent, or by 4.6 percent annually (table 2-2). Globally soybean meal dominates trade, although its share has fallen from over 80 percent to about 75 percent as trade in rapeseed meal and sunflowerseed meal increased in relative terms. Nearly 40 percent of the soybean meal produced in 1985/86 was traded internationally, as compared with 25 percent of the sunflowerseed meal and 17 percent of the rapeseed meal.

Vegetable oil exports also rose by more than 30 percent over the period (4.7 percent annually) (table 2-3). Palm oil is the leader, with about 35 percent of the export market in 1985/86, followed by soybean oil (24 percent), sunflowerseed oil (14 percent) and rapeseed oil (8 percent). Soybean oil exports actually fell during the period while the other four increased. In most years, nearly two-thirds of world palm oil production has been traded while about 25 to 30 percent of soybean oil production enters the export market. For rapeseed oil and sunflowerseed oil, the shares of production going for export have been increasing and in 1985/86 were 24 percent and 33 percent, respectively.

<u>Leading exporting countries</u>.--The United States, Argentina, and Brazil accounted for nearly 90 percent of world oilseed exports in 1986 (table 2-5). The four exporters of oilseed meals, the United States, Argentina, Brazil, and the EC, supplied 97 percent of reported world exports in 1986 (excluding intra-EC trade). Malaysia, Argentina, the EC, Brazil, the United States, and the Philippines supplied nearly 90 percent of world vegetable oil exports in 1986.

<u>Leading importing countries</u>.--The EC is the destination for over half of the world's exports of oilseeds and nearly two-thirds of the world's exports of oilseed meals. As the dominant market for oilseeds and oilseed meals, the EC has a major influence on world oilseed trade. The total EC market (excluding intra-EC trade) for oilseeds fell from 16 million to 14 million metric tons during 1978-86, whereas its oilseed meal imports remained constant at

1/ Estimated from official data of the United Nations (UN) and IMF.

12 million tons (see ch. 4). The shrinking EC market for oilseeds outside EC-member countries heightened competition among non-EC suppliers, and the increased exports of other suppliers except the United States came about largely as a result of diminished exports from the United States. According to UN data, in 1979 the United States supplied 76 percent of oilseed exports and 30 percent of oilseed meal exports going to the EC; by 1986, the U.S. shares of EC imports of oilseeds and oilseed meal were 70 and 24 percent, respectively.

Japan and Taiwan together take another one-fifth of the world's exports of oilseeds. Eastern Europe and the USSR are also major markets for oilseeds and oilseed meals. Although a leading consumer of oilseed products, China is also a leading producer and is essentially self-sufficient, importing some vegetable oil, primarily palm oil, and exporting small amounts of oilseed meal and soybeans. India and Pakistan are major markets for vegetable oils.

Prices.--After a several-decade-long period of almost continually rising prices, nominal oilseed product prices have fallen since the early 1980's in response to the increased world supply of oilseeds and dampened demand. Moreover, since world prices of the different types of oilseeds, vegetable oils, and oilseed meals have tended to move in tandem over the years, nearly all of the different oilseed products have experienced falling prices (fig. 2-3). The price of U.S. soybeans in the EC (Rotterdam), for example, rose to a record high $310 per ton in 1980/81, and then declined irregularly by nearly one-third to $209 per ton in 1986/87, the lowest level since the early 1970's (table 2-6). Rotterdam prices of rapeseed and sunflowerseed followed a similar pattern. Similarly, oilseed meal prices set a record in 1980/81, declined thereafter to a low in 1984/85, and then recovered somewhat through 1986/87. Soybean oil prices fluctuated sharply from 1978/79 to 1983/84 peaking in the latter year at $722 per ton (Rotterdam), and thereafter declined steadily to the lowest level since 1971 in 1986/87.

Figure 2-3a.--World oilseed prices
crop years 1979/80-1986/87

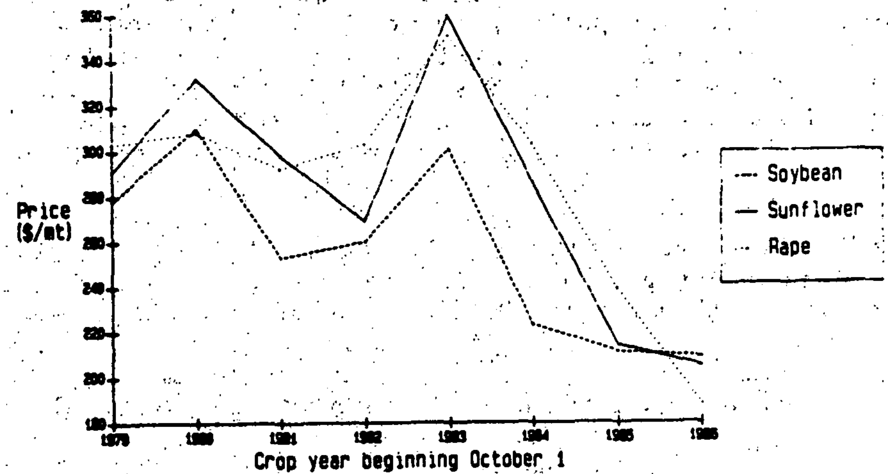


Figure 2-3b.--World oilseed meal prices
crop years 1979/80-1986/87

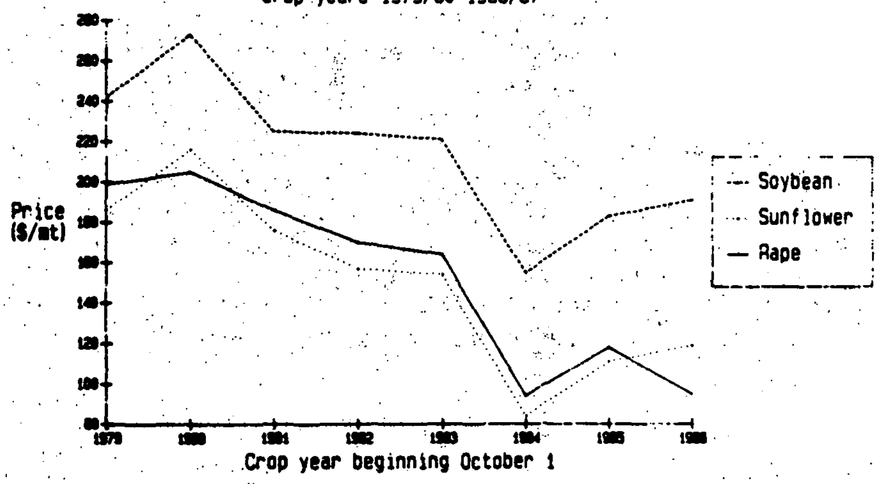


Figure 2-3c.--World prices of vegetable oils
crop years 1979/80-1986/87

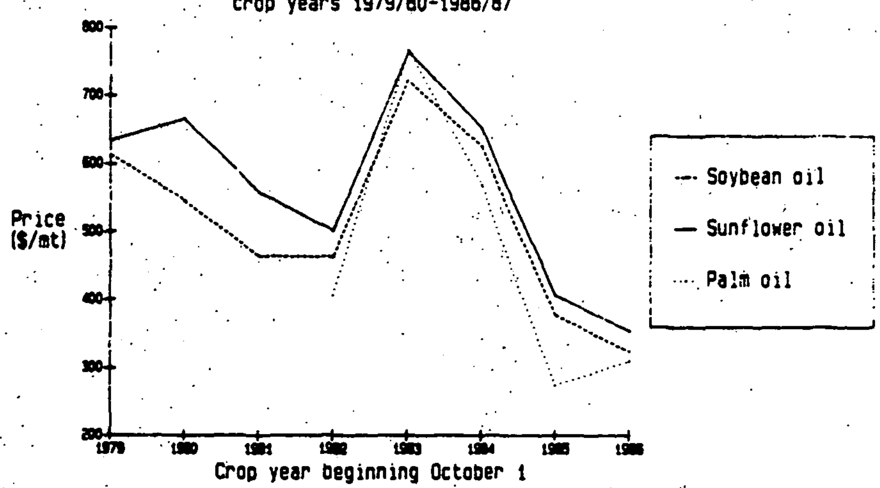


Table 2-1
Major oilseeds: World production, exports, and crush, crop years 1979/80 to 1986/87 1/

(Million metric tons)

Product	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/	1979/80-1985/86 Net change	1979/80-1985/86 Average annual growth rate
Production:										
Soybeans.......	93.7	80.8	86.1	93.6	83.2	93.1	96.9	98.3	3.2	0.6
Cottonseed.....	25.2	25.6	27.5	26.7	26.1	33.9	30.6	27.1	5.4	3.3
Sunflowerseed..	15.3	13.1	14.8	16.6	15.4	18.0	19.5	19.0	4.2	4.1
Rapeseed.......	10.1	11.1	12.4	14.8	14.3	17.0	18.6	19.7	8.5	10.7
Peanuts........	17.1	16.0	19.9	17.5	18.8	19.8	20.4	20.3	3.3	3.0
Other..........	6.1	6.6	8.7	8.7	8.0	9.3	10.1	10.0	4.0	8.8
Total........	167.5	153.2	169.4	177.9	165.9	191.1	196.1	194.4	28.6	2.7
Exports:										
Soybeans.......	29.1	24.6	29.3	28.6	26.2	25.3	26.1	28.5	-3.0	-1.8
Cottonseed.....	.2	.2	.2	.2	.3	.3	.3	.3	.1	7.0
Sunflowerseed..	2.7	1.9	2.1	1.9	2.0	2.2	1.9	1.8	-.8	-5.7
Rapeseed.......	2.1	2.3	2.1	2.4	2.5	3.1	3.6	4.5	1.5	9.4
Peanuts........	1.2	1.2	1.1	1.0	1.0	1.0	1.3	1.3	.1	1.3
Other..........	.0	.6	1.2	.9	1.0	1.1	1.2	1.3	.9	26.0
Total........	35.6	30.8	36.0	35.0	33.0	33.0	34.4	37.7	-1.2	-.6
Crush:										
Soybeans.......	74.6	71.7	72.2	76.2	70.9	73.7	76.2	82.8	1.6	.4
Cottonseed.....	19.8	21.0	21.7	21.4	21.1	26.7	23.9	21.3	4.1	3.2
Sunflowerseed..	12.4	11.7	12.6	14.2	13.7	15.8	16.7	16.4	4.3	5.1
Rapeseed.......	8.7	10.5	12.0	13.8	13.3	15.4	16.8	18.3	8.1	11.6
Peanuts........	10.4	9.7	11.2	9.7	10.1	10.5	10.8	10.5	.4	.6
Other..........	5.8	5.9	8.3	8.1	7.5	8.4	9.7	9.2	3.9	8.9
Total........	131.7	130.5	131.0	143.4	136.6	150.5	154.1	158.5	22.4	2.7

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Preliminary figures.

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

Table 2-2
Major oilseed meals: World production, exports, and consumption, crop years 1979/80 to 1986/87 1/

(Million metric tons)

Product	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/	1979/80-1985/86 Net change	1979/80-1985/86 Average annual growth rate
Production:										
Soybean........	59.5	56.7	57.3	60.5	55.3	58.1	60.1	65.2	0.6	0.2
Cottonseed.....	9.3	9.7	10.2	9.9	9.7	12.6	11.1	9.9	1.8	3.0
Sunflowerseed..	5.7	5.4	5.8	6.7	6.4	7.3	7.7	7.5	2.0	5.1
Rapeseed.......	5.2	6.2	7.4	8.4	8.1	9.4	10.1	11.0	4.9	11.7
Peanut.........	4.2	3.9	4.6	3.9	4.1	4.3	4.4	4.3	.2	.8
Other..........	2.0	2.4	3.5	3.6	3.7	4.1	4.5	4.3	2.5	14.5
Total........	85.9	84.3	88.8	93.0	87.3	95.8	97.9	102.2	12.0	2.2
Exports:										
Soybean........	19.0	20.1	20.7	23.3	21.4	22.3	23.0	25.6	4.0	3.2
Cottonseed.....	.9	.8	.8	.8	.7	.8	1.0	.9	.1	1.8
Sunflowerseed..	.8	.7	.9	1.3	1.3	1.7	1.9	1.4	1.1	15.5
Rapeseed.......	.5	.8	.8	.8	1.2	1.5	1.7	2.0	1.2	22.6
Peanut.........	1.0	.7	.6	.6	.6	.5	.5	.6	-.5	-10.9
Other..........	1.4	1.4	2.4	2.3	1.9	2.4	2.9	2.8	1.5	12.9
Total........	23.6	24.5	26.2	29.1	27.1	29.2	31.0	33.3	7.4	4.7
Consumption:										
Soybean........	58.1	56.6	57.9	59.8	55.8	58.9	61.0	65.4	2.9	.8
Cottonseed.....	9.2	9.7	10.1	10.0	9.7	12.4	11.1	10.0	1.9	3.2
Sunflowerseed..	5.8	5.5	5.8	6.8	6.4	7.2	7.8	7.7	2.0	5.1
Rapeseed.......	5.3	6.0	7.2	8.5	8.2	9.5	10.0	11.0	4.7	11.2
Peanut.........	4.2	3.9	4.6	4.0	4.2	4.2	4.5	4.3	.3	1.2
Other..........	2.6	2.3	3.7	4.6	3.4	5.1	4.5	4.3	1.9	9.6
Total........	85.2	84.0	89.3	93.7	87.7	97.3	98.9	102.7	13.7	2.5

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Preliminary figures.

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

Table 2-3
Major vegetable oils: World production, exports, and consumption, crop years 1979/80 to 1986/87 1/

(Million metric tons)

Product	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/	1979/80-1985/86 Net change	1979/80-1985/86 Average annual growth rate
Production:										
Soybean........	13.2	12.8	12.7	13.6	12.8	13.3	13.6	14.7	0.4	0.5
Cottonseed.....	3.2	3.2	3.2	3.1	3.1	3.9	3.5	3.1	.3	1.5
Sunflowerseed..	5.0	4.7	5.0	5.6	5.5	6.2	6.6	6.5	1.6	4.7
Rapeseed.......	3.4	4.0	4.4	5.0	4.9	5.6	6.2	6.7	2.8	10.5
Palm...........	4.8	5.2	6.0	5.9	6.3	6.9	8.1	8.0	3.3	9.1
Peanut.........	3.1	2.9	3.3	2.9	2.9	3.0	3.1	3.0	.0	.0
Other..........	4.8	5.3	5.6	6.0	5.3	6.8	6.7	6.2	1.9	5.7
Total........	37.5	38.1	40.2	42.1	40.8	45.7	47.8	48.2	10.3	4.1
Exports:										
Soybean........	3.6	3.4	3.5	3.7	4.0	3.7	3.2	3.8	-.4	-1.9
Cottonseed.....	.4	.4	.6	.4	.3	.4	.4	.2	.0	.0
Sunflowerseed..	1.1	1.2	1.2	1.6	1.6	1.9	2.2	1.8	1.1	12.2
Rapeseed.......	.6	.8	.8	.8	1.0	1.3	1.3	1.6	.7	13.7
Palm...........	3.7	3.4	3.9	4.0	3.5	4.4	5.4	5.2	1.7	6.5
Peanut.........	.4	.3	.4	.5	.3	.3	.3	.3	-.1	-4.7
Other..........	2.0	2.5	2.1	2.5	2.1	2.5	2.8	3.0	.8	5.8
Total........	11.8	12.0	12.5	13.5	12.8	14.5	15.6	15.9	3.8	4.8
Consumption:										
Soybean........	12.4	12.6	12.9	13.5	13.0	13.0	13.5	14.0	1.1	1.4
Cottonseed.....	3.2	3.3	3.2	3.1	3.1	3.8	3.4	3.1	.2	1.0
Sunflowerseed..	4.7	4.5	4.9	5.3	5.6	6.0	6.3	6.5	1.6	5.0
Rapeseed.......	3.3	4.0	4.3	4.9	4.8	5.5	5.9	6.6	2.6	10.2
Palm...........	4.5	4.9	5.5	6.0	5.9	6.5	8.1	8.4	3.6	10.3
Peanut.........	3.1	2.9	3.3	2.8	3.0	3.1	3.0	3.0	-.1	-.5
Other..........	4.8	5.2	6.9	5.8	5.5	5.8	6.8	6.4	2.0	6.0
Total........	36.0	37.4	41.0	41.4	40.9	43.7	47.0	48.0	11.0	4.5

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Preliminary figures.

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

Table 2-4.
Major oilseeds: Production, by principal producers, average during 1980/81-1984/85 and annual 1985/86 and 1986/87

(Million metric tons)

Product/producer	Average for 1980/81-1984/85	1985/86	1986/87
Soybeans:			
United States	51.6	57.1	52.8
Brazil	15.3	14.1	17.3
China	9.2	10.5	11.7
Argentina	5.1	7.3	7.3
EC	.0	.3	.9
Other	6.2	7.6	8.3
Total	87.4	96.9	98.3
Cottonseed:			
China	6.9	7.1	6.0
United States	4.3	4.8	3.5
U.S.S.R.	5.0	4.8	4.9
India	3.0	3.7	3.2
Pakistan	1.5	2.5	2.6
Brazil	1.3	1.5	1.1
Other	5.8	6.0	5.8
Total	27.8	30.4	27.1
Sunflowerseed:			
U.S.S.R.	4.9	5.2	5.3
Argentina	2.3	4.1	2.3
Eastern Europe	2.1	2.0	2.8
United States	1.9	1.4	1.2
China	1.3	1.9	1.4
EC	1.5	2.6	3.3
Other	1.6	2.2	2.7
Total	15.6	19.4	19.0
Rapeseed:			
China	4.1	5.6	5.9
EC	2.5	3.7	3.7
Canada	2.5	3.5	3.8
India	2.5	3.0	2.8
East Europe	1.3	2.0	2.3
Other	1.0	1.2	1.2
Total	13.9	19.0	19.7
Peanuts:			
India	6.3	5.2	5.9
China	4.0	6.7	5.9
United States	1.6	1.9	1.7
Other	6.6	6.6	6.8
Total	18.5	20.4	20.3

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

Table 2-5.
Oilseeds and oilseed meals: World export market shares, by leading suppliers, 1979-86

(In percent)

Supplier	1979	1980	1981	1982	1983	1984	1985	1986
Oilseeds:								
United States	73	74	75	82	79	71	63	74
Argentina	10	9	8	6	5	12	13	11
Brazil	2	5	5	2	4	5	13	4
Canada	9	7	8	6	7	8	9	9
All other	6	4	5	4	4	4	3	1
Total	100	100	100	100	100	100	100	100
Oilseed meals:								
United States	36	38	31	31	28	24	23	31
Argentina	9	8	7	10	13	20	20	22
Brazil	30	35	42	39	38	40	44	39
EC-12	4	5	6	8	11	8	9	6
All other	21	14	14	11	9	8	4	3
Total	100	100	100	100	100	100	100	100
Vegetable oils:								
United States	17	16	14	13	16	13	8	9
Argentina	7	7	5	7	6	11	12	14
Malaysia 1/	34	31	37	41	45	29	29	45
EC-12	12	11	12	12	3	12	12	10
Philippines	9	8	10	8	8	5	5	10
All other	31	25	22	22	22	30	34	11
Total	100	100	100	100	100	100	100	100

1/ Commission staff estimate based on USDA data and fieldwork.

Note.--Totals may vary because of rounding. Data for the EC exclude intra-EC exports among EC member countries.

Source: Derived from data of the United Nations, except as noted.

Table 2-6
Oilseeds and oilseed products: World prices, crop years, 1979/80 to 1986/87

(a) Oilseeds:

Year beginning October 1—	Soybean U.S. 1/	Soybean U.S. 2/	Soybean Brazil 3/	Soybean Rott 4/	Peanuts U.S. 5/	Peanuts Rott 6/	Sunflowerseed U.S. 7/	Sunflowerseed Rott 8/	Rapeseed Rott 9/
	(U.S. dollars per metric ton)								
1979/80	234	240	255	278	451	939	197	291	303
1980/81	272	274	287	310	542	1843	242	332	308
1981/82	219	224	243	253	573	900	236	298	292
1982/83	224	229	242	260	567	885	209	269	303
1983/84	275	274	284	301	578	980	312	360	351
1984/85	209	210	215	223	533	713	241	286	303
1985/86	187	188	196	211	531	857	175	214	239
1986/87	180	183	192	209	602	836	152	205	188

1/ U.S. farm price. 2/ U.S. No. 1 yellow cash central Illinois. 3/ Rio Grande, Brazil FOB. 4/ Rotterdam CIF; U.S. No. 2 yellow. 5/ U.S. farm price; in-shell basis. 6/ Rotterdam CIF; edible peanuts shelled basis. 7/ U.S. farm price. 8/ Rotterdam CIF; U.S./Canada. 9/ Rotterdam CIF, Canada 40% oil.

(b) Protein meal:

Year beginning October 1—	Soybean U.S. 1/	Soybean Brazil 2/	Soybean Rott 3/	Cottonseed U.S. 4/	Cottonseed Rott 5/	Sunflowerseed U.S. 6/	Sunflowerseed Rott 7/	Peanut U.S. 8/	Peanut Rott 9/	Rapeseed Hamb 10/
	(U.S. dollars per metric ton)									
1979/80	201	214	242	181	201	106	186	186	224	199
1980/81	241	247	273	217	226	122	216	236	260	205
1981/82	201	212	225	172	196	117	176	197	195	186
1982/83	206	213	224	195	172	110	157	214	189	170
1983/84	207	203	221	210	173	123	154	231	197	164
1984/85	138	141	155	110	97	58	84	156	N/A	94
1985/86	171	175	183	147	115	75	111	N/A	166	118
1986/87	179	179	191	164	136	84	119	N/A	161	95

1/ Decatur FOB; average wholesale 44 percent protein. 2/ Rio Grande, Brazil FOB; bulk rate 45-56 percent protein. 3/ Rotterdam CIF; U.S. 44 percent pro fat. 4/ Memphis FOB; 41 percent protein solvent extraction. 5/ Denmark CIF; pellets 38 percent protein. 6/ Minneapolis FOB; 28 percent protein. 7/ Rotterdam CIF; Argentina-Uruguay pellets 37-38 percent. 8/ Southeast mills FOB; 50 percent protein. 9/ Rotterdam CIF; Indian 48 percent protein. 10/ Hamburg FOB; ex-mill 34 percent protein.

(c) Vegetable oil:

Year beginning October 1—	Soybean U.S 1/	Soybean Brazil 2/	Soybean Rott 3/	Cottonseed U.S. 4/	Cottonseed Rott 5/	Sunflowerseed U.S. 6/	Sunflowerseed Rott 7/	Peanut U.S. 8/	Peanut Rott 9/	Palm Malay 10/	Rapeseed Rott 11/
	(U.S. dollars per metric ton)										
1979/80	536	570	613	559	680	575	634	609	784	N/A	587
1980/81	500	496	545	569	666	594	666	892	1111	N/A	510
1981/82	419	443	463	443	582	550	557	609	667	N/A	438
1982/83	454	444	463	481	611	495	501	647	588	406	436
1983/84	674	685	722	717	844	742	765	1104	1035	767	696
1984/85	651	609	625	643	763	662	652	878	914	569	586
1985/86	399	342	377	389	513	422	406	655	644	274	338
1986/87	339	301	324	391	491	352	354	575	511	310	297

1/ Decatur average wholesale tank crude. 2/ Rio Grande, Brazil FOB; bulk rate. 3/ Dutch FOB; Ex-Mill. 4/ Valley points FOB; tank cars crude. 5/ Rotterdam CIF; US PBSY. 6/ Minneapolis FOB. 7/ Rotterdam; ex-mill. 8/ Southeast mills FOB; tank cars crude. 9/ Rotterdam CIF; any origin. 10/ Malaysia FOB; RBD. 11/ Rotterdam FOB; ex-mill.

Note.—Annual prices shown are simple averages of monthly prices.

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

CHAPTER 3. OILSEED COMPLEX OF THE UNITED STATES

General

The U.S. oilseed complex, or system of products and producers, centers on the soybean and its derivatives, soybean meal and oil. Other oilseeds, particularly cottonseed, sunflowerseed, peanuts, and flaxseed, are grown by U.S. farmers, but soybeans are the predominant type, accounting for a growing share of U.S. oilseed production. Soybeans accounted for 89 percent of the U.S. production of oilseeds in the 1986/87 crop year (ending September 30), up from 82 percent in 1977/78 (fig. 3-1). The soybean is also distinguished from other oilseeds by the direct influence of meal and oil demand on its production; many other oilseeds are byproducts whose production is influenced by fiber markets (cottonseed), edible nut markets (peanuts), or other nonoilseed product markets (e.g., beef tallow). For these reasons, this chapter focuses on the farming and processing of soybeans, with only passing attention given to U.S. production and trade in other oilseeds and oilseed products.

The following discussion examines separately the soybean farm sector and the soybean processing sector. The main reason for splitting the oilseed and oilseed product industry into these two sectors (which is also the structure of the following chapters on Argentina, Brazil, and the European Community (EC)) is that they are distinctly different stages in the production and marketing of oilseeds and oilseed products. The sectors are differentiated by their end products, production methods, industry concentration and other structural elements, and the impacts experienced from Government policies and from foreign competition.

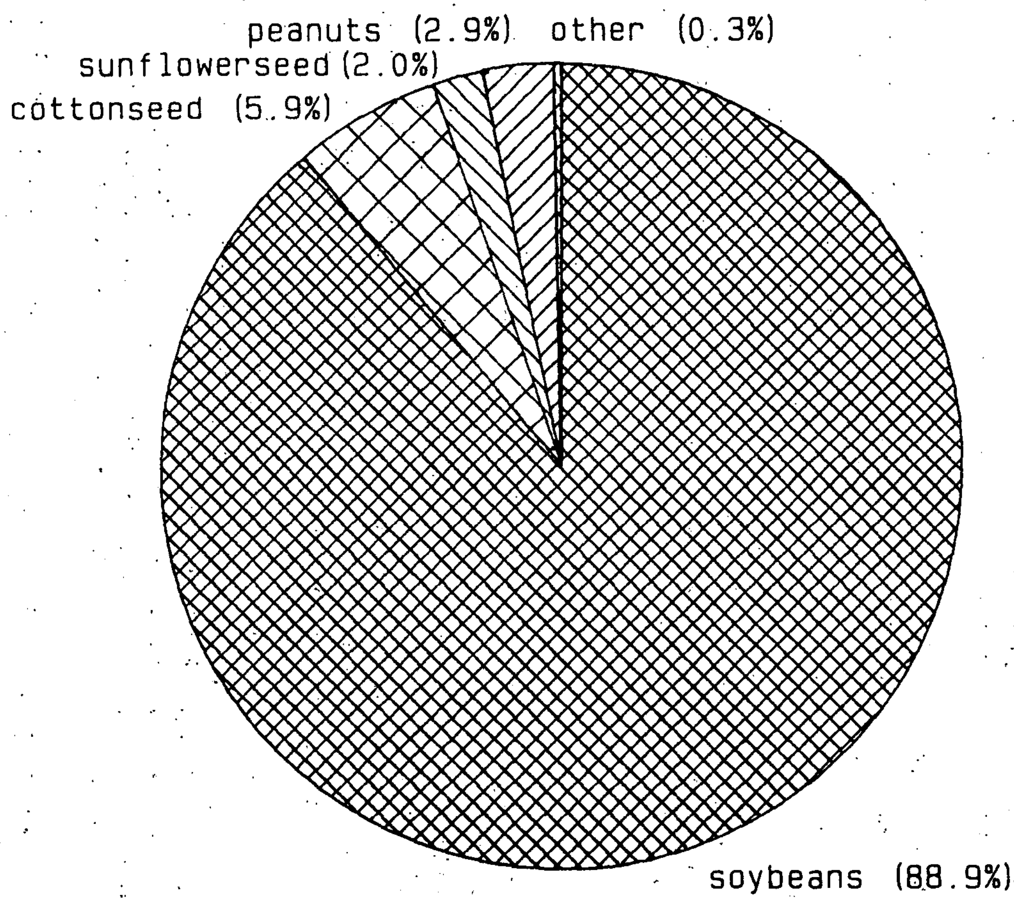
Structure of the U.S. Soybean Farm Sector

Soybean farmers are the base upon which the U.S. oilseed complex rests. Their ability to efficiently supply dependable quantities of soybeans determines U.S. soybean export performance and largely determines the ability of oilseed crushers to supply U.S. and foreign consumers of oilseed meal and vegetable oil. Farmers produce and compete subject to the constraints of land quality, climate, Government programs, crushers' market power, and the uncertainty in increasingly important export markets.

Soybeans are a homogeneous commodity grown in almost every region of the United States. Soybean planting is concentrated, however, in the Midwest and Northern Plains. Planted from mid-May to mid-June, depending on the region, soybeans are ready for harvest from September through late November. Following harvest, soybeans are sold to local grain elevators or farmers' cooperatives for transport to export facilities, or to crushers for processing.

Soybean farmers in most regions rotate soybeans with other crops, usually corn or wheat. Crop rotation maintains long-run soil quality; soybeans and other legumes produce nitrogen, which the soil absorbs, replacing that which corn and other grains leech from the soil. Machinery and technology for these other crops are similar to that used for soybeans, thus increasing the flexibility farmers have in switching crops in response to changing market

Figure 3.1
U.S. oilseed production by type 1986/87



conditions. Thus, a farmer's decision to grow soybeans is dependent not only on soybean profitability, but on the expected returns from growing alternative crops, or even the return from land used as pasture for livestock. Soybean production can therefore be influenced through indirect channels, including the U.S. Department of Agriculture (USDA) "set aside" program for wheat or corn farmers, in which crop-rotating farmers reduce acreage in wheat or corn and thus may also reduce their soybean output. 1/

Size of the soybean farm sector

Declining soybean prices, along with the USDA set-aside program and other factors, have compressed the soybean farm sector, both the number of farms and harvested acreage. This is a reversal of the expansion of the sector in the 1960's and 1970's, during an extended period of rising soybean prices. The growing markets in these earlier decades prompted a rise in the price of soybeans relative to other crops and an expansion of soybean planting. Expansion took place in regions that, because of a natural propensity for high soil erosion, low rainfall, or other factors, were not economical for soybeans at previous low prices. However, since the early 1980's, declining soybean prices and Government acreage set-aside programs have caused a contraction in planted soybean acreage, as farmland has been reconverted to alternative crops, or left for forest or pastureland.

Number of farms, harvested acreage, and production.--The soybean farm sector has grown from virtual insignificance in the early part of this century to the second most valuable U.S. agricultural crop (behind corn). By the late 1960's, roughly one-sixth of all U.S. farms (450,000 out of a total of 2.7 million) were planting soybeans. 2/ During the agricultural boom of the 1970's, the sector grew further, reaching 550,000 farms by 1978. Soybean markets weakened after 1981 and the sector shrank, declining to 511,000 farms in 1982 and, assuming the number of soybean farms has declined at least proportionately with the decline in all cash-grain farms, the number would be about 460,000 in 1987. This estimate is somewhat higher than the reported membership of the American Soybean Association of 425,000 farms in 1987.

U.S. harvested acreage increased from 42 million acres in 1970 to 70 million acres in 1979, before declining to 59 million acres in 1986; acreage is projected to decline further in 1987 (table 3-1). This trend in harvested acreage follows the decline in the number of soybean farms.

U.S. production of soybeans doubled between 1970 and 1979, from 1.13 billion bushels to a record 2.26 billion bushels, the combined result of increased acreage and increased yield per acre (table 3-1). This represents a (compound) average increase of 8 percent annually. Since 1979, production has declined only slightly compared with the significant decline in acreage, because of the generally increasing yield per acre. Between 1979 and 1986, production declined by an average of 2.2 percent annually, to 1.94 billion bushels, and is projected to increase to 1.97 billion bushels in 1987.

1/ As discussed later, farmers are prevented from using land set aside from what or corn production under USDA programs for increased soybean production.
2/ USDA, Economic Research Service, Soybeans: Background for 1985 Farm Legislation, Washington, DC, U.S. Department of Agriculture, Agriculture Information Bulletin No. 472, pp. 1-4.

Regional distribution.--The effects of changing market conditions on the size of the soybean farm sector can be seen from a different angle by examining the regional growth and decline of the farm sector. Historically, the dominant region for soybean production has been the Great Lakes/Corn Belt States, with additional acreage planted in the Northern Plains States. When soybean prices rose in the 1970's, additional land, primarily in the Southeastern States and the Mississippi River delta, was brought into soybean production. Since 1981, weak markets have forced a cutback of output in these southern regions (table 3-2). Thus, the relative importance of the traditional Corn Belt and Northern Plains States has increased; although soybeans were planted in 29 States in 1986, the traditional region alone accounted for 82 percent of total output in that year, up from 66 percent in 1979.

Costs and revenues for soybean farming

Most soybeans are raised on cash-grain farms. 1/ Financial and operating characteristics of U.S. cash-grain farms in 1982 are shown in table 3-3. In the Corn Belt region where most soybean farms are concentrated, the average farm had assets of $503,668, an amount approximately equal to the assets of the average U.S. farm of $499,531. According to the USDA, the average U.S. cash grain farm had assets of $309,000 in 1987, a drop of nearly 40 percent from 1982. 2/ Most of this decline in asset value was attributable to declining land values. For the average U.S. farm, 88 of a total 498 acres were planted in soybeans.

Average national costs of production in the United States.--The trend in soybean farm costs in recent years depends on how one calculates such costs. Cash expenses (seed, fertilizer, electricity, etc.) have remained relatively unchanged, fluctuating around an average of $112.62 per planted acre during 1983-85 (table 3-4). However, full economic costs (including return to labor and capital, excluding interest expenses) fell during 1983-85, from $189 to $170 per planted acre, or by 10 percent during the period. The principal cause of the decline in costs was reduced land rent, which has been reflected in diminishing farmland values in recent years.

This rent-based decline in farming costs must be interpreted carefully. It applies only to those farms that rent, rather than own, their land, and only to that portion of a farmer's land that is rented. Farmers that own their land suffered a greater loss than land-renting farmers insofar as landowners experienced a decline in asset value. If the land was mortgaged, landowners also faced the risk of bankruptcy because of declining revenues (see below) and fixed mortgage payments. Landowners that rent their land to tenant farmers likewise suffered losses in asset value, which were reflected in the reduced rent receipts. Landowning farmers have therefore not enjoyed the same decline in costs as land renting farmers. Even for landrenters, however, the decline in costs was less than the decline in revenues, as discussed later.

1/ A cash grain farm is defined by the U.S. Census Bureau as a farm whose sales of cash grains constitute more than one-half of the total cash receipts.
2/ USDA, Economic Research Service, Financial Characteristics of U.S. Farms, Jan. 1, 1987, Washington, DC, August 1987, pp. 83 and 114.

Regional costs of production in the United States.--Costs of production for U.S. soybean farmers vary considerably across regions, and are affected by annual changes in crop yields. During 1980-85, the average variable cost of production of a bushel of soybeans, as computed by the USDA, fluctuated between $1.62 and $2.28. Per bushel variable costs peaked in 1983, a drought year of substantially lower yields. In 1985, favorable yields and lower acreage planted (presumably with the elimination of higher cost and marginally producing land) resulted in the lowest costs of the 6-year period. As shown in table 3-5, the Lake States/Corn Belt and Northern Plains regions have substantially lower costs of production than do soybean farmers in the Delta and Southeast regions. In 1985, soybean farmers in the Lake States/Corn Belt had variable costs about 16 percent below the national average, whereas the variable costs of Southeast farmers were 72 percent above the average.

The recent decline in the average variable cost of U.S. soybean production reported in table 3-5 was the result in part of higher-cost land in the southern and southeastern States being forced out of production, with a corresponding decline in overall U.S. production. The remaining land was more efficient to begin with; hence, the remaining soybean output was produced at lower average variable cost.

Of greater significance for U.S. competitiveness, however, is the fact that in each region average variable costs declined during 1983-85. This was true even for the Lake States/Corn Belt and Northern Plains regions, where in table 3-2 it is reported that soybean output actually increased. Declining average variable costs in these two regions at a time when output was rising runs counter to the expected observation, namely, an increase in cost associated with increased output. Thus, these data suggest that there has been a real improvement in efficiency and competitiveness in U.S. soybean farming in recent years, caused by rising per acre yields and more efficient use of fertilizer and energy, among other factors (table 3-4).

Farm revenues.--In recent years, revenues from soybean farming have fallen from the highs of the late 1970's and early 1980's. Such high revenues were achieved from the combined effects of rising output and rising prices. Likewise, the recent decline in revenues has been caused by the declining output marketed at reduced prices. On a per-acre basis, cash receipts for soybean farmers fell by 20 percent between 1983 and 1985, because of sharply lower prices, which fell by nearly 40 percent during 1983-85 (table 3-4). This drop in receipts was less than the drop in prices because of a 30-percent improvement in average soybean yield per acre. This decline in gross cash receipts, less the costs described earlier, left farmers with a per-acre net return of $61.75 in 1985, down by 38 percent from the 1983 net return of $99.64.

Gross farm revenues received by U.S. soybean farms declined from a record high of $15.7 billion in 1979 to $9.4 billion in 1986, or by 5 percent. 1/ During this period, soybean production decreased by 14 percent, from 2.26 billion bushels to 1.94 billion bushels (table 3-1), and in the same period, the average farm price of soybeans fell by 31 percent, from $6.81 to $4.70 per bushel.

1/ Estimate based on production volumes and average farm prices from 1979 to 1986.

The causes of the decline in U.S. soybean prices are largely tied to the export market. An important indicator of world soybean prices is the market price in Rotterdam (see ch. 2). The Rotterdam-U.S. (Decatur, Illinois) price differential generally declined during 1979-87, from $33 to $38 per metric ton during 1979-81 to $13 to $24 per ton during 1985-87. This put downward pressure on U.S. prices. Partly because of the USDA loan-support program, described later, average U.S. soybean prices fell by less during 1980-86 than prices in foreign markets, and, probably, by less than U.S. prices would have fallen had they been unsupported.

Soybean markets and marketing issues

Important domestic and export markets.--For domestically consumed soybeans, the most important market is the U.S. oilseed-crushing sector, which processes soybeans into meal and oil for domestic and export markets. Only minor quantities of soybeans are domestically marketed through any other channel. Domestic shipments of soybeans, estimated as the difference between total production and exports, increased from 693 million bushels in 1970 to 1.4 billion bushels in 1979, then decreased to 1.2 billion bushels in 1986. The ultimate destination of the processed soybean products--whether for domestic or foreign consumption--is discussed in the following section on the U.S. oilseed-crushing sector.

U.S. exports of soybeans increased from 434 million bushels in 1970 to 929 million bushels in 1981, before decreasing to 760 million bushels in 1986 (table 3-6). Exports as a share of domestic production increased from 35 percent in 1971 to 47 percent in 1981, then fell to 38 percent in 1986.

The single most important export market for U.S. soybeans is the EC, where the beans are crushed locally for domestic meal and oil consumption. Shipments to the EC accounted for 46 percent of all U.S. exports in 1986, and an average of 50 percent during 1980-86 (table 3-7). Other important markets for U.S. soybean exports are Japan (19 percent), Taiwan (8 percent), and the Soviet Union (7 percent).

Price determination. 1/--A number of structural characteristics of soybean markets make soybean pricing a highly competitive process. Soybeans are a basic agricultural crop, a homogeneous commodity, where price is the overriding factor in the purchase decision. Soybean farmers are numerous, in the hundreds of thousands, every one insignificant compared with the national total. The ability to double-crop and to otherwise farm a variety of crops simultaneously allows farmers to enter or exit soybean farming easily as year-to-year prices change. Further, although prices are determined at the local level between farmers and elevators or crushing mills, in a competitive market prices across States or regions will not differ for extended periods by more than the cost of transport to common market areas such as export terminals.

1/ This section is based in part on Mack N. Leath, "Pricing Strategies Used By Soybean Producers," Staff Paper No. 86E-343, February 1986, Department of Agricultural Economics, University of Illinois at Urbana-Champaign.

Despite such competitive influences, soybean pricing can be complex. The local market is heavily influenced by aggregate supply and demand at the national and international levels through the futures markets and Government price-support policies. As a result, local prices may reflect import demand in Rotterdam or USDA forecasts of next season's Brazilian crop as much as the local mill's capacity. When a farmer delivers his soybeans to the local elevator or mill, the price he receives is largely out of the control of either party, buyer or seller. Buyers and sellers may seek prices that bring a targeted return on investment, a predetermined gross margin, or simply move the harvest or keep the mill running at full capacity, but in all cases local prices cannot be sustained above or below a relatively small range surrounding national market prices.

Despite their lack of bargaining power, farmers do have price strategies available to them. Farmers plan the pricing of a soybean crop as early as the February preceding the planting of the crop and continue until the harvested crop has all been sold, as late as the middle of the following year. This long planning period is required for farmers to take full advantage of the three basic price strategies open to them: a forward cash contract, where quantity and price arrangements are made prior to delivery from the field or storage facility; a cash market offer, under which a given quantity of soybeans is sold for immediate delivery at the current market price; and a price-later contract, which provides for immediate delivery but at a price to be determined at a later date. Prices set in the future may be based either on cash-market or futures-market prices, depending on the particular arrangement.

To accommodate all these pricing options, farmers typically employ some or all of three marketing strategies: sell directly from the harvested field to buyers (who provide transportation); deliver to an elevator, crusher, or other off-farm destination at harvest; or store the harvested crop on-farm for marketing during the following winter or spring.

In a recent survey of Midwestern and Southern soybean farms, 1/ it was found that virtually all the crop was either delivered off-farm by the farmer (54 percent of the crop of the farm sample) or kept in on-farm storage for later sale (43 percent); only a minor portion (3 percent) was picked up at harvest by buyers. Of off-farm deliveries, two-thirds of the crop was sold via cash market offer, and most of the remainder was forward contracted. For the portion of the crop stored on-farm, pricing strategies were evenly divided between forward contracts and cash market offers; very little was sold in price-later arrangements. Although farmers in most States have all three price options available, in some States the scant use of some options (for example, forward contracting in the Carolinas) suggests that crushers or elevators in those States do not offer such arrangements. 2/ The high proportion of soybeans held on-farm for later marketing suggests that farmers are willing and able to forgo immediate sale and withhold supplies in the hope of higher prices in the future.

As a way to obtain higher prices and more efficiently market their harvest, many soybean farmers have formed or joined cooperatives. Cooperatives provide various services for their members, including marketing soybeans to

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1/ Ibid.
2/ Ibid, p. 16.

elevators and crushers. By acting as the sole agent for many farmers at once, cooperatives may be able to obtain greater bargaining leverage for farmers. Cooperatives play an important role in the marketing of soybeans and grain, accounting for 37 percent of all such farm-level marketing in 1985. 1/

In addition to crop marketing, some cooperatives operate mills and market processed soybean products for their members, thereby capturing for the farmer a greater share of the consumer's oilseed dollar. By storing soybeans and/or the processed products, cooperatives also attempt to help farmers maximize prices by selling when prices are high and holding inventories when prices are low. An added advantage for members of large cooperatives is direct access to export markets, since some cooperatives operate export transport facilities.

During periods of weak soybean markets, the USDA loan guarantee program (see the discussion on Government programs later in this section) effectively supports soybean prices at approximately the level of the loan default "price." At that price, the market demand for soybeans becomes perfectly price elastic, that is, all that is supplied at that price beyond what is demanded by private buyers will be absorbed by the Government. This program tends to stabilize prices (at least downward), but as discussed later in the report, at the sacrifice of important market signals to U.S. producers and exporters competing with unregulated foreign rivals.

Transportation factors.--Since oilseeds and oilseed products are bulky products with relatively low unit values, transportation and storage factors are important influences on oilseed markets. The most efficient transport systems for bulk products are barge or tanker by water and railcar by land. These systems require a specialized infrastructure, including a rail system and adequate port facilities. The United States has long had such an infrastructure, by design, as in the case of rail, and by nature, as with the extensive waterways connecting the interior farming areas, most of which lie adjacent to the Mississippi River system, with export ports. In 1977 (the latest year for which data are available), 61 percent of soybeans moving within the United States to a U.S. export port were transported by river barge, 23 percent by railroad, and 16 percent by truck. 2/

U.S. export flows of soybeans.--From U.S. export ports, oilseeds and oilseed products are moved to foreign countries mostly by ocean bulk carriers (except for a small amount transported by rail directly to Mexico and Canada). In many cases, oilseeds and products are moved in so-called tramp ships leased to a shipper for one or more voyages or for a fixed period. 3/ Tramp freight rates are negotiated between a shipper and an owner, often with

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1/ Cooperative Management Service, Agricultural Cooperative Service, Farmer Cooperative Statistics, 1985, USDA, Washington, DC, ACS Report No. 17, December 1986, pp. 9-10.
2/ Mack N. Leath, et al., Soybean Movement in the United States: Interregional Flow Patterns and Transportation Requirements in 1977, University of Illinois, Champaign, Ill., 1977.
3/ Velmar Davis, "Roles of the Transportation Modes," in USDA, ERS, Transportation and Competitiveness of U.S. Agricultural Products in World Markets: Proceedings of a Research Symposium, October 1986, (forthcoming, Fall 1987).

an intermediary broker involved. Very few oilseed products move internationally in liners, which are operated by firms with published rates and regular ports-of-call.

The transportation advantages of U.S. soybean producers are reflected in geographic trade flows, which for the most part have Corn Belt or Lake State soybeans moving by barge down the Mississippi River or by railcar to New Orleans and other Gulf of Mexico export ports. During the 4 most recent years, 1983-86, about 80 percent of U.S. soybean exports left the United States through gulf ports, and most of these through Mississippi River ports such as New Orleans (table 3-8). The region with the next highest average exports during these 4 years was the South Atlantic (Ports of Baltimore, Norfolk, Charleston, Savannah, and West Palm Beach). The ports in the Pacific region lost a considerable share of U.S. soybean exports, much of it to gulf ports.

Domestic transportation factors.--Transportation undoubtedly plays a role in the location of the soybean processing plants in the United States and abroad because of the relative costs of storing and transporting soybeans, meal, and oil. According to one source, a high percentage of domestic soybean meal shipments are within the region of the meal plant, supporting the hypothesis that soybean processors tend to locate near high soybean meal consumption areas. 1/ Transport rates have tended to discourage the shipment of the relatively low-valued soybean meal over long distances. Soybean oil transportation costs are less influential in location of plants since the oil is a relatively higher valued commodity. 2/

Rail rates, loadings, and shipments data for grain (including soybeans) are shown in the following tabulation: 3/

Year	Rail freight rate index for grain (annualized) 1/	Railcar loadings	Barge grain shipments
		(1,000 cars)	(Million bushels)
1979	62.9	27.5	1,622.6
1980	75.0	29.3	1,935.4
1981	86.7	26.3	1,907.4
1982	93.4	24.9	2,135.0
1983	94.0	26.1	2,113.8
1984	100.0	27.2	1,904.2
1985	98.3	22.8	1,655.3
1986	99.0	24.3	2/

1/ 1984 = 100.
2/ Not available.

1/ G.E. D'Souza, T.D. Phillips, and W.J. Free, The U.S. Soybean Processing Industry, Tennessee Valley Authority (TVA) Bulletin 312, January 1986, p. 16.
2/ Ibid.
3/ Source: USDA, Agricultural Outlook, March 1987, p. 50. Rail freight index is compiled by USDA from U.S. Bureau of Labor Statistics (BLS), U.S. Department of Labor.

Railcar loadings of grain peaked in 1980, then declined irregularly; barge shipments, on other hand, peaked in 1982, then steadily declined into 1985 (the latest year for which data are available). U.S. industry sources dispute the accuracy of the BLS data on rail freight costs. According to trade sources, the BLS price index quoted above does not reflect the actual rates paid by many grain shippers because with the deregulation of railroads, trucking, and barges, many transportation arrangements are private and not published. 1/

Other marketing issues.--The soybean farming sector is atomistic in structure, consisting of hundreds of thousands of widely dispersed farmers and dozens of farmer cooperative-operated elevators that supply crushers with soybeans. Although cooperatives help strengthen the market power of farmers, there remains a general imbalance in concentration between farmers and crushers, particularly at the local or regional level (the most relevant market delimitation from the farmers' perspective).

Concerning relative market power in the U.S. soybean market, there is a commonly portrayed image of joint economic interest between the oilseed farming and crushing sectors. 2/ Despite this image, the fact that the revenue received by farmers constitutes a cost incurred by crushers suggests that if market power in the soybean market is asymmetrical then this similarity in interests may also be asymmetrical. When demand for processed soybean products is increasing, rising prices received by crushers may be passed on in part to soybean suppliers, benefiting both farmers and crushers, but when product prices are declining, crushers with market power may be able to pass the output price decline backward to farmers, largely insulating themselves from adverse price moves in the process.

In 1985, a USDA study found that during 1963-83, U.S. soybean processors incurred higher operating costs as a result of higher risk factors; these costs were then successfully passed on to suppliers (farmers) and customers (meal and oil users). 3/ The researchers estimated that two-thirds of the

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1/ For further discussion of transportation issues, see Tenpao Lee, C. Phillip Baumel, and Robert Acton, "The Impacts of Transportation Rates on World Soybean Trade Competition," in World Soybean Research Conference III, (R. Shibbles, editor), Iowa State Univ., 1985, p. 117; Robert J. Hauser and C. Phillip Baumel, "Research Issues in Grain Transportation," and, James M. MacDonald, "Developments in Grain Rail Rates and Services Since Deregulation," both in USDA, ERS, Transportation and Competitiveness of U.S. Agricultural Products in World Markets: Proceedings of a Research Symposium, October 1986 (forthcoming, fall 1987).

2/ This view is expressed in such processing company statements as the following: "We merchandise and process the farmers' crops. We provide feed and feed ingredients for livestock and poultry. Our corporate activities are almost exclusively dedicated to providing services to farmers both here and abroad." Annual Report 1986, Archer Daniels Midland Co., p. 4. While reduced farm prices would in isolation increase crushers' margins, they would also reduce farm incomes and therefore likely reduce supplies, which in turn would reduce crushers' output; hence the crushers' and farmers' joint interest lies in expanding markets and raising processed product prices.

3/ M.S. Boyd, et al., "The Impact of Risk on Soybean Crushing Margins," Oil Crops, USDA, December 1985.

higher operating costs were passed on to farmers in the form of lower soybean prices, and one-third was passed on to meal and oil users in the form of higher meal and oil prices.

Government programs

One of the most important characteristics of the U.S. oilseed farm sector is the role Government has in influencing industry structure, output, price, and export performance. Many Federal Government programs, primarily those of the USDA, are targeted at, or indirectly influence, oilseed farmers. The dominant effect of such Government involvement falls on the supply side. The USDA support policy for soybeans induces higher output of soybeans. 1/ Government-sponsored research and development (R&D) improves soybean farm productivity and per acre yields. On the demand side, USDA export enhancements widen the world market for U.S. oilseed products, and food stamps and surplus food donations expand U.S. food consumption.

U.S. farm programs are extensive and complex; a full description goes beyond the scope of this study. This section summarizes the key provisions of the support program, and highlights those provisions that are believed to significantly influence U.S. soybean trade. Nonagricultural policies of the U.S. Government and foreign government policies are examined for their effects on the U.S. soybean industry in chapter 8.

The Food Security Act of 1985.--In an effort to revise current and future U.S. Government support of agriculture, Congress passed the Food Security Act of 1985. This act, covering the five crop years 1986 through 1990, contains provisions for the following commodities: soybeans, upland cotton, feed grains, wheat, rice, dairy products, peanuts, sugar, wool and mohair, and honey. The main programs under the act are nonrecourse commodity loans, inventory and financial activities of the Commodity Credit Corporation (CCC), direct cash transfers for deficiency payments for grain and cotton, farm storage payments for grain, and paid land diversion for grain and cotton. The effects of the act and its predecessors on soybeans are both direct and indirect. The direct effects flow from the soybean-specific provisions, and the indirect effects flow from the provisions related to the other commodities all of which are alternative crops for various soybean farmers.

The primary Government assistance to grain and oilseed farmers is in the form of price and income supports. To be eligible for price and income supports, grain and cotton farmers must comply with acreage reduction or other supply control programs, but soybean farmers do not face the same restrictions. Yet, since soybeans are often grown as part of a crop mix on many farms, price and income supports, and the accompanying acreage controls for other crops, affect soybean acreage. Furthermore, the effects are not similar. Although the supports for soybeans by themselves would tend to increase soybean acreage, the price supports for corn forbid the diversion of land from corn to soybean planting, thus tending to reduce soybean acreage and production. 2/

1/ Offsetting this are the price-support policies for corn, wheat, and other crops that are rotated with soybeans. Their acreage-reduction provisions also force a reduction in soybean acreage.
2/ USDA, "Expected Soy-Corn Returns Indicate Soybean Acreage," Agricultural Outlook, May 1987, pp. 12-14.

Nonrecourse commodity loans.--All soybean farmers have the option of placing their soybeans as collateral for USDA loans, receiving loan funds at a specific rate per bushel of soybeans. Such loans, called nonrecourse loans, can be redeemed by the farmer prior to maturity from the market sale of the soybeans. If market prices are too low (i.e., below the loan rate per bushel), the farmer may default on his loan obligation and forfeit the soybeans, which become Government property. Nonredemption of the loan, in essence, takes the soybeans out of the open market and keeps the price prevailing in the open market from falling below the loan rate. The interest rate on nonrecourse loans is usually below commercial lending rates.

For soybeans, two principal provisions of the 1985 Act cover the USDA loan program. In particular, the export-discouraging effects of the price floor that the program effectively provides have been modified. If the Secretary of Agriculture, who sets the soybean loan rate, determines that the rate is excessively high to maintain exports and domestic demand, the rate may be reduced. However, such reduction is limited to no more than 5 percent per year and in any case not below $4.50 per bushel. In view of the fact that the loan rate in 1987 was $4.77, which can only be reduced 5.66 percent before it reaches $4.50, the new loan provision provides little leeway if export prices continue to fall.

Average market prices for soybeans exceeded the USDA loan rate until 1985, when the loan rate became an effective price floor, as shown in the following tabulation of USDA data (per bushel):

Year	Average price received by farmers	USDA loan rate
1976.....	$6.81	$2.50
1977.....	5.88	3.50
1978.....	6.66	4.50
1979.....	6.28	4.50
1980.....	7.57	5.02
1981.....	6.04	5.02
1982.....	5.69	5.02
1983.....	8.19	5.02
1984.....	5.84	5.02
1985.....	5.05	5.02
1986 1/..	4.70	2/ 4.77
1987.....	3/	4.77

1/ USDA projected average farm price as of May 1987.
2/ The nominal loan rate of $4.77 per bushel (8.0¢ per pound) in 1986 was reduced to $4.56 per bushel (7.6¢ per pound) in response to the Gramm-Rudman-Hollings Deficit Reduction Act.
3/ Not available.

A study by USDA's Economic Research Service (ERS) on the effects of U.S. price-support programs reported that for soybeans the U.S. provided a producer subsidy ranging up to 9 percent of the market price during 1982-1984. Comparable subsidy levels for soybeans and rapeseed in the EC were reported to be 25 and 49 percent. In contrast, Argentina and Brazil levied a producer tax on soybeans equivalent to 10 to 25 percent in Argentina and 1 to 9 percent in Brazil. 1/ These foreign government programs are discussed in following chapters.

Public Law 480 and the Commodity Credit Corporation.--The USDA promotes exports through two main programs, the Agricultural Trade Development Act (known as Public Law 480, or P.L. 480) and the CCC. Under P.L. 480, concessional sales and donations are made for the purpose of humanitarian and/or development assistance. This has been of particular help to U.S. exports of vegetable oil; nearly one-third of all U.S. exports of soybean oil in 1985 received P.L. 480 assistance, and 7 percent of all U.S. exports of cottonseed oil were so assisted.

The CCC provides various types of assistance, the most important of which are direct loans to foreign governments and guarantees of loans made by commercial banks for exports. Between 1980 and 1987, according to the USDA, gross expenditures of the CCC rose from $10 billion to $47 billion. Net expenditures rose from under $3 billion to over $25 billion during the period. These expenditures were for all commodities and were not separately reported for soybeans.

Another export program, the Export Enhancement Program, was authorized under section 1127 of the 1985 Act. This provides export payment-in-kind by USDA to exporters in order to bring about export sales. Exporters are given generic commodity certificates good for supplies of various commodities as assistance in marketing price-competitive exports, especially where foreign competition is subsidized or enjoys other unfair trade advantages. However, to date this program has been used only once for oilseed products.

U.S. tariffs and import protection.--U.S. tariffs on imports of oilseeds, fats and oils, and oilseed meals are shown in appendix E. Except for quotas on U.S. imports of butter oil, butter, cream, and peanuts, there are no quantitative restrictions affecting oilseeds and oilseed products. The principal tariff is on soybean oil and amounts to 22.5 percent ad valorem. U.S. imports of soybeans enter free of duty.

The two principal oilseed products imported into the United States are palm oil and coconut oil, which together accounted for over two-thirds of the value of U.S. imports of all oilseeds and products in recent years. Both of these vegetable oils enter the United States free of duty.

Structure of the U.S. Oilseed Crushing Sector

Oilseed crushers are the sole domestic market for virtually all U.S.-produced soybeans. Those soybeans that are not directly exported or consumed are processed by crushers into soybean meal and vegetable oil for domestic and export markets. A detailed examination of the oilseed crushing sector, including its structure and financial performance, is important in explaining the size of the U.S. soybean and products industry and its performance in international trade because the crushers are largely

1/ ERS, USDA, Government Intervention in Agriculture, January 1987, pp. 29-30.

responsible for U.S. exports of soybeans and soybean products. This section of the report describes the structure of the oilseed crushing sector, including structural measures such as output trends and the number and concentration of firms, and structural influences such as the roles of technological development and Government policies.

In examining the structure of the U.S. soybean crushing industry, a distinction must be made between the U.S. industry itself and U.S.-based firms engaged in oilseed processing both domestically and worldwide. The operation of a processing facility wholly contained within the United States may differ from the operation of a facility that is part of a multinational enterprise because of potentially different competitive strategies in the two types of firms. This section of the report examines primarily the structure of the U.S.-based operations of U.S. soybean crushers, with attention paid later to the structure of the global industry in which U.S.-based firms play a dominant part.

Production, shipments, trade, and apparent consumption

Production and shipments.--Soybean meal and oil are produced from soybeans in approximately fixed proportions, so that trends in the output of one commodity match those of the other. Output of soybean products has slowed from the sustained increase during the 1960's and 1970's that led the industry to a then-record output of meal and oil in the 1979/80 crop year. In that year, U.S. soybean crushers produced 24.6 million metric tons of meal and 5.5 million metric tons of oil (table 3-9). In the years following, production growth largely stagnated, and recent output levels are only slightly higher than the production volume achieved in the 1979/80 crop year.

Exports and imports.--Foreign markets have been important outlets for U.S. production of oilseeds, oilseed meals, and fats and oils. During crop years 1977/78 to 1986/87, about 37 percent of U.S.-produced oilseeds (soybeans, cottonseed, sunflowerseed, flaxseed, and peanuts) were exported, as were about 24 percent of the major protein meals and 22 percent of the vegetable and marine oils (tables 3-10 and 3-11).

Exports of soybeans and soybean products followed a similar pattern during 1977/78 to 1986/87. The share of U.S. soybean production being exported rose from 40 percent in 1977/78 to a peak of 47 percent in 1981/82, and thereafter declined to 35 percent in 1986/87 (table 3-12). Exports of soybean meal as a share of U.S. output also peaked in 1979/80 at 29 percent, thereafter declining steadily to 20 percent in 1984/85, and then recovering to 24 percent in 1986/87. The average share of U.S. soybean meal output sold in foreign markets during the ten years amounted to 26 percent. An average 17 percent of U.S. soybean oil was sold in foreign markets, although during 1977/78 to 1986/87 the share declined from a peak of 22 percent in 1979/80 to 11 percent by 1986/87.

In value terms, U.S. exports of oilseeds and products peaked in 1981 at $9.3 billion, declined by 38 percent to $5.8 billion in 1985, and then recovered by 9 percent in 1986 (table 3-13). In 1981, the record year, oilseeds accounted for about 72 percent of all oilseeds and products exports, fats and oils about 18 percent, and oilseed meals the remaining 10 percent. By 1986, oilseeds represented 71 percent of the $6.3 billion worth of oilseeds and products exports, fats and oils about 20 percent, and oilseed meals about 9 percent.

Soybeans and soybean products make up the bulk of U.S. exports of oilseeds and oilseed products (table 3-14). As a share of U.S. exports of all oilseed products in 1986, soybean and soybean products accounted for 97 percent, or 62.5 billion pounds of the 64.3 billion pounds of U.S. oilseeds and oilseed products exported in that year. Of the quantity of U.S. exports of oilseeds, oilseed meals, and fats and oils in 1986, the shares made up by soybeans, soybean meal, and soybean oil were 98, 98, and 86 percent, respectively. Similarly large shares of export values are accounted for by soybean and soybean product exports.

Soybean and soybean meal exports go principally to the more affluent developed European countries, Japan, and a handful of Asian countries which have experienced recent rapid industrial growth (tables 3-7 and 3-15). These countries purchase significant amounts of soybeans from the United States, and possess advanced oilseed crushing mills. In addition to the purchase of soybeans, the developed countries also purchase soybean meal to satisfy a part of their demand for oilseed meal. Purchase of soybean meal allows maximum flexibility in altering feed ration composition, mitigates any bottlenecks occurring because of a lack of crushing capacity, and eliminates the problem of disposal of any soybean oil produced as a byproduct of soybean crushing. Many of the developed countries are more nearly self-sufficient in edible fats and oils production, and already export a large portion of the soybean oil produced from U.S. soybeans crushed in their oilseed mills.

Soybean oil sales are mainly to developing countries that have low per capita consumption of edible fats and oils (table 3-16). These countries are for the most part not interested in purchasing soybeans or soybean meal since they lack either the necessary crushing mills or a livestock sector requiring significant volumes of oilseed meal.

U.S. soybean oil exports peaked in 1979 at 2.5 billion pounds, then declined irregularly to 2.3 billion pounds in 1984. However, in 1985, soybean oil exports declined by 1 billion pounds (or 43 percent from the those in previous year). U.S. soybean oil exports in 1986 totaled 1.2 billion pounds, down slightly from the level of 1985. U.S. exports of soybean oil have been much more dependent on official U.S. export assistance than exports of either soybeans or soybean meal; the share of U.S. soybean oil exports receiving official assistance rose from 17 percent in fiscal year 1979 to 35 percent in fiscal year 1986. For such exports, leading markets were Pakistan, India, Mexico, and Bangladesh, which together accounted for about two-thirds of U.S. exports of soybean oil in 1986.

Fats and oils were the chief oilseed product imported into the United States during 1978-86, accounting for 88 percent of all oilseeds and oilseed product imports (table 3-17). U.S. imports of oilseeds and oilseed meals supplied less than 1 percent of domestic consumption during crop years 1977/78 to 1986/87, whereas imported fats and oils supplied about 14 percent of consumption. The United States is among the top five leading markets for vegetable oil in the world, importing an average of nearly 2 billion pounds annually during 1978-86. By 1986, the United States had become a net importer of vegetable oils. The principal oils imported were coconut and palm oils. U.S. imports of soybeans, soybean oil, and soybean meal have been small, amounting to less than $1 million annually during 1978-86.

The Philippines and Malaysia supplied 58 percent of U.S. imports of oilseeds and products during 1978-86, chiefly in the form of coconut, palm, and palm kernel oils (tables 3-18 through 3-21). Canada has also supplied a significant amount of rapeseed oil to the United States since 1984 when the U.S. Food and Drug Administration first allowed rapeseed oil to be used in edible fats and oils products in the United States.

Apparent consumption.--Most soybean meal consumed in the United States and elsewhere goes into animal feed, although smaller amounts are also used to prepare soy-based foods. The principal factor influencing the demand for oilseed meals is the demand for meat and dairy products, a factor which is ultimately reflected in the number of livestock raised and in the rate of feed consumed per animal unit.

In the United States, there was little change during 1976-85 in the number of "high-protein animal units" (a composite of the equivalent number of poultry, dairy cattle, and other livestock animals), although the total amount of feed consumed per animal rose as did total feed consumption. During this period, the number of high-protein animal units averaged 109 million head (table 3-22). However, the amount of feed consumed per animal unit rose by about 2 percent annually. U.S. consumption of high protein feed rose from an average 22.2 million metric tons during 1976-80 to an average 24.1 million tons during 1981-85, an annual gain of 1.9 percent. Oilseed meal consumption increased from an average 17 million metric tons during 1976-80 to about 19 million tons during 1981-85, a growth of about 2.2 percent annually.

Soybean meal consumption in livestock feeds averaged about 15 million metric tons during 1976-80, and then increased irregularly during 1981-85 to about 17.5 million tons, a compound annual rate of growth of 2.0 percent (table 3-23). Most of the growth in soybean meal consumption has been because of increased broiler and turkey feed consumption, a situation consistent with the rising demand for poultry meat in the United States.

Consumption in the United States of all types of vegetable oils and animal fats used in food has grown by slow, but steady levels for a number of years. During 1981-85, growth in consumption of all edible fats and oils averaged 3.3 percent annually, and that of soybean oil averaged 2.3 percent. Most of the increase in apparent consumption in soybean and other vegetable oils has been attributed to increased population, to more popular foods that contain higher amounts of food fats, and to stable or declining prices for the food fats and oils products. 1/

1/ See for example, Jorge Hazera, "Per Capita Consumption of Food Fats and Oils, 1971-82," USDA, Oil Crops Outlook and Situation Report, August 1983, pp. 11-13.

Number and location of firms and employment

There are 13 firms engaged in soybean crushing in the United States. These firms operate a combined total of 72 plants (mills), scattered across several States in a region encompassing the Corn Belt, Mississippi River delta, and southeastern United States, and bounded approximately by Nebraska, Minnesota, Pennsylvania, Georgia, and Louisiana. In 1982, the latest year for which Census data are available, there were approximately 6,200 people employed in the crushing of soybeans and other oilseeds.

Table 3-24 shows mill distribution by State as of January 1986. Most of the industry's mills are found in Illinois and Iowa, whose 23 mills together account for almost a third of the total number of mills and over 40 percent of industry crushing capacity. Mill location is determined primarily by three factors: the location of soybean harvesting capacity, the size of the local or regional oilseed meal market, and the availability of transportation systems. These factors appear to be of fairly equal importance. Although many mills are concentrated in the Corn Belt States, where soybean production is particularly concentrated, a number are also located in Southern and Southeastern States where poultry processors and other large users of meal are located.

In addition, many are close to water and/or rail transport systems. Such transport systems are important considerations for export trade, which is an important part of industry shipments. The waterways of the Mississippi and its tributaries, and of the Great Lakes-St. Lawrence system are particularly important to soybean product traders, and a number of mills are located adjacent to these waterways. 1/ Railways connect many of the other mills to these waterways, or directly to coastal export ports. An important element in such forms of transportation is their large scale, allowing for low-cost bulk transport.

The relative unit values of oilseed meal and oil are important influences in mill location. Since oil is high valued, transportation cost accounts for a smaller part of total delivered cost than for meal, which is low valued and bulky. Thus, other things equal, a mill is best situated near meal markets to reduce meal transport costs, leaving oil to be shipped wherever oil markets exist.

Soybean crusher concentration

Soybean crushing is highly concentrated in only a few firms. Industry sources indicated that of the total daily capacity of 117,050 tons of soybeans held by the 13 firms in 1986, 77 percent was held by the 4 largest firms and 93 percent was held by the 8 largest firms. All but 6 of the firms operate multiple mills, the 2 largest firms each operating approximately 20 mills.

1/ Of 65 mills responding to a Commission questionnaire, 27 reported a location on a waterway (i.e., a river, one of the Great Lakes, the Gulf of Mexico, or the Atlantic coast).

The larger firms gained their market shares by building or acquiring additional facilities rather than expanding existing ones, despite the economies of scale reported to exist in soybean crushing. 1/ A possible explanation for this is that when prices of soybeans and soybean products decline over extended periods, then smaller or less efficient firms more readily sell out to larger or more efficient ones; this results in generally increased industry concentration and, therefore, an altered industry structure.

The most recent example of such a reshuffling of industry assets has taken place since at least 1983, as a result of the general decline in soybean and other agricultural commodity prices during the 1980's. A partial listing of recent mergers and other asset transfers is presented in table 3-25.

The following tabulation presents data on mill construction and acquisitions for 65 U.S. soybean mills, including data on the year of original construction and, for those mills not currently owned by the original owner, the year when the mill was purchased (used) by the current owner, about which sufficient information was obtained from the U.S. industry in response to Commission questionnaires:

	From a sample of 65 reporting mills, number--		
		Acquired 1/	
Time period	Constructed	new	used
1890-1949	34	8	2
1950-59	12	6	1
1960-69	9	4	8
1970-74	3	3	2
1975-79	5	3	5
1980	0	0	1
1981	2	2	3
1982	0	0	1
1983	0	0	6
1984	0	0	2
1985	0	0	11
1986	0	0	1

1/ Acquired by the current owner during the stated period.

An obvious characteristic of this sample of mills is their age; most were constructed prior to 1950, and only two mills are of 1980's vintage. At least one facility is nearly 100 years old, having been constructed in 1890. Another trend in the above data is the increased acquisition of used mills that occurred in the first half of the 1980's compared with any previous period. In the 1983-85 period alone, some 19 mills changed hands (11 in the peak year 1985), and none were constructed.

1/ Several U.S. industry sources interviewed by Commission staff reported that economies of size exist in soybean crushing. See also the discussion of size economies later in this section.

Conditions of entry and exit

How volatile the structure of the oilseed crushing industry is depends largely on how easily firms enter and exit the industry. Firms normally enter an industry if there are profits to be made, and exit if profits decline and unacceptable losses are incurred. However, barriers to entry may insulate profitable firms from potential competition from new firms whose entry would take away some of those profits. Likewise, barriers to exit might force unprofitable firms to absorb continued losses when they would prefer to cease production. Thus, such barriers tend to stabilize industry structure in the face of fluctuating economic fortunes and, therefore, influence how firms perform in the short as well as the long run.

The most important conditions of entry and exit in domestic soybean crushing include economies of size and other elements of the cost structure of the industry, the homogeneity of the product, Government policies, and firm-specific technology.

Economies of size.--The term economies of size 1/ refers generally to the declining average cost of an activity that often occurs as the volume of that activity increases. Economies of size may occur in production, purchasing, marketing, and/or multiplant location and logistics. Such economies are predominantly a result of the existence of high fixed costs, which are allocated over a larger volume of output as size increases, causing average unit cost to decline. Economies of size are less prevalent when fixed costs are low relative to variable costs, such as when variable inputs (i.e., labor or information) become scarce with increased volume, increasing their prices.

Soybean crushing mills are heavily capital intensive, and consequently, have high fixed costs. Among their most significant fixed-cost items are soybean conveyors, driers, cracking mills, flakers and grinders, screeners, and solvent extractors. In addition, the extreme flammability of soybean dust and the hexane solvent require investment in explosion-proof equipment and explosion-suppression systems throughout the plant. The significant energy requirements of the mills, moreover, are in many cases supplied by company-operated sources, such as coal-fired generators. All these factors add to the large fixed expense of soybean crushing. The principal variable expenses include (besides soybeans) energy and solvent (usually hexane); labor is not a significant expense.

The Commission received detailed cost information from U.S. soybean crushers covering 67 U.S. soybean mills (excluding those with incomplete data). Table 3-26 presents average cost data for 65 of those mills, 2/ by mill size, for 1986.

1/ The term "economies of size" is preferred here over the more common, largely theoretical term "economies of scale," because the concept of economies of size allows analysis of the average cost savings from increasing an activity within an enterprise (for example, a vegetable oil refinery increasing only its scale of oil refining, yet keeping its overhead costs the same, or nearly so). Economies of scale is a more restrictive concept, the analysis of which requires that all aspects of an activity (overhead, general, selling, and administrative expenses, etc., as well as oil refining itself) be increased in exactly equal proportions, which is rarely if ever the case in the real world.
2/ The largest two mills were excluded to withhold proprietary data.

A number of points can be made about this cost information. For the "average" soybean mill, total costs of processing one pound of soybeans amounted to $6.50 in 1986; by far the principal component of this total was the cost of soybeans, which was $5.87, or 90 percent of total costs. The remaining cost items consisted mainly of processing expenses, totaling $0.53 per pound, most significantly energy (fuel, power, and utilities), labor, and depreciation and amortization. Nonprocessing costs--general, selling, and administrative expenses and allocated corporate overhead--totaled $0.10, or 1.5 percent of total costs.

A number of these average costs, particularly fixed expenses such as overhead and depreciation, depend on the mill's rate of capacity utilization, which vary considerably by mill size (table 3-26). This has implications for a mill's potential cost savings from economies of size, since large mills cannot enjoy such cost savings if they cannot operate at full capacity. Although the data by mill size presented here exhibit slight evidence of size economies (average processing costs generally decline slightly as mill size increases), such a trend might be more evident if differences in capacity utilization could be adjusted for. U.S. industry sources suggested two factors that might account for low capacity utilization, particularly for large mills: a seasonal shortage of soybean supplies, which prevents mills from completing a sufficiently long production run, and reduced export demand, which forces large mills situated near export points or along major rivers to cut back output in order to avoid inventory build up.

In addition to production costs, economies of size may be achieved in input purchasing, marketing, and logistics. Economies of size in purchasing are achieved primarily through enhanced bargaining power or reduced suppliers' costs. Because of the above-noted production economies of size, it is often not efficient to have more than one soybean mill in a particular location, especially where soybean production is limited. The fewer mills, the less the potential competition for harvested soybeans in that area; thus, the mills have relatively greater bargaining power vis-a-vis soybean farmers. The high concentration in mills and elevators noted earlier contributes to the crushers' achievement of economies of size in purchasing.

Marketing economies of size in soybean products exist in part because trade in such products is highly export oriented. The homogeneity of the product precludes the marketing economies often associated with differentiated or brand-name products (such as advertising cost), but the importance of well-developed market channels and transport systems offsets such homogeneity and creates a competitive advantage for large, export-oriented firms.

Another related reason for marketing economies achieved by U.S. soybean processors arises from their role as grain merchants, particularly through a combination of their presence in foreign markets (either in trading, refining, or other further processing) and their experience in other commodities trading. The presence of some of the larger U.S. (and foreign) multinationals in other countries facilitates the marketing of U.S. soybean products in those countries either through foreign processing subsidiaries of U.S. firms or buyers located by foreign marketing subsidiaries. The costs of developing soybean product channels in foreign markets is reduced when such costs are spread across a variety of agricultural or other commodities. Because in many cases state trading agencies or other large diversified buyers act as foreign buyers, firms that develop contacts in such markets for one commodity can use the same contacts for other commodities, including soybeans and soybean products. For example, ADM, which processes and markets an array of agricultural products, recently entered the rice milling business: "a natural place for us ... It's a processing business, and we can use the same buyers and salesmen we have in our other businesses." 1/

Concentration in export marketing.--In view of the prevalence of large firms involved in the export of oilseeds and grain, concern has occasionally been expressed that such trade is highly concentrated. The popular press has noted the role played in such trade by large multinational firms, particularly in reference to the 1973 U.S.-U.S.S.R. deal. 2/ A number of analytical studies of the export trade have been carried out since then, but without a consensus on the concentration of trade in large firms. A 1976 USDA study determined that the 6 largest grain exporters accounted for 90 percent of total exports in the early 1970's. 3/ Other studies, however, have indicated a more moderate concentration; two studies found 4-firm concentration ratios in U.S. grain/oilseed trade that ranged between 40 and 65 percent, depending on the year and the product group. 4/ Data supplied to the Commission by the USDA on the storage capacity and ownership of U.S. export grain elevators in 1986 indicate that the 8 largest owners of such elevators controlled 64 percent of the 400 million bushels of grain and oilseed storage capacity then in existence. Farm cooperatives held an additional 10 percent, and others, including the U.S. Government, held the remaining 26 percent.

A related source of economies of size is achieved in logistics and transportation. The scattered distribution of soybean mills requires a transportation network connecting them with input supplies and export ports. Shipment of large volumes of soybeans, oil, or meal is done least costly by bulk rail or water transport, and the larger U.S. oilseed firms have acquired a significant share of such transport facilities. For example, Cargill, Inc., reportedly regards itself as one of the largest operators of railcars in the United States, with 2,000 hopper cars and 2,000 tank cars for commodity transport. 5/ ADM reportedly owns or controls 1,000 river barges, 12,000 railroad cars, and 50 to 100 oceangoing vessels. 6/ They and other large U.S.

1/ Dwayne O. Andreas, chairman, Archer Daniels Midland Co., quoted in Barron's, June 22, 1987, p. 37.
2/ James Trager, The Great Grain Robbery (New York: Ballentine Books, 1975).
3/ Farmer Cooperative Service, USDA, Improving the Export Capability of Grain Cooperatives, June 1976.
4/ Bruce Wright and Kenneth Krause, "Foreign Investment in the U.S. Grain Trade," in Foreign Direct Investment in the United States, U.S. Department of Commerce, Washington, DC, 1976. Richard Caves and Thomas Pugel, "New Evidence on Competition in the Grain Trade," Food Research Institute Studies, Vol. XVIII, No. 3, 1982. For an analysis of the roles played in U.S. grain and oilseed exports by Japanese-owned trading firms and by farm cooperatives, see U.S. General Accounting Office, Market Structure and Pricing Efficiency of the U.S. Grain Export System, 1982; and Neilson Conklin and Reynold Dahl, "Organization and Pricing Efficiency of the U.S. Grain Export System," Minnesota Agricultural Economist, No. 635, May 1982, p. 3.
5/ Wall Street Journal, Nov. 20, 1985, p. 6.
6/ Barron's, June 22, 1987, p. 37.

oilseed firms have the production volume to justify (and necessitate) extensive transportation systems between soybean harvesting areas, mills, export facilities, and foreign ports. Such capacity gives large firms a cost advantage relative to small firms that lack the volume to justify investment in bulk transport; indeed, such firms must, in some cases, use the transport facilities of their larger competitors.

Government policies.--The various U.S. and foreign government policies and programs that directly and indirectly affect soybean farming, crushing, and marketing shape the structure of the oilseed crushing industry in a number of ways. For example, Government policies can affect the level of soybean production and the number of mills the industry can profitably support; the USDA loan program has affected price levels and volatility, changes in which influence profitability and risk; export promotion programs can further concentrate the marketing and production of soybeans in the hands of the larger agricultural traders, particularly those that control export terminals; and U.S. Government-sponsored R&D (used as foreign economic aid, for example) can assist foreign oilseed producers and processors, stimulating new competition for U.S. exporters. 1/ Changes in the industry structure, in turn, shape new policies or alter the effects of existing ones. The more important policies and programs in this regard, both in the United States and other countries, are described elsewhere in this report; here, only some of their potential implications for the structure of the crushing industry are discussed.

For several decades prior to the 1970's, soybean price variability was dampened by frequently effective price floors set by the USDA price-support program. 2/ However, in the early 1970's, U.S. market prices for soybeans began rising dramatically, and by the latter half of the decade wide swings in market prices were experienced. Such price swings were typically correlated with annual production levels that moved in opposite directions from prices and with changing conditions in export markets.

An important effect of soybean price variability is to increase the risk faced by processors that operate on narrow margins between the price of soybean inputs and the prices of soybean oil and meal. A relatively small change in either input or output prices can significantly affect this gross margin. A recent study investigated such risk, 3/ and concluded that increasing price variability puts those soybean crushers with poor risk management at a competitive disadvantage, assuming crushers are risk averse. Two examples of risk management tools are the use of futures markets to hedge the prices of inputs and outputs, and the widening of margins as input prices become more volatile. The former tool of risk management, futures trading, is

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1/ Alternatively, such R&D may be adopted by U.S. firms, then exported to their foreign subsidiaries. An indication that this may be true is the claim made by industry sources in Commission staff interviews that the U.S.-controlled mills in foreign countries are typically more efficient than the locally owned mills that haven't yet benefited from U.S.-developed (including Government) technology.

2/ U.S. Department of Agriculture, Soybeans--Background for 1985 Farm Legislation, Economic Research Service, Ag. Info. Bulletin No. 472.

3/ M.S. Boyd, et al., "Soybean Crushing Margins and Risk," Agribusiness, Vol. 3, No. 2 (summer 1987), pp. 235-39.

generally available to most firms, and is commonly employed in the oilseed crushing industry. If the crushing industry is highly competitive, the latter tool, a wider margin, is not readily available as a strategic "tool" per se, since it requires control over input and/or output prices that competitive firms are assumed not to have. However, for such firms, increased risk may be offset by a wider margin simply by the elimination of a sufficient number of firms to depress soybean prices and tighten the oil and meal markets. For an industry with a dominant firm or group of firms, a wider margin in response to price variability may be possible as a premediated competitive strategy on the part of the dominant firm or firms.

Government price stabilization programs, by reducing soybean price risk, reduce the incentive for risk averse firms to exit the industry, and may cause additional entry by new firms. 1/ Industry structure is affected by changes in price risk if small or singleline firms are more risk averse than large or diversified firms; the former may be more readily induced by price risk to cease production, leaving a greater share of the market for the latter firms that may be better able to handle price risk. M.S. Boyd, et al., suggest that Government price stabilization programs would reduce the risk faced by competitive soybean crushers and in the process reduce gross margins (and consumer prices); further, although they judge unlikely the possibility that the industry is less than highly competitive, they argue that, if in fact crushers are not competitive, volatile soybean prices provide such firms with opportunities to exert market power and drive up margins. 2/

Offsetting the risk-reducing effects of an increasingly effective price floor in the U.S. soybean market is the dependency of U.S. soybean exporters and crushers on export markets, where oil and meal prices are not similarly supported. The declining foreign prices of oil and meal have in some recent years squeezed U.S. exporters that have not been able to pass the entire decline back to their input suppliers, the U.S. soybean farmers (table 3-27).

The results of this squeeze on gross margins in recent years have been a "consolidation" of the industry 3/ and the transfer of crushers' assets, particularly acquisitions by larger crushers. Added to these are the effects of Government programs which have reduced corn and soybean acreage and, consequently, reduced domestic soybean production. Thus, industry contraction rather than expansion may well have resulted from the U.S. Government price stabilization programs.

1/ If stabilized soybean prices cause soybean acreage and output to increase, then this increases the likelihood of added entry by crushers.
2/ M.S. Boyd, et al., op. cit., p. 237.
3/ Dwayne O. Andreas, op. cit., p. 13. Andreas reportedly places blame for much of the U.S. industry's recent financial stress on U.S. Government farm support programs and foreign Government trade restrictions; in addition, he attributes part of the industry's troubles on the lingering effects of past U.S. embargoes of soybean exports to Japan and other markets, which he argues stimulated foreign production and depressed demand for U.S. exports. "Grinding It Out," op. cit., pp. 38-39. See also Archer Daniels Midland Annual Reports for 1985 and 1986.

The question of the effect Government policy has on U.S. technological development in agriculture and the subsequent transfer of such technology abroad, including to competitors, was recently the subject of studies by the Office of Technology Assessment (OTA), which concluded that technology transfer is indeed a factor in explaining changes in U.S. competitiveness in agriculture, including oilseeds. 1/ Although the United States maintains a long-held technological advantage, the reports note, the increasing ease with which new technology is disseminated internationally is "closing the gap" between U.S. producers and their foreign rivals.

Although there are several causes of technology transfer, including U.S. academic training of foreign students, the dissemination of research results in journals and other publications, and the direct transfer by U.S. multinational firms to foreign subsidiaries, Government plays an important role. The OTA studies suggest that differing national treatments of patent protection, for example, serve to stimulate research in countries where patent data is sufficiently vague to maintain trade secrets and to retard research where patent applications require more disclosure of technological details. The likely net effect is uncertain: in countries where patent protection is weak, "a foreign technology that can be imported constitutes an inexpensive alternative [to domestic R&D]. In this situation, however, foreign firms may be reluctant to transfer technology, and fewer incentives exist to import or adopt foreign innovations." 2/

Technology.--The ability of, and incentive for, crushers to conduct their own R&D depends on their size, financial resources, expertise, and ability to prevent disclosure to competitors. In addition, the innovative conduct of machinery and equipment suppliers and other potential sources of technological progress outside the crushing industry affects crushers' R&D activity. Large crushers are in a particularly advantageous position with respect to R&D. Such firms have vast financial resources, and are capable of and actively devoting many thousands of dollars annually to R&D. This investment yields a variety of economies, including applications to the processing of other agricultural commodities and the export of such innovations to the firm's foreign facilities, where it can compete more effectively with local rivals.

Some firms whose representatives were interviewed by Commission staff carry out extensive R&D, with an eye to possible applications in other fields in order to spread fixed R&D costs over increased output. Risky R&D, that is investment in pure research or in areas where likely returns are low, is avoided, a strategy expected of firms that emphasize short-run profit maximization. Some firms rely heavily on equipment suppliers to provide innovations, which relieves the buyer of expensive R&D, but also provides those same innovations to competitors. Smaller crushers reportedly may make minor modifications in equipment, or design their plant a particular way, strategies that achieve future cost savings at little current expense. In general,

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1/ U.S. Congress, Office of Technology Assessment, Technology, Public Policy, and the Changing Structure of American Agriculture, OTA-F-285 (Washington, DC: U.S. Government Printing Office, March 1986); and U.S. Congress, Office of Technology Assessment, A Review of U.S. Competitiveness in Agricultural Trade--A Technical Memorandum, OTA-TM-TET-29 (Washington, DC: U.S. Government Printing Office, October 1986).
2/ OTA, A Review of U.S. Competitiveness in Agricultural Trade, op. cit., p. 52.

however, the basics of soybean processing, such as the use of solvent extraction, are industrywide; major innovations appear to make their way throughout the industry over a period of only a few years.

According to industry sources interviewed by Commission staff, the high energy costs experienced over the last 15 years have spurred investment in energy conservation measures, including the use of coal or cogeneration facilities, and the retrofitting of plant to minimize the loss of steam. In addition, better dehulling procedures that are less energy-intensive and meal-processing systems have also been developed.

Market growth rate.--The growth rate of the market for oil and meal, as well as of the supply of soybeans, influences the rate of entry and exit of firms, and their conduct. An expanding market and/or supply of soybeans allows room for new entrants and tends to ease competitive pressure for existing firms; contracting markets or soybean supplies drive firms out of business and increase competitive pressure. Prior to the 1980s, the long run expansion of the U.S. and foreign oilseed markets kept output prices high and stimulated additional production of oilseeds. The crushing industry expanded, both domestically and in foreign markets. As seen earlier, new mills were constructed in the United States through the 1970s. Industry sources report significant expansion by U.S. crushers into markets abroad, including the construction or acquisition of mills. However, since 1980, domestic expansion has stopped, and there are signs of a contraction as a handful of mills have been idled or kept operating only at sharply reduced capacity. Foreign expansion has not shown a similar slowdown, perhaps because of lower raw material costs or other factors that characterize oilseed crushing in other countries. A number of U.S. firms have exited the industry (although others have expanded, exhibiting a longer run view toward a possible future upturn in the market). By affecting the exit of some firms and the growth strategies of others, clearly the rate of growth of the markets for oilseed products influences industry structure.

Horizontal and vertical integration and diversification

In recent years, U.S.-based oilseed firms have actively invested (and divested) both vertically (into input and/or output markets) and horizontally (within the same industry). Several U.S. crushers are integrated upstream into the transport and farming of soybeans and/or downstream into the transport, further processing, and marketing of processed oilseed products. Examples of upstream integration include Perdue's soybean farms, which supply the firm's milling operations that in turn provide poultry feed. ADM has entered into a joint venture with GROWMARK, a farmers' cooperative, for soybean supplies and transport facilities. Ag Processing, another cooperative, operates several mills for its members. Numerous other examples exist where crushers own or operate through joint ventures soybean farming or transport facilities.

A number of crushers are integrated downstream into the further processing and/or direct marketing of animal feed and vegetable-oil-based products such as margarine. Most of the large crushers mix their own animal feed for distribution to livestock and poultry farmers, and process, package, and market oil-based consumer products. 1/

1/ An extensive listing of examples of the latter, including products and brand names held by the major oilseed processors, is contained in the annual Directory of the Institute of Shortening and Edible Oils, Inc., Washington, DC.

An example of horizontal investment is ADM's active acquisitions of processing facilities in recent years, taking advantage of the generally soft world oilseed market, which has depressed prices of such facilities below book or replacement values. 1/ Cargill has also acquired soybean mills from firms exiting the industry, reportedly for the same buy-now-and-hold strategy as ADM. 2/

This strategy appears to contrast with that of A.E. Staley, one of the original U.S. soybean processing companies, and Ralston Purina, one of the oldest and largest U.S. food-processing companies. Both of these firms sold several soybean mills to ADM and Cargill in recent years, and now have relatively minor interests in oilseed product processing. Both companies are solvent and highly diversified into other agricultural and food businesses, but their investment strategy apparently differs from that of ADM and Cargill. For instance, Ralston Purina, which has moved increasingly toward a profit-center management approach, has sought to remove itself from any involvement in commodity processing and concentrate instead on consumer products and animal feed. 3/ The firm's sale of the soybean mills to Cargill was taken to "improve future financial performance ... (by removing) the Company from a commodities business and free(ing) cash for other investment." 4/ Part of the difference in investment strategy between firms like Cargill and Ralston Purina may lie in international integration; Cargill reportedly operates in 48 countries, a network unmatched by either Ralston Purina or A.E. Staley. 5/ Such global investment expands several-fold the size of the market available to multinational traders like Cargill and allows them to match suppliers with buyers from a variety of locations around the world, reducing the risk of loss from relying on a single production area.

All of the largest U.S. soybean crushers operate oilseed crushing and/or oil refining facilities in other countries. Several U.S.-based crushers each reported multiple foreign oilseed mills or refineries in response to a Commission questionnaire; the responses were about evenly divided between plants built by the current owner and those acquired from other firms. Among publicly reported foreign investments, ADM operates a number of oilseed facilities in Europe. In 1986, ADM purchased three oilseed plants from Unilever, a large British/Netherlands agricultural processor and consumer products manufacturer. 6/ The three plants, including two in West Germany and one (the largest in the world 7/) in Europoort, Netherlands, have a combined annual capacity of 3 million tons, representing over one-half of Unilever's European oilseed crushing capacity. 8/ Since 1982, ADM has had a 45 percent interest in Alfred C. Toepfer International, a large commodities trading firm headquartered in Hamburg, West Germany. 9/ The remaining 55 percent of

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1/ "What you do in this business is buy things at the low of a cycle and operate them at another time." ADM Chairman Dwayne Andreas, quoted in Business Week, Aug. 26, 1985, pp. 35-37. ADM has reportedly "seldom paid above book value for companies and plants, and has landed many of them at distressed prices as little as one-third book." Barron's, June 22, 1987, p. 37.
2/ Business Week, Aug. 26, 1985, pp. 35-37.
3/ 1984 Annual Report to Shareholders, Ralston Purina Co., pp. 2-3.
4/ 1985 Annual Report to Shareholders, Ralston Purina Co., p. 2.
5/ Business Week, Aug. 26, 1985, pp. 35-37.
6/ The Public Ledger, Apr. 11, 1986, p. 1.
7/ Barron's, June 22, 1987, p. 37.
8/ The Public Ledger, Apr. 11, 1986, p. 1.
9/ Annual Report '83, Archer Daniels Midland Co., pp. 3-4.

Toepfer is owned by various farm cooperatives in Europe and the United States among others. ADM has reportedly negotiated to set up soybean processing in the Soviet Union. 1/ Cargill reportedly operates soybean processing facilities in seven countries and maintains offices in 48 countries. 2/ Recently, Central Soya was acquired by an Italian agribusiness firm, giving it increased access to the European market, as well as the backing of an immense ($11 billion in expected 1987 sales 3/) agricultural product trader.

Although increased investment abroad has been the more common trend, some disinvestment has also taken place. Staley Continental, formerly A.E. Staley Manufacturing, one of the oldest U.S. soybean crushers, operated through a joint venture a soybean and sunflowerseed processing facility in Spain from 1963 to 1987. 4/ The facility was divested by Staley in 1987 reportedly as part of an "overall corporate strategy," which in view of the firm's domestic milling divestitures would appear to be one of retreating from basic commodity processing.

Vertically integrated farm cooperatives.--There is some vertical integration between the soybean farming and crushing sectors, primarily in the form of cooperative-operated soybean mills and joint ventures between cooperatives and crushers. Among the former, the most significant is Ag Processing Inc, a soybean processing/marketing cooperative formed in 1984 from acquisitions of soybean mills by Boone Valley Cooperative Processing Association (Iowa) from various other cooperatives and soybean crushers. 5/ This downstream move by farmers into processing and marketing of soybean products was intended to avoid "very serious bean price erosion" by maintaining soybean crushing capacity, the utilization of which was sharply curtailed in the early-mid 1980's. 6/ Significant joint ventures between cooperatives and crushers include an agreement between GROWMARK, Inc. and Archer Daniels Midland Company (ADM) that ADM operate a network of elevators, river houses, and a Louisiana export terminal, an agreement that offers GROWMARK farmers access to ADM's worldwide marketing ability and provides ADM with reliable supplies of GROWMARK soybeans and grain, both for processing and for direct export. 7/

Cooperative crushers are distinguished from noncooperative-owned crushers by their corporate structure and, more important, their effects on soybean, meal, and oil supplies. The corporate structure of a farm cooperative is straightforward: farmers own shares in a cooperative (and only farmers may be cooperative shareholders), which is a separate entity that carries out services for its members, such as marketing and processing outputs and supplying inputs. Through cooperatives, farmers can jointly own and operate their own crushing mills, thereby ensuring a buyer for their soybeans and perhaps obtaining some market power and, therefore, a degree of influence over price.

1/ The New Yorker, Feb. 16, 1987, pp. 60-61.
2/ Forbes, Aug. 26, 1987, p. 37.
3/ Milling and Baking News, Sept. 15, 1987, p. 12.
4/ Milling and Baking News, June 30, 1987, p. 50.
5/ 1984 Annual Report, Ag Processing Inc, p. 2.
6/ Ibid.
7/ Annual Report 1986, Archer Daniels Midland Co., p. 1.

The distinguishing characteristic of cooperative-owned mills lies not, however, in their market power, which many large crushers have; but instead, cooperatives are different because they lack complete control over their input and output supply. Unlike noncooperative crushers, which if large enough can control price by adjusting output, cooperative crushers have difficulty controlling supply (especially over multiyear periods); without control over supply, there is no control over price. If a cooperative succeeds in obtaining higher meal or oil prices and transfers those into higher prices for its members, those members will increase their supplies next year and new members will be attracted to the cooperative. The cooperative's supply of soybeans, and therefore of meal and oil, will rise and its prices will fall. Generally, membership cannot be controlled. Under most circumstances, new members must be accepted and existing members cannot be compelled to remain; to do otherwise risks violation of applicable antitrust regulations. 1/

Pricing, marketing, and risk management

Pricing and marketing.--The homogeneity of individual oilseed types and oilseed products and the wide variety and substitutability of such products can make domestic and international oilseed markets highly competitive and responsive to price changes. Exporting or importing countries, and the firms operating within them, face stiff price competition from rival suppliers or buyers. The nature of such competition depends on the size of the firm or country. For small countries and firms, pricing "decisions" are already made for them: either sell at the going price or don't sell at all. Small countries are at the mercy of the market; if market prices fall, the country's exporters must accept them. To offset this risk, Governments in small countries may implement export assistance programs or domestic price support programs to stabilize producers' prices and net revenues.

Large exporting or importing countries, some State trading agencies, and large multinational agricultural firms trade in such volumes that their sales or purchase decisions can affect world market supply and demand and, therefore, market prices. Their size forces such organizations to develop pricing policies or market strategies. An example of a national price policy in the United States is the soybean loan program. This Government program has frequently placed a floor under domestic soybean prices to prop them up during periods of soft markets. Another program that indirectly affects prices is the Food for Peace Program under Public Law 480, which maintains U.S. exports of soybean products, particularly soybean oil, in the face of declining demand abroad.

There is an obvious trade off between the support of commodity prices and farmers' incomes and the competitiveness of U.S. agriculture. A floor under soybean prices when exports are unimportant stabilizes prices and protects

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1/ Cooperatives, which are a form of business trust, are generally exempted from antitrust laws by the Capper-Volstead Act and sec. 6 of the Clayton Act. See W.F. Mueller, et al., The Sunkist Case: A Study in Legal-Economic Analysis (Lexington, MA: D.C. Heath and Co., 1987), especially ch. 2 and 3, for a discussion of the law and economics of antitrust as it applies to agricultural cooperatives.

farmers against the risk of deep price declines. However, when exports are important, as in U.S. soybean trade, price supports may make U.S. producers uncompetitive when world (uncontrolled) prices fall below the U.S. support price. Not only are U.S. exporters of soybeans made uncompetitive, but exporters of meal and oil processed from price-supported soybeans cannot then compete with foreign crushers that buy soybeans at unsupported prices.

Pricing policies of private firms are materially different from those of governments. These firms are concerned with net income, and they typically seek to maximize sales volume subject to maintaining a satisfactory (but not necessarily a maximum) margin between input prices and output prices. However, for large firms, expansion of production and sales may squeeze margins by raising input costs and depressing output prices. Thus, a firm must coordinate internal decisions to balance its trade so as to maintain the margin. Such policy making for homogeneous oilseed products can be a complex task. In some cases, U.S.-based multinational firms have found the costs of a centralized global marketing system prohibitive, and have instead left marketing and supply decisions to local profit centers, which decide for themselves whether or not market prices are acceptable or if supplies should be withheld until prices rise. The firm's headquarters then serves as an information clearinghouse for connecting the firm's suppliers with orders from its own buyers or independent buyers. In addition, the headquarters, in many cases, arranges transportation and other marketing tasks. Such a pricing strategy forces the firm, although large relative to the market, to operate as a coordinated group of small "price-takers," since each profit center operates autonomously in some important respects. The marketing emphasis of such a strategy is consistent with the common characterization of some multinationals as merchants, rather than processors, of agricultural products.

Futures markets for soybeans, soy meal, and soy oil are an important source of information about current and expected future prices and serve as a hedge against adverse price movements. Virtually all crushers and traders of oilseeds, meal, and oil have the financial resources to gain access to futures markets, and for most such firms futures markets are vital in determining current and future prices. For example, a soybean mill deciding what price to offer local farmers and elevators for soybeans will consult the daily soybean futures quotes as a guide to current market conditions. The mill's price is then adjusted to allow for transportation, local market anomalies, and expected conditions in the meal and oil markets (for which futures markets are also consulted).

For many crushers, particularly multimill firms, the firm's headquarters actually carries out any trading in futures contracts, and the mill management merely uses the quotes as price guides. Futures trading is used to reduce price risk (see the following discussion of risk management), and is therefore an important element in the pricing strategy of risk-averse oilseed crushers and traders.

<u>Sources and management of risk</u>.--The high fixed costs of soybean milling, the dependency on volatile supplies of soybeans, and the exposure of soybean crushers to the vagaries of various meal and oil markets, all combine to make soybean milling a risky enterprise. Such risk takes two forms, long term and short term. Long term risk includes, among other variables, uncertain long-run demand and supply patterns and political instability (e.g., ranging

from domestic Government restrictions on output or price to national appropriation of assets). U.S.-based crushers have to deal with changes in Government agricultural policies and/or the parameters of those policies, such as the USDA loan support program, which affects the minimum price for soybeans in the U.S. market. Multinational crushers probably face greater political risks, particularly in less developed countries subject to political upheaval, exchange rate controls intended to remedy debt problems, or other risks to business. This risk may influence multinationals' decisions to invest in relatively stable countries, such as Brazil and Argentina (both of which, however, have experienced political instability during the past several years), and avoid riskier areas.

Long-run risk also comes from the increased dependence on export markets, which are further beyond the control of the industry than domestic markets. This dependence subjects the industry to variations in demand for oil in less developed economies and for meal in industrialized economies. Those crushers that also trade soybeans themselves are subject to variations in foreign soybean demand, whether caused by competition from substitute products or trade barriers erected by foreign governments. One way to deal with this kind of risk is to invest in other countries' markets, either as a supplier (e.g., an oilseed crusher) or a buyer (such as an oil refiner or animal feed distributor). Such foreign investment, as noted above, is common for oilseed crushers, and may be used to avoid the risk of unexpected market fluctuations.

Short-run risk is somewhat different from long-run risk. It involves primarily the risk of adverse output price or input cost fluctuations. Oilseed crushers are concerned with maintaining an acceptable margin between the average cost of oilseeds and the average unit value of oilseed products. Because the cost of oilseeds is such a large proportion of the value of oilseed products (90 percent or more), this margin is quite small relative to the value of the crusher's output. A small increase in the price of soybeans, for example, or a small decline in the price of meal, can squeeze or wipe out altogether a crusher's margin. Futures markets are widely used to offset this risk.

Finally, oilseed product pricing is complicated by the existence of farmer cooperative-owned mills. For several years prior to the 1980's, a relatively large number of cooperatives operated soybean mills for their members. In the early 1980's, many of these merged their soybean milling operations into Ag Processing, which now accounts for virtually all cooperative-owned soybean milling. The complexity arises from the fact that a cooperative is obligated to serve its members' interests by processing, or at least marketing, all of the soybeans offered to it by its members; furthermore, because of the open-door nature of cooperatives required by Federal laws, a cooperative has no control over the size of its membership and must accept any new applicants or grant withdrawal to any existing members that desire to cancel membership. Thus, it does not have the control over its throughput that a proprietary or commercial mill does. Its pricing policy, therefore, must be designed to promote sufficient demand to accommodate its members' supplies, keep its mills fully utilized, and return an acceptable profit to its constituency. Ag Processing, with a reported 11.5 percent of the U.S. soybean processing capacity, 1/ is relatively large--its production

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1/ Feedstuffs, August 24, 1984.

affects market supply and price levels, and its price policy probably takes into account rivals' competitive reactions to price changes as well as the direct interests of its membership.

Industry structure vis-a-vis customers and suppliers

The structure of the oilseed-crushing industry and the conduct of its firms are affected by the respective industry structures of oilseed suppliers and oilseed product customers. The relative market power between oilseed crushers and their suppliers and customers helps determine how competitive crushers appear and, in part, how important the export market is for U.S. producers of oilseeds and oilseed products.

Suppliers.--As described earlier, the soybean farming sector is atomistic in structure, consisting of hundreds of widely dispersed farmers and numerous farmer cooperative-operated elevators that supply crushers with soybeans. There is a general imbalance in concentration between farmers and crushers, particularly at the local or regional level (the most relevant market delimitation from the farmers' perspective). The combination of many farmers into cooperatives helps bring their market power into balance with the crushing sector, since cooperatives control a larger supply and can contract on behalf of all their membership at once.

Customers.--Customers for the output of the oilseed crushing sector fall into one of two broad categories, those that utilize or market oilseed meal and those that further process vegetable oil. These groups of firms are important since it is their demand for meal and oil inputs that determines the size and condition of the oilseed farming and crushing sectors.

Traditionally, the driving force behind the soybean market has been the market for soybean meal, which, because of its high yield per unit of soybeans is higher valued than oil. The principal markets for soybean meal are the poultry and livestock industries, where soybean meal serves as the most important of the many ingredients of animal feed. Since animal feed is typically a mix of products, the demand for soybean meal depends in large part on its price relative to the prices of such other meal components as grains and other oilseed meals. Subject to a minimum nutritional constraint, feed manufacturers may substitute any of the various meal components for others in response to price changes; however, high protein content makes soybean meal attractive within a wide range of price.

Despite the concentration in soybean crushing, the soybean meal market appears to be highly competitive. The competitive pressure on soybean meal suppliers comes not only from the larger feed manufacturers but also from the various substitutes for soybean meal in feed manufacture. As a result, soybean meal suppliers face a market encompassing oilseed meals and a number of grains besides.

Additionally, the export market is important for at least two reasons. First, the export market opens up more customers for U.S. production. Second, it creates a number of important new competitors in the forms of both new producing areas for traditional oilseeds and new products such as palm oil. Thus, trade both expands markets and creates new competition for U.S. producers.

The domestic market for soybean meal is heterogeneous, ranging from independent hog farmers that mix their own feed to large corporations that manufacture and market animal feed worldwide. In addition, especially for the larger diversified oilseed crushers, a major customer is often another of the firm's divisions that itself manufactures animal feed. In all cases, however, it is ultimately the demand for meat products (i.e., the output of the poultry and livestock industries) that determines the size of the soybean meal market. The demand for poultry, in particular, has been strong during the last several years because of a shift in consumer demand away from red meats, relatively low poultry prices, and generally rising incomes.

Financial performance of U.S. soybean processing firms

All nine U.S. soybean processing firms that were surveyed provided usable data in response to Commission questionnaires on the income-and-loss experience of their overall operations during 1982-86. These nine firms together accounted for an estimated 90 percent of U.S. soybean oil and meal production in crop year 1985/86. However, one firm acquired a significant number of additional plants in 1984; thus, it could not provide comparable data for 1982 and 1983. For this reason, although data are shown for the period 1982-86, only data for the period 1984-86 are analyzed below.

Net sales of soybean products of the nine companies fell by 15 percent, from $9.4 billion in 1984 to $8.0 billion in 1986. Exports, which accounted for most of the net sales, fell by 15 percent (down by $1.2 billion) during 1984-86, and intra-company transfers also declined by 14 percent during the same period. The total cost of goods sold fell by 15 percent, from $9.2 billion in 1984 to $7.8 billion in 1986. During 1984-86, the cost of soybeans and/or soybean products, which accounted for most of the total cost of goods sold, also fell by 15 percent. Costs of fuel and labor fell during 1984-86: costs of fuel, power, and utilities fell by 24 percent and direct labor costs fell by 12 percent during 1984-86. Plant costs and other fuel and labor rose slightly by 5 percent during the period. General, selling, and administration expenses rose by 16 percent during the period.

During 1984-86, gross profits of those surveyed fluctuated around $200 million annually; operating income, net income before income taxes, and cash flows from operations rose from 1984 to 1985, but then declined in 1986.

The share of total net sales accounted for by the cost of soybean and/or soybean products, the largest share of total net sales, ranged from 87 to 88 percent during 1984-86. The next largest cost component was for other plant costs (excluding soybean and labor costs), and this cost category reached 5.5 percent of net sales in 1986. Costs of fuel, power and utilities as a percent of net sales fluctuated between 3.3 and 3.7 percent of total net sales during the 3 years.

In 1984, one firm reported an operating loss and three firms reported net losses; by 1986, one firm reported an operating loss and one reported a net loss.

Table 3-1
Soybeans: U.S. acreage, yield, and production, 1970-87

Year	Planted	Harvested	Yield	Production
	----Million acres---		Bushels per acre	Million bushels
1970................	43.1	42.2	26.7	1,127.1
1971................	43.5	42.7	27.5	1,176.1
1972................	46.9	45.7	27.8	1,270.6
1973................	56.5	55.7	27.8	1,547.5
1974................	52.5	51.3	23.7	1,216.3
1975................	54.6	53.6	28.9	1,548.3
1976................	50.3	49.4	26.1	1,288.6
1977................	59.0	57.8	30.6	1,767.3
1978................	64.7	63.7	29.4	1,868.8
1979................	71.4	70.3	32.1	2,260.7
1980................	69.9	67.8	26.5	1,797.5
1981................	67.5	66.2	30.1	1,989.1
1982................	70.9	69.4	31.5	2,190.3
1983................	63.1	61.8	26.5	1,635.8
1984................	67.8	66.1	28.1	1,860.9
1985................	63.7	61.6	34.1	2,098.5
1986................	60.4	58.3	33.3	1,940.0
1987 1/............	58.7	57.6	34.2	1,968.0

1/ Projection in October 1987.

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

Table 3-2
Soybeans: U.S. production, by States and by regions, 1972, 1979, 1982, and 1986

(In millions of bushels)

State/region	1972	1979	1982	1986
Great Lakes/Northern Plains States:				
Ohio	80	145	137	150
Indiana	109	159	178	162
Illinois	259	379	362	366
Iowa	216	306	311	363
Missouri	109	184	177	178
Minnesota	90	163	171	170
Kansas	24	41	47	60
Michigan	15	30	32	38
Nebraska	23	55	81	96
North Dakota	4	6	8	17
South Dakota	7	23	24	41
Total	936	1,491	1,528	1,641
Southeast States:				
North Carolina	29	46	52	38
South Carolina	20	40	40	15
Georgia	10	59	68	15
Alabama	16	54	52	14
Total	75	199	212	82
South Central States:				
Kentucky	25	54	52	37
Tennessee	29	71	62	38
Mississippi	48	119	92	44
Arkansas	81	144	108	69
Louisiana	38	94	75	38
Total	221	482	389	226
All other	38	88	61	61
Grand total	1,270	2,260	2,190	2,010

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

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

Table 3-3
U.S. cash grain farms, 1982 1/

Characteristic	Unit	U.S. average	Corn Belt 2/	Southern Plains 2/	Northern Plains 2/	North-west 2/
Assets:						
Land in farms	Acres per farm	498	325	790	1,012	1,142
Value of land	dollars per acre	872	1,357	407	569	718
Value of land and buildings	dollars per farm	434,582	441,174	321,265	575,776	820,304
Value of machinery and equipment	do	64,949	62,494	69,182	87,541	101,580
Total assets 3/	do	499,531	503,668	390,447	663,317	921,884
Crop enterprises:						
Corn	acres per farm	77	111	29	83	9
Sorghum	do	15	2	80	18	0
Wheat	do	94	26	240	239	335
Barley	do	10	2	2	41	107
Oats	do	6	4	3	20	4
Sunflowerseed	do	6	2	0	45	0
Soybeans	do	88	107	27	33	0
Hay	do	14	8	19	38	26
Income:						
Total sales	dollars per farm	59,509	60,092	58,272	71,128	98,717
Cash grains	do	50,206	52,360	48,061	60,058	84,003
All other crops	do	2,146	863	2,783	1,636	9,368
All livestock	do	6,150	6,869	7,427	9,428	5,346
Cattle and calves	do	3,715	2,998	6,737	7,226	4,768
Hogs and pigs	do	2,000	3,368	472	1,746	211
Agricultural services	do	530	494	715	624	880
Total operating expenses	do	26,407	25,415	28,982	32,538	41,486
Form of organization:						
Individual or family	percent	85.6	85.2	86.7	85.8	78.5
Partnerships	do	11.2	11.9	10.1	10.3	11.9
Corporations	do	2.7	2.4	2.6	3.5	8.7
Operating ratios:						
Operating expenses:						
Per acre	dollars per acre	53.00	78.20	36.70	32.20	36.30
Per dollar of sales	dollars	.45	.42	.50	.46	.42
Per dollar of assets	do	.05	.05	.07	.05	.05
Sales:						
Per acre	dollars per acre	117.00	185.00	74.00	70.00	86.00
Per dollar of assets	do	.12	.12	.15	.11	.11
Per dollar of operating expenses	do	2.22	2.36	2.01	2.19	2.38
Cash returns	dollars per acre	64.00	106.80	37.30	37.80	49.70
Number of farms		576,353	263,936	78,500	73,084	13,175

1/ Farms whose sales of cash grains constitute more than half of total cash receipts.
2/ The Corn Belt is Iowa, Illinois, Indiana, Minnesota, Ohio, and Missouri. The Southern Plains is Kansas, Oklahoma, Texas, and Colorado. The Northern Plains is Montana, North Dakota, South Dakota, and Nebraska. The Northwest is Washington, Oregon, and Idaho.
3/ Includes land, buildings, improvements, machinery, and equipment and excludes inventories of crops and livestock.

Source: Census of Agriculture, 1982.

Table 3-4
Soybeans: U.S. production costs, 1983-85
(Per planted acre)

Item	1983	1984	1985
Cash receipts:			
Primary crop	$204.46	$166.72	$162.72
Total	204.46	166.72	162.72
Cash expenses: 1/			
Seed	7.98	10.08	8.74
Fertilizer	7.58	7.70	6.84
Lime and gypsum	1.16	1.15	1.12
Chemicals	19.18	18.35	17.47
Custom operations	3.84	3.85	3.86
Fuel, lube, and electricity	10.35	8.43	7.58
Repairs	6.63	6.64	6.49
Hired labor	1.47	1.47	1.50
Miscellaneous	.34	.35	.34
Technical services	.18	.16	.15
Total, variable expenses	58.71	58.18	54.10
General farm overhead	10.43	10.81	10.91
Taxes and insurance	11.18	11.77	12.16
Interest	32.57	33.82	33.23
Total, fixed expenses	54.18	56.40	56.30
Total, cash expenses	112.89	114.58	110.40
Receipts less cash expenses	91.57	52.14	52.32
Capital replacement	24.50	24.13	23.80
Receipts less expenses and replacement	67.07	28.01	28.52
Economic (full ownership) costs:			
Variable expenses	58.71	58.18	54.10
General farm overhead	10.43	10.81	10.91
Taxes and insurance	11.18	11.77	12.16
Capital replacement	24.50	24.13	23.80
Allocated returns to owned inputs:			
Return to operating capital 2/	2.21	2.47	1.81
Return to other nonland capital 3/	8.22	8.08	8.06
Net land rent 4/	63.46	52.99	48.80
Unpaid labor	9.82	9.84	10.07
Total, economic costs	188.53	178.27	169.71
Residual returns to management and risk 5/	15.93	-11.55	-6.99
Total, returns to owned inputs 6/	99.64	61.83	61.75
Harvest-period price (per bushel)	$7.95	$6.05	$4.86
Yield (bushels/planted acre)	25.72	27.54	33.45

1/ Sum of operator and landlord expenses.
2/ Variable expense items multiplied by part of year used and the 6-month U.S. Treasury bill rate.
3/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in farm sector.
4/ Of total acres rented, percentage of cash- and share-rented acres multiplied by the average cash and share rent.
5/ Total cash receipts less total economic costs.
6/ Sum of allocated and residual returns.

Source: U.S. Department of Agriculture, Economic Indicators of the Farm Sector: Costs of Production 1985, 1986, p. 71.

Table 3-5
Soybeans: U.S. average variable cost of production, by selected regions, 1980-85

Region	1980	1981	1982	1983	1984	1985
	Per bushel					
Delta	$3.77	$3.46	$2.66	$2.96	$2.42	$2.32
Lake States and Corn Belt	1.42	1.51	1.46	1.83	1.81	1.35
Northern Plains	1.56	1.28	1.36	1.95	2.15	1.36
Southeast	4.63	3.39	2.90	4.29	3.17	2.79
U.S. average	2.06	2.01	1.83	2.28	2.11	1.62
	Percentage difference from U.S. average					
Delta	83	72	45	30	15	43
Lake States and Corn Belt	-31	-25	-20	-20	-14	-17
Northern Plains	-24	-36	-26	-14	2	-16
Southeast	125	69	58	88	50	72

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

Table 3-6
Soybeans: U.S. use and stocks, crop years 1970-86

Year beginning Sept. 1--	Crush	Seed, feed, and residual	Exports	Total use	Ending stocks	Ratio of stocks to use
	Million bushels					Percent
1970	760	64	434	1,258	99	7.9
1971	721	65	417	1,203	72	6.0
1972	722	82	479	1,283	60	4.7
1973	821	77	539	1,437	171	11.9
1974	701	77	421	1,199	188	15.7
1975	865	71	555	1,491	245	16.4
1976	790	77	564	1,431	103	7.2
1977	927	82	700	1,709	161	9.4
1978	1,018	97	739	1,854	176	9.5
1979	1,123	81	875	2,079	358	17.2
1980	1,020	99	724	1,843	313	17.0
1981	1,030	89	929	2,048	254	12.4
1982	1,108	86	905	2,099	345	16.4
1983	983	79	743	1,805	176	9.8
1984	1,030	93	598	1,721	316	18.4
1985 1/	1,053	86	740	1,879	536	28.5
1986 2/	1,080	90	760	1,930	615	31.3

1/ Preliminary.
2/ U.S. Department of Agriculture forecast.

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

Table 3-7
Soybeans, n.s.p.f.: 1/ U.S. exports of domestic merchandise, by major markets, 1978-86

Year	EC-12	Japan	Taiwan	Soviet Union	Republic of Korea	All other	Total
	Quantity (1,000 pounds)						
1978...	24,452,732	8,498,573	2,359,195	1,648,934	652,807	8,840,679	45,644,920
1979...	22,908,180	8,192,960	2,426,700	4,006,020	929,940	7,606,440	46,050,240
1980...	25,717,740	8,890,980	2,063,100	381,300	1,244,340	9,716,100	48,013,500
1981...	26,732,700	8,821,560	2,321,040	74,400	936,060	9,242,160	48,127,860
1982...	32,528,220	8,967,480	2,483,580	1,430,940	1,206,360	9,456,060	56,162,640
1983...	24,627,420	10,031,880	3,031,380	1,236,480	1,641,600	9,485,400	50,054,220
1984...	19,584,080	9,124,020	2,894,040	101,880	1,455,600	9,845,040	42,954,780
1985...	16,513,380	9,474,060	2,994,060	0	1,824,960	7,833,840	38,640,300
1986...	21,603,600	9,086,520	3,825,120	3,347,940	2,232,660	6,956,880	47,052,660
	Value (1,000 dollars)						
1978...	2,777,579	980,747	254,583	199,771	77,304	918,082	5,208,066
1979...	2,808,664	1,031,858	308,898	489,278	116,779	945,492	5,700,969
1980...	3,138,180	1,105,238	261,673	45,322	155,482	1,174,047	5,879,942
1981...	3,420,842	1,137,878	314,169	8,432	124,027	1,180,181	6,185,529
1982...	3,609,266	970,044	285,560	171,264	141,879	1,039,734	6,217,747
1983...	2,890,731	1,209,373	362,647	157,162	201,200	1,092,273	5,913,386
1984...	2,366,738	1,171,696	390,637	14,039	186,788	1,289,277	5,419,175
1985...	1,634,090	936,982	321,720	0	185,476	810,647	3,888,916
1986...	1,948,589	837,212	358,750	312,981	206,091	651,906	4,315,528

1/ Schedule B items 1754100.

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

Table 3-8
Soybeans: Distribution of U.S. soybeans inspected for export, by regions and by port areas, 1978 and 1983-86

Port	1978	1983	1984	1985	1986 3/
	In percent				
Great Lakes region...........	12	3	6	5	5
South Atlantic region........	9	7	8	9	7
North Atlantic region........	2	2	1	1	0
Gulf region..................	77	84	78	79	83
Pacific region...............	1/	3	3	3	2
Interior parts...............	2/	1	4	3	2
Total....................	100	100	100	100	100
	Million bushels				
Total volume inspected.......	700	832	704	617	790

1/ Less than 0.5 percent.
2/ Not reported separately.

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

Source: Compiled from data of the U.S. Department of Agriculture, Federal Grain Inspection Service.

Table 3-9
Soybean oil and meal: U.S. production, imports for consumption, exports of domestic merchandise, apparent consumption, and ending stocks, crop years 1977/78-1986/87

(In thousands of metric tons)

Crop year 1/	Production	Imports	Exports	Apparent consumption	Ending stocks
Oil:					
1977/78....	4,666	0	933	3,752	331
1978/79....	5,136	0	1,059	4,056	352
1979/80....	5,491	0	1,220	4,074	549
1980/81....	5,112	0	740	4,134	787
1981/82....	4,980	0	942	4,325	500
1982/83....	5,462	0	918	4,472	572
1983/84....	4,932	0	827	4,350	327
1984/85....	5,202	0	753	4,498	287
1985/86....	5,269	4	570	4,560	430
1986/87....	5,830	0	499	4,876	885
Meal:					
1977/78...	20,296	0	5,516	14,767	220
1978/79...	22,094	0	5,997	16,075	242
1979/80...	24,589	0	7,196	17,430	205
1980/81...	22,055	0	6,154	15,958	148
1981/82...	22,348	0	6,266	16,071	159
1982/83...	24,235	0	6,449	17,515	430
1983/84...	20,646	0	4,862	15,983	231
1984/85...	22,252	0	4,460	17,672	351
1985/86...	22,635	0	5,476	17,318	192
1986/87...	25,291	0	6,713	18,507	263

1/ The crop year for soybean oil runs from Sept. 1 to Aug. 31 of the following year. Data for 1986/87 are preliminary as of September 1987.

Source: Compiled from official statistics of the U.S. Department of Agriculture, Foreign Agricultural Service.

Table 3-10
Oilseeds: U.S. harvested acreage, yield, production, imports, exports, crush, domestic consumption, and ending stocks, crop years 1977/78 to 1986/87
(In thousands of metric tons)

Crop year	Harvested acreage 1/	Yield 2/	Production	Imports	Exports	Crush	Domestic consumption	Ending stocks
1977/78.....	30,849	1.831	56,484	25	20,530	29,867	33,824	5,662
1978/79.....	32,863	1.782	58,567	48	22,018	32,308	36,544	5,715
1979/80.....	36,819	1.960	72,181	60	26,206	35,534	39,726	12,024
1980/81.....	35,115	1.592	55,915	274	21,568	32,756	37,327	9,318
1981/82.....	34,755	1.840	63,964	108	27,142	33,087	38,079	8,169
1982/83.....	34,767	1.960	68,154	90	26,318	34,745	39,608	10,487
1983/84.....	30,307	1.664	50,430	153	21,642	30,185	34,182	5,246
1984/85.....	33,287	1.778	59,189	123	17,720	32,322	37,085	9,753
1985/86.....	31,043	2.107	65,413	101	20,994	33,063	38,727	15,546
1986/87 3/..	29,175	2.101	61,305	75	19,863	33,635	38,898	18,165

1/ Harvested acreage in thousand metric tons.
2/ Yield in metric tons per hectare.
3/ Preliminary.

Note.--Major oilseeds include cottonseed, flaxseed, peanut, rapeseed, soybeans, and sunflowerseed. The crop year runs from Sept. 1 to Aug. 31 of the following year.

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

Table 3-11
Vegetable and marine oils and protein meals: U.S. production, imports, exports, domestic consumption, and ending stocks, crop years 1977/78 to 1986/87

(In thousands of metric tons)

Crop year	Production	Imports	Exports	Domestic consumption	Ending stocks
Vegetable and marine oils:					
1977/78	5,717	711	1,485	5,053	521
1978/79	6,148	707	1,537	5,251	588
1979/80	6,700	584	1,793	5,198	849
1980/81	6,214	777	1,527	5,274	1,039
1981/82	6,160	672	1,574	5,518	779
1982/83	6,591	700	1,597	5,619	854
1983/84	5,832	727	1,376	5,520	517
1984/85	6,255	788	1,235	5,820	505
1985/86	6,395	1,112	1,122	6,102	788
1986/87 1/	6,403	984	1,087	6,244	844
Protein meals:					
1977/78	23,000	54	5,767	17,260	298
1978/79	24,689	100	6,269	18,514	304
1979/80	27,508	75	7,578	20,042	267
1980/81	24,747	105	6,404	18,460	255
1981/82	25,234	110	6,507	18,782	310
1982/83	26,739	140	6,592	20,074	523
1983/84	22,630	171	5,019	17,969	336
1984/85	24,818	377	4,564	20,531	436
1985/86	25,108	318	5,602	19,987	273
1986/87 1/	25,820	332	5,894	20,158	373

1/ Preliminary.

Note.--Major oils include coconut, cottonseed, fish, linseed, olive, palm, palm kernel, peanut, rapeseed, soybean, and sunflowerseed. Major protein meals include copra, cottonseed, fish, linseed, peanut, rapeseed, soybean, and sunflowerseed. The crop year runs from Sept. 1 to Aug. 31 of the following year.

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

Table 3-12
Soybeans: U.S. area, yield, production, imports for consumption, exports of domestic merchandise, crush, apparent consumption, and ending stocks, crop years 1977/78 to 1986/87

Crop year 1/	Area 2/	Yield 3/	Production	Imports	Exports	Crush	Apparent consumption	Ending stocks
			In thousands of metric tons					
1977/78....	23,403	2.055	48,097	0	19,061	25,220	27,451	4,386
1978/79....	25,764	1.974	50,859	0	20,117	27,701	30,349	4,779
1979/80....	28,467	2.161	61,525	0	23,818	30,573	32,730	9,756
1980/81....	27,443	1.783	48,921	0	19,712	27,773	30,446	8,519
1981/82....	26,776	2.022	54,135	0	25,285	28,032	30,443	6,926
1982/83....	28,102	2.121	59,610	0	24,634	30,155	32,523	9,379
1983/84....	25,303	1.759	44,518	0	20,215	26,753	28,900	4,782
1984/85....	26,755	1.893	50,644	0	16,279	28,032	30,545	8,602
1985/86....	24,922	2.292	57,113	0	20,143	28,658	30,977	14,595
1986/87 4/.	24,050	2.271	54,622	0	19,051	30,345	32,884	17,282

1/ The crop year for soybeans runs from Sept. 1 to Aug. 31 of the following year.
2/ In hectares.
3/ In metric tons per hectare.
4/ Data for 1986/87 are preliminary.

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

Table 3-13
Oilseeds and oilseed products: U.S. exports, by commodities, 1978-86

Year	Oilseeds	Oilseed meals	Fats and oils	Total
	Quantity (1,000 pounds)			
1978	48,829,674	14,804,000	3,256,627	67,257,620
1979	49,196,994	14,202,000	3,510,507	69,600,416
1980	51,887,909	16,374,000	3,986,252	72,429,923
1981	52,069,672	15,016,000	3,565,750	78,211,919
1982	59,630,169	14,208,000	3,540,338	69,674,867
1983	51,926,529	14,860,000	3,176,099	64,577,761
1984	46,541,661	10,264,000	3,593,013	54,028,292
1985	40,171,279	10,698,000	2,488,584	61,380,616
1986	48,194,032	13,402,000	2,654,682	64,250,714
	Value (1,000 dollars)			
1978	5,587,962	1,299,738	944,201	7,831,900
1979	6,114,832	1,478,084	1,121,404	8,714,320
1980	6,341,738	1,726,810	1,180,991	9,249,539
1981	6,732,656	1,661,351	1,030,631	9,424,638
1982	6,657,718	1,446,930	910,462	9,015,110
1983	6,162,343	1,567,462	843,752	8,573,558
1984	5,987,898	1,049,800	1,220,229	8,257,927
1985	4,098,536	888,654	838,495	5,825,685
1986	4,457,572	1,241,232	636,203	6,335,007

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

Table 3-14
Soybeans and soybean products: U.S. exports, by commodities, 1978-86

Year	Soybeans	Soybean meal	Soybean oil	Total
	Quantity (1,000 pounds)			
1978	45,644,920	13,966,000	3,713,608	63,324,528
1979	46,050,240	13,418,000	4,589,612	64,057,852
1980	48,013,500	15,484,000	4,519,557	68,017,057
1981	48,127,860	13,986,000	3,301,394	65,415,254
1982	56,162,640	13,694,000	3,740,844	73,597,484
1983	50,054,220	14,304,000	3,279,265	67,637,485
1984	42,954,780	9,854,000	4,362,337	57,171,117
1985	38,640,300	10,396,000	2,476,480	51,512,780
1986	47,052,660	13,136,000	2,273,972	62,462,632
	Value (1,000 dollars)			
1978	5,208,066	1,242,184	1,025,523	7,475,773
1979	5,700,969	1,416,457	1,393,454	8,510,880
1980	5,879,942	1,654,063	1,267,563	8,800,468
1981	6,185,529	1,588,523	846,266	8,620,318
1982	6,217,747	1,411,436	863,897	8,493,080
1983	5,913,386	1,527,074	787,997	8,228,457
1984	5,419,175	1,019,333	1,408,417	7,846,925
1985	3,888,916	870,558	819,925	5,579,399
1986	4,315,528	1,224,014	479,971	6,019,513

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

Table 3-15
Soybean oil cake and meal: 1/ U.S. exports of domestic merchandise, by major markets, 1978-86

Year	EC-12	Canada	Vene-zuela	Egypt	Indo-nesia	All other	Total
	Quantity (1,000 short tons)						
1978....	3,648	865	185	54	16	2,216	6,983
1979....	3,503	439	297	0	20	2,451	6,709
1980....	4,301	373	374	0	21	2,674	7,742
1981....	4,165	373	440	2	0	2,013	6,993
1982....	4,497	396	523	12	90	1,339	6,847
1983....	4,535	434	559	25	50	1,551	7,152
1984....	2,004	533	589	18	88	1,695	4,927
1985....	2,275	543	804	125	0	1,450	5,198
1986....	3,082	804	466	279	228	1,709	6,568
	Value (1,000 dollars)						
1978....	674,316	84,350	40,187	10,166	3,763	429,402	1,242,184
1979....	706,250	97,794	71,542	-	4,372	536,499	1,416,457
1980....	894,843	81,317	85,152	-	4,603	588,149	1,654,063
1981....	905,682	83,438	107,867	680	-	490,855	1,588,523
1982....	909,109	79,669	114,886	2,882	18,377	286,512	1,411,436
1983....	940,390	97,020	129,910	5,838	11,563	342,352	1,527,074
1984....	393,529	111,961	138,680	4,483	17,440	353,240	1,019,333
1985....	374,706	92,634	134,901	19,427	-	248,890	870,558
1986....	567,617	144,793	91,468	47,591	44,549	327,997	1,224,014

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

Table 3-16
Soybean oil, crude, refined, or hydrogenated: 1/ U.S. exports of domestic merchandise, by major markets, 1978-86

Year	Pakistan	India	Mexico	Bangla-desh	Somalia	All other	Total
	Quantity (1,000 pounds)						
1978...	211,230	591,217	75,512	58,892	10,343	1,101,488	2,048,681
1979...	360,537	496,572	1,606	116,888	15,412	1,498,699	2,489,713
1980...	331,176	807,770	110,993	21,899	31,773	1,112,789	2,416,401
1981...	400,529	202,179	5,599	55,766	28,172	1,110,790	1,803,036
1982...	603,254	78,646	235,432	100,404	24,867	1,013,960	2,056,563
1983...	362,922	129,443	1,509	58,580	28,665	1,151,001	1,732,120
1984...	500,561	434,007	296,689	32,729	23,416	991,972	2,279,375
1985...	380,426	45,844	82,848	0	30,717	753,810	1,293,646
1986...	575,778	79,979	84,506	51,725	35,556	363,387	1,190,930
	Value (1,000 dollars)						
1978...	56,050	163,359	20,440	17,922	3,598	307,740	569,109
1979...	108,179	165,684	512	38,912	6,702	448,616	768,604
1980...	91,668	228,144	31,416	7,293	11,612	318,757	688,890
1981...	94,911	59,268	1,673	15,592	9,498	292,967	473,908
1982...	131,208	24,081	63,009	22,782	7,386	237,918	486,383
1983...	93,222	38,617	450	14,752	7,494	269,332	423,866
1984...	162,371	142,431	71,348	10,233	10,129	345,116	741,628
1985...	118,511	18,196	24,033	-	13,228	257,480	431,449
1986...	111,473	20,097	18,646	9,684	9,178	83,965	253,044

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

Table 3-17
Oilseeds and oilseed products: U.S. imports, by commodities, 1978-86

Year	Oilseeds	Oilseed meals	Fats and oils	Total
	Quantity (1,000 pounds)			
1978	143,861	19,792	1,898,768	2,062,421
1979	210,930	55,695	1,716,937	1,983,562
1980	193,694	58,245	1,567,130	1,819,069
1981	445,198	116,119	1,694,651	2,255,968
1982	272,744	145,802	1,554,755	1,973,301
1983	382,719	255,727	1,802,423	2,410,869
1984	341,161	256,074	1,617,056	2,214,291
1985	435,377	344,767	2,104,439	2,884,583
1986	306,471	331,691	2,568,261	3,206,423
	Value (1,000 dollars)			
1978	35,656	1,680	480,188	517,524
1979	49,917	4,356	672,635	726,908
1980	51,043	4,776	525,383	581,202
1981	86,772	9,859	471,267	567,898
1982	59,463	10,708	386,042	456,213
1983	79,824	17,502	461,856	559,182
1984	73,134	18,481	671,771	763,386
1985	76,110	15,428	630,444	721,982
1986	50,008	17,197	486,642	553,847

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

Table 3-18
Oilseeds and products: U.S. imports for consumption, by principal sources, 1978-86

(In thousands of dollars)

Year	Philippines	Malaysia	EC-12	Canada	Mexico	All other	Total
1978	246,789	89,051	50,450	12,087	17,967	101,180	517,524
1979	354,790	141,126	58,689	23,728	21,909	126,667	726,909
1980	225,224	115,208	62,731	23,808	25,153	129,079	581,203
1981	229,643	91,348	60,585	62,645	27,784	95,893	567,898
1982	169,600	81,913	64,431	33,938	24,552	81,779	456,213
1983	193,821	110,162	63,097	56,186	24,930	110,986	559,182
1984	273,909	189,614	70,762	59,854	25,243	144,003	763,385
1985	181,485	176,475	75,247	72,264	20,863	195,648	721,982
1986	157,852	126,341	89,319	58,344	18,851	103,140	553,847

1/ TSUS items 175.03-178.30 and 184.50-184.53.

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

Table 3-19
Coconut oil: 1/ U.S. imports for consumption, by major sources, 1978-86

Year	Phil-ippines	Sri Lanka	Malay-sia	Pacific Trust Territory	EC-12	All other	Total
	Quantity (1,000 pounds)						
1978...	987,224	2,174	1,106	19,042	1	12,947	1,022,494
1979...	879,902	22,421	16,544	32,158	3	28,761	979,789
1980...	750,028	7,746	16,239	13,440	7	101,844	889,304
1981...	959,707	25,182	8,960	17,254	2,238	23,542	1,036,883
1982...	815,846	10,223	13,504	7,746	12	42,431	889,762
1983...	877,550	21,816	29,397	8,313	21	53,619	990,716
1984...	696,226	8,486	58,366	10,051	11	60,027	833,167
1985...	686,733	39,852	71,465	8,287	90	186,076	992,503
1986...	1,063,394	61,868	31,834	6,779	138	14,065	1,178,078
	Value (1,000 dollars)						
1978...	246,386	638	351	4,598	1	3,948	255,922
1979...	353,485	10,054	7,467	12,713	3	11,406	395,128
1980...	224,631	3,142	5,583	3,937	9	32,931	270,233
1981...	229,538	6,287	2,411	4,212	522	6,137	249,107
1982...	168,686	2,196	2,887	1,228	12	9,088	184,097
1983...	193,549	5,548	8,330	1,694	18	13,939	223,078
1984...	272,988	4,987	29,447	4,882	14	29,979	342,297
1985...	179,044	11,981	25,988	2,501	58	59,450	279,022
1986...	156,405	9,844	4,500	908	123	1,870	173,650

1/ TSUS items 176.1720-176.1740.

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

Table 3-20
Palm kernel oil: 1/ U.S. imports for consumption, by major sources, 1978-86

Year	Malaysia	Indonesia	Singapore	Macao	EC-12	All other	Total
	Quantity (1,000 pounds)						
1978......	92,473	13,682	2,137	0	13,775	4,109	126,176
1979......	143,251	0	7,626	0	13,431	3,573	167,881
1980......	159,036	0	3,338	0	17,504	3,751	183,629
1981......	119,965	0	0	0	15,689	17,052	152,706
1982......	184,236	0	0	0	18,940	7,666	210,842
1983......	214,144	0	0	0	19,626	1,123	234,893
1984......	182,418	1,653	730	0	14,604	2,717	202,122
1985......	201,554	49,249	10,813	0	20,030	1,224	282,870
1986......	288,375	49,834	4,801	11,013	13,974	5,929	373,926
	Value (1,000 dollars)						
1978......	24,339	3,462	447	-	7,852	1,192	37,292
1979......	53,581	-	3,228	-	10,119	1,586	68,514
1980......	49,777	-	1,190	-	13,385	1,274	65,626
1981......	30,158	-	-	-	9,926	4,224	44,308
1982......	35,399	-	-	-	11,429	1,714	48,542
1983......	48,443	-	-	-	12,343	210	60,996
1984......	78,899	346	604	-	12,031	1,216	93,096
1985......	56,932	15,176	3,861	-	14,672	518	91,159
1986......	45,051	6,378	1,771	1,114	7,450	984	62,748

1/ TSUS items 176.32-176.33.

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

Table 3-21
Palm oil: 1/ U.S. imports for consumption, by major sources, 1978-86

Year	Malay- sia	Indo- nesia	Sin- gapore	Phil- ippines	EC-12	All other	Total
	Quantity (1,000 pounds)						
1978......	307,630	8,776	2,255	2,292	2	1,866	322,821
1979......	295,690	12,366	2,197	1,135	37	742	312,167
1980......	251,297	0	2,426	1,116	43	609	255,491
1981......	263,943	4,437	0	0	76	267	268,723
1982......	220,664	25,927	0	2,205	1,115	97	250,008
1983......	289,230	31,225	7,535	0	6	739	328,735
1984......	277,148	41,554	3,308	0	1,264	2,356	325,630
1985......	376,987	62,641	38,121	9,835	2,432	6,919	496,935
1986......	534,277	36,182	18,366	7,840	2,244	6,579	605,488
	Value (1,000 dollars)						
1978......	64,361	1,766	449	399	1	399	67,375
1979......	80,078	3,224	577	425	17	206	84,527
1980......	59,845	-	628	301	35	168	60,977
1981......	58,777	848	-	-	32	101	59,758
1982......	43,626	4,344	-	385	193	45	48,593
1983......	53,387	5,712	1,152	-	3	502	60,756
1984......	80,816	8,508	713	-	896	1,192	92,125
1985......	93,555	13,231	9,120	2,249	652	1,842	120,649
1986......	76,778	4,527	3,849	745	497	1,311	87,707

1/ TSUS item 176.34.

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

Table 3-22
U.S. high-protein livestock feed: Quantity of feed and high-protein animal units, 1976-80 average and 1981-85

Item	1976-80 Average	Year beginning Oct. 1-- 1981	1982	1983	1984	1985
Quantity of feed (in 44-percent protein soybean meal equivalent):						
Oilseed meal (1,000 metric tons)......	17,223	18,974	19,690	17,776	20,700	20,140
Animal protein (1,000 metric tons.......	3,214	3,701	2,564	2,331	3,900	3,670
Grain protein (1,000 metric tons)......	984	1,003	1,035	1,400	1,990	1,760
Total 1/ (1,000 metric tons)......	22,225	23,678	23,286	21,507	26,600	25,600
High-protein animal units (million head)..................	109	110	109	109	109	110
Feed consumed per animal unit (pounds)..............	446	474	471	432	535	512

1/ Because of rounding, figures may not add to the totals shown.

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

Table 3-23
Principal oilseed meals: Consumption in processed livestock feeds, 1976-80 average and 1981-85

(In thousands of metric tons)

Feed	1976-80 Average	Year beginning Oct. 1-- 1981	1982	1983	1984	1985
Soybean..............	15,211	15,777	17,011	15,453	17,691	17,509
Cottonseed...........	1,560	1,779	1,439	1,082	1,617	1,492
Linseed..............	116	100	70	70	115	113
Peanut...............	112	114	80	80	100	141
Sunflowerseed........	116	430	302	300	427	254
Total............	17,114	18,200	18,902	16,985	19,950	19,509

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

Table 3-24
Soybean processing mills: U.S. crushing capacity, by State, January 1986

State	Capacity 1/	Share of total capacity	Number of mills
		Percent	
Illinois................	28,800	24	13
Iowa....................	19,500	17	10
Minnesota...............	8,400	7	4
Missouri................	6,500	6	4
Arkansas................	6,300	5	5
Ohio....................	5,300	5	5
Kansas..................	4,500	4	3
Indiana.................	1,800	2	3
Georgia.................	4,050	3	4
Michigan................	3,600	3	3
South Carolina..........	2,600	3	3
Other...................	24,150	21	16
Total...............	115,500	100	73

1/ Capacity measured in thousands of short tons of daily processing capacity.

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

Source: Compiled from unofficial data supplied by U.S. trade sources.

Table 3-25.--Soybean-related mergers and other asset transfers in the U.S. soybean-processing industry, September 1983 to September 1987

Month/ Year	Buyer	Seller	Description of merger or asset transfer
Sept. 1983	Ag Processing	Boone Valley Coop. Assoc.; Farmland Industries; and Land O'Lakes	Partial merger of three farmers' cooperatives to form Ag Processing, with soybean processing as its primary business. The new firm reportedly controls 9 percent of the U.S. industry through its 6 midwestern mills. 1/
Feb. 1984	Seaboard Corp.	Central Soya	Acquisition of poultry processing division, a large buyer of soybean meal. 2/
Feb. 1984	Unilever (U.S.)	Beatrice Foods	Acquisition of Beatrice's Shedd Margarine Group, a large ($200 million) buyer of soybean oil. 3/
Mar. 1984	Archer Daniels Midland	Continental	Acquisition of one soybean mill and elevator, employing 90 people, which Continental had previously announced it would close because of weak soybean product markets. 4/
May 1984	Central Soya	Proctor & Gamble	Acquisition of assets of Proctor & Gamble's Victory Soya Mills, Ltd., unit (Canada), as Proctor & Gamble continues to exit from commodity industries. 5/
Oct. 1984	A.E. Staley	CFS Continental	Merger. Staley reportedly is trying to diversify out of raw commodities; CFS, reportedly the second largest U.S. food-service distributor, is a large buyer of oilseed products. 6/ The merger will nearly double Staley's annual sales of $1.6 billion, including income from soybean crushing. 7/ Earlier, Staley reported an indefinitely long closure of its largest mill because of continuing weakness in soybean product markets. 8/ Later, Staley announced the formation of Staley Continental, Inc., a holding company consisting of the two merging firms as operating companies. 9/
Jan. 1985	Cargill	Ralston Purina	In an attempt to move away from commodity-based businesses, Ralston Purina sold 6 of its 7 soybean mills; the seventh (Memphis, TN) is reported to be permanently closed. 10/ The deal leaves Ralston Purina completely dependent on outside sources for soybean products for its pet food and other products, and gives Cargill a total of 20 soybean mills. 11/

See footnotes at end of table.

Table 3-25--Continued
Soybean-related mergers and other asset transfers in the U.S. soybean-processing industry, September 1983 to September 1987

Month/ Year	Buyer	Seller	Description of merger or asset transfer
Jan. 1985	Independent Soy Processors, Inc.	Staley Continental	Continuing to divest itself of soybean operations, Staley Continental sold its soybean milling and protein-concentrate business, including four mills in Illinios, Ohio, Indiana, and Missouri, and a mill and oil refinery in Iowa to Independent Soy Processors (ISP). ISP includes Archer Daniels Midland (ADM) as a minority shareholder. The mills have been leased to, and are being operated by, ADM. 12/
Apr. 1985	Shamrock Holdings	Central Soya	Shamrock, a Disney family-controlled firm, acquired controlling interest in Central Soya, previously publicly held, reportedly viewing the decline in soybean markets as only a short-run phenomenon. 13/
Mar. 1986	Cargill	Continental	Acquisition of soybean mill, oil refinery, and bulk handling facility in Liverpool, England. 14/
Feb. 1986	Unilever (U.S.)	Central Soya	Acquisition of J.H. Filbert, Inc., a Baltimore, MD-based producer and distributor of margarines and salad-related products. 15/
Mar. 1986	Central Soya	Staley Continental	Acquisition of Staley product line of soy proteins, marketed in the United States and world markets. 16/
Apr. 1986	Archer Daniels Midland	Unilever PLC	Because of low oilseed crushing margins, Unilever sold two West Germany oilseed mills and one Netherlands oilseed mill, accounting for over half of the firm's total European milling capacity, to ADM, which will supply the mills with raw material imported from the United States, Brazil, China, and Argentina, (including shipments from ADM oilseed export facilities), as well as European sources. The Netherlands mill is reported to be the world's largest. 17/
Jan. 1987	Central Soya	Bunge	Proposed acquisition of seven soybean mills, employing over 500 people, located in Cairo, IL; Decatur, AL; Emporia, KS; Logansport, IN; Jackson, MS; and Vicksburg, MS 18/ The deal was subsequently terminated. 19/

See footnotes at end of table.

Table 3-25--Continued
Soybean-related mergers and other asset transfers in the U.S. soybean-processing industry, September 1983 to September 1987

Month/ Year	Buyer	Seller	Description of merger or asset transfer
July 1987	Archer Daniels Midland	Gold Kist, Inc.	Gold Kist, a farmer's cooperative, sold ADM a soybean milling and refining facility in Valdosta, GA. Gold Kist owns a minor interest in Toepfer International Group, a West German grain trading firm controlled by ADM. 20/
Sept. 1987	Ferruzzi Agricola Finanziario	Shamrock Holdings	Purchase of Central Soya (see above purchase of Central Soya by Shamrock) to Italian agribusiness conglomerate, which reportedly will operate it as an autonomous subsidiary. The purchase "will allow Central Soya to extend its product lines . . . into Europe." 21/

1/ Feedstuffs, Aug. 20, 1984.
2/ Wall Street Journal, Feb. 27, 1984.
3/ Ibid., Jan. 10, 1984 and Feb. 27, 1984.
4/ Ibid., Mar. 30, 1984.
5/ Ibid., May 14, 1984.
6/ Ibid., Oct. 17, 1984.
7/ Ibid., Oct. 23, 1984.
8/ Ibid., Dec. 14, 1983.
9/ Ibid., Feb. 12, 1985.
10/ Ibid., Oct. 19, 1984.
11/ Ibid., Jan. 3, 1985.
12/ Ibid., Jan. 14, 1985; Standard & Poor's News, Jan. 12, 1985; Staley Continental: Annual Report 1985.
13/ Wall Street Journal, Apr. 2, 1985; Business Week, Aug. 26, 1985.
14/ Feedstuffs, Jan. 6, 1986.
15/ Wall Street Journal, Feb. 11, 1986.
16/ Moody's Corporate News, Mar. 10, 1986.
17/ Archer Daniels Midland Annual Report FY 1986; Wall Street Journal, Sept. 30, 1986 and Apr. 10, 1986; The Public Ledger, Apr. 11, 1986; Unilever: Annual Report 1985.
18/ Moody's Corporate News, Jan. 26, 1987.
19/ Milling and Baking News, Feb. 24, 1987.
20/ Ibid., July 7, 1987.
21/ The New York Times, Sept. 15, 1987; Milling and Baking News, Sept. 15, 1987.

Table 3-26
U.S. soybean mills: Average costs of production, by mill (processing capacities), 1986 1/

Item	Under 10	10-14	15-19	20-24	25-29	30-34	35-39	All sizes
	per bushel of soybeans processed							
Manufacturing costs:								
Direct labor	$0.15	$0.10	$0.10	$0.08	$0.08	$0.10	$0.08	$0.09
Fuel, power, and utilities	.19	.18	.14	.14	.19	.17	.18	.17
Repairs	.06	.07	.07	.05	.06	.08	.06	.06
Solvent	.02	.02	.01	.01	.02	.01	.01	.01
Depreciation and amortization	.08	.10	.11	.07	.09	.10	.10	.09
Other processing costs	.10	.09	.12	.09	.11	.08	.11	.10
Total processing costs	.60	.55	.55	.44	.55	.54	.54	.53
Cost of goods sold 2/	4.57	5.12	4.58	5.88	6.34	8.27	5.92	5.74
General, selling, and administrative expenses	.05	.07	.05	.06	.07	.02	.03	.06
Financial expenses and corporate overhead	.07	.04	.06	.06	.03	.02	.05	.05
All costs	5.30	5.79	5.25	6.44	6.99	8.84	6.54	6.37
Capacity utilization 3/.....percent	76.6	70.9	74.0	77.6	76.5	86.4	66.7	74.5

1/ Mill processing capacities are in millions of pounds of soybeans processed per year. Data cover 65 U.S. mills. Calculated by taking weighted averages of mills in stated size categories.
2/ Cost of purchase of soybeans minus inventory change.
3/ Calculated on the basis of reported practical annual crush capacity, that is, the maximum or best average daily rate of capacity achieved for a calendar or fiscal month over the past 2-year period.

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

Table 3-27
Soybean products: USDA loan rates, U.S. prices and margins, 1965-86.

Year	USDA loan rate 1/	Average annual price of-- Soybeans	Meal	Oil	Weighted meal-oil price 2/	Margin between output and soybean prices	Margin as a percent of bean price
	Cents per pound						percent
1965....	3.8	4.2	4.1	11.8	5.3	1.1	26.2
1966....	4.2	4.6	3.9	10.1	4.9	.3	5.7
1967....	4.2	4.2	3.8	8.4	4.5	.3	6.7
1968....	4.2	4.1	3.7	8.4	4.4	.3	7.3
1969....	3.8	3.9	3.9	11.2	5.1	1.2	29.7
1970....	3.8	4.8	3.9	12.8	5.4	.6	11.5
1971....	3.8	5.1	4.5	11.3	5.5	.4	8.6
1972....	3.8	7.3	11.4	16.5	11.9	4.6	62.5
1973....	3.8	9.5	7.3	31.5	11.4	1.9	19.6
1974....	3.8	11.1	6.5	30.7	10.6	-.5	-4.5
1975....	3/	8.2	7.4	18.3	9.1	.9	10.6
1976....	4.2	11.4	10.0	23.9	12.1	.7	6.1
1977....	5.8	9.8	8.2	24.5	10.8	1.0	10.3
1978....	7.5	11.1	9.5	27.2	12.3	1.2	10.9
1979....	7.5	10.5	9.1	24.3	11.5	1.0	9.2
1980....	8.4	12.6	10.9	22.7	12.6	0	0
1981....	8.4	10.1	9.1	19.0	10.5	.4	4.2
1982....	8.4	9.4	9.4	20.6	11.0	1.6	17.5
1983....	8.4	13.0	9.4	30.6	12.8	-.2	-1.2
1984....	8.4	9.6	6.3	29.5	10.2	.6	6.5
1985....	8.4	8.5	7.5	18.5	9.2	.7	8.0
1986 4/.	8.0	8.0	7.1	16.0	8.4	.4	5.3

1/ Loan rate under the USDA loan program.
2/ Calculated as sum of meal price times meal/bean yield (0.78) plus oil price times oil/bean yield (0.18).
3/ Support not authorized in 1975.
4/ The nominal loan rate of $4.77 per bushel (8.0¢ per pound) in 1986 was reduced to $4.56 per bushel (7.6¢ per pound) in response to the Gramm-Rudman-Hollings Deficit Reduction Act.

Source: Compiled from data in U.S. Department of Agriculture, Economic Research Service, Oil Crops: Situation and Outlook Yearbook, July 1986.

CHAPTER 4. OILSEED COMPLEX OF THE EUROPEAN COMMUNITY

Overview of the EC Oilseed Farming Sector

The European Community (EC) ranks with the United States as a leading consuming region for oilseeds and oilseed products. Long an important oilseed importer, the EC has in recent years developed its own oilseed farming capability to the point where EC oilseed farmers now constitute a politically important--if economically still small--component of the EC agricultural sector.

Production, trade, and apparent consumption

For decades prior to the 1980's, the EC was the world's largest market for oilseeds, with imported oilseeds (from the United States, Argentina, and Brazil) accounting for most of the supply. In recent years, output from EC farmers has accounted for an increasing share of supply at the expense of foreign sources; moreover, EC producers have been exporting significant quantities of oilseeds (principally rapeseed and cottonseed).

Production.--The leading oilseeds grown in the EC are rapeseed, sunflowerseed, soybeans, cottonseed, flaxseed, and peanuts. Between crop years 1977/78 and 1986/87, EC production of these oilseeds rose steadily from 1.9 million metric tons to an estimated 8.0 million, representing an increase of over 300 percent during the 9-year period (table 4-1). In 1986/87, rapeseed and sunflowerseed accounted for 45 percent and 38 percent, respectively, of the total, followed by soybeans (10 percent), cottonseed (6 percent), and flaxseed and peanuts (together less than 1 percent). France, historically the leading EC oilseed supplier, accounted for 37 percent of total production in 1986/87; in the same crop year, other important suppliers included Spain, Italy, West Germany, and the United Kingdom (table 4-2).

EC oilseed harvested area rose 168 percent, from 1,464 hectares in 1977/78 to an estimated 3,924 hectares in 1986/87; the bulk of the increase in harvested area during this period was accounted for by sunflowerseed and rapeseed (table 4-3). In 1986/87, sunflowerseed and rapeseed accounted for 51 percent and 32 percent, respectively, of the total harvested area, followed by cottonseed and soybeans (7 percent each), and flaxseed and peanuts (3 percent collectively). France accounted for one-third of the total harvested area in 1986/87, followed by Spain with 26 percent; other significant harvested areas were in Italy, West Germany, Greece, the United Kingdom, and Denmark (table 4-4).

Trade.--EC exports of oilseeds jumped by 508 percent between 1977/78 and 1986/87; from only 471,000 metric tons in 1977/78, exports reached nearly 3 million metric tons only 10 years later (table 4-5). During the same period, exports of oilseed meal rose by 79 percent and of vegetable oil by 59 percent. These trends are demonstrations of the remarkable growth of the EC oilseed farm sector in recent years.

EC oilseed imports, on the other hand, have remained more or less constant for several years, totaling 17.6 million metric tons in 1986/87, representing an increase of 6 percent over those in 1977/78 (table 4-5). However, from the peak import year 1979/80, when 20.1 million metric tons were imported, imports declined overall by 12 percent by 1986/87. Increasing domestic output of oilseeds is the principal cause of the slow change in imports; as the EC oilseed farm sector continues to grow, EC crushers are being increasingly supplied by rising intra-EC production, which has reduced crushers' reliance on imports.

Apparent consumption.--Apparent consumption of oilseeds in the EC has been generally increasing for several years (table 4-5). Such consumption amounted to 17.9 million metric tons in 1977/78 and increased by 28 percent to 22.9 million metric tons by 1986/87. As the data on apparent consumption of oil and meal attest, such increased consumption of oilseeds has supplied a growing EC demand for oilseed products, particularly meal, which, as in the U.S. market, is destined for indirect consumption by consumers through the domestic poultry and livestock markets.

Number and location of oilseed farms

Number of farms and average size.--Oilseeds are still a marginal crop relative to all other agricultural crops throughout Europe, accounting for only about 2 percent of total agricultural production. 1/ Only limited data are available on oilseed farm operations per se, therefore much of the following discussion relates to EC farm operations in general.

The structure of farming in the EC has undergone some basic changes over the last several years. The traditional narrow focus of farmers on a limited number of products--the product types depending on climate, soil conditions, and other regional characteristics--has given way to increased diversity, in much the same way as farms have become "multiproduct" in the United States. 2/ Many are small, part-time farms, where farming is the principal source of family income. In 1980, there were an estimated 6 million farms, down from 15 million in 1950, 10 million in 1960, and 8.5 million in 1970. The average EC farm size was 16 hectares (40 acres) compared with 160 hectares (400 acres) in the United States. Over 60 percent of all farms were less than 10 hectares (25 acres) in size, with one-half of all farms employing the equivalent of only one full-time worker as the total labor input. It seems most likely that the extensive public support of the farming sector, most significantly through the Common Agricultural Policy, allows small farms to survive; for despite low capital costs and a low opportunity cost for labor (much agricultural labor is undereducated in some regions), small farms appear less efficient than large ones, and provide lower incomes for their laborers.

1/ The Agricultural Situation in the EC-1986 Report, Commission of the European Communities, Brussels, Belgium, 1987.
2/ B.F. Stanton, Production Costs for Cereals in the European Community: Comparisons with the United States, 1977-84, Cornell University, Agricultural Economics Research Report 86-2, March 1986.

The average farm size varies by country throughout the EC; farms in the United Kingdom are over four times the EC average, as shown in the following tabulation of data on average farm size (in hectares per farm): 1/

Country	Farm size
United Kingdom	64.5
Denmark	28.8
Luxembourg	27.9
France	25.5
Ireland	22.8
West Germany	15.5
Netherlands	14.5
Belgium	13.6
Italy	5.6
Greece	3.6

The average farm size for oilseed production in the EC is 12 hectares (30 acres), with 62 percent of all farms less than 10 hectares and only 4 percent more than 50 hectares. 2/ The decrease in the number of smaller EC farms, as in the United States, has resulted in an increase in the proportion of larger-sized farms, with a resulting rise in overall average farm size. 3/

The value of EC farm capital has fallen in recent years. In the United Kingdom, for example, farm capital value fell by nearly 18 percent from 1984 to 1985, the greatest annual drop since the mid-1970's, following a decline in cash income throughout the farming sector in recent years. 4/ The overall growth rate during the 1976-85 period, however, was up 6.5 percent. According to recent reports, 5/ reduced land values have sparked renewed interest in land investment, primarily from private purchasers and trusts, with institutional investors less interested.

Throughout the EC, nearly all agricultural commodities are handled by processors, dealers, and other middlemen, rather than through direct sales between farmers and consumers. 6/ In recent years, a number of EC-wide programs have been established on a sectoral or regional basis, for the purpose of marketing and processing agricultural products. Also, producers' cooperatives and associations have been formed in an effort to improve the farmers' bargaining position with handlers and processors through organized programs of production and marketing.

Farm incomes.--Farming income varies considerably by country, by region within country, by type of farm, and by farm size (fig. 4-1). Farming regions with the highest average incomes include those with the largest farming units (e.g., the United Kingdom, Denmark, and Northern France), and the lowest average incomes are found in Greece, southern Italy, southwestern France, and

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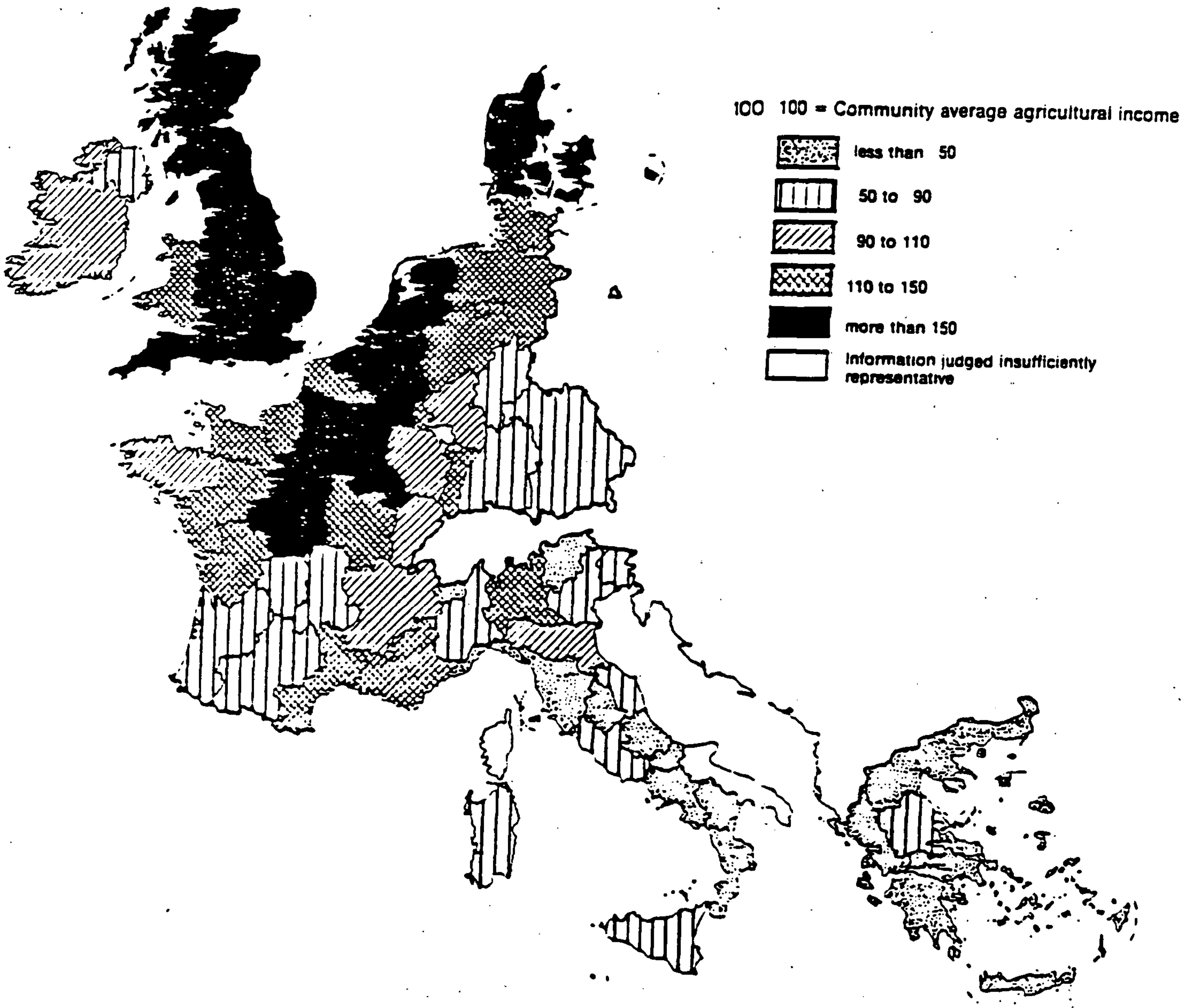
1/ "British Farms The Biggest In The EC", Agra Europe, May 30, 1986.
2/ B.F. Stanton, op. cit.
3/ The Agricultural Policy of the European Community, Office for Official Publications of the European Communities, 3d ed., Luxembourg, 1983.
4/ "Institutions Own Less UK Farm Land As Returns Fall", Agra Europe, May 23, 1986.
5/ Ibid.
6/ The Agricultural Policy of the European Community, op. cit.

Figure 4-1
Disparities in agricultural income, 1/ according to region, 1981-82



1/ Farm net value-added per AWU.

Source: Farm Accountancy Data Network, European Community, Brussels.

southeastern West Germany. In West Germany, farm incomes in recent years have been highest for large-size farms engaged principally in raising commercial crops (e.g., cereals, sugar beets, and potatoes). The greatest increases in average farm income have been reported for small-size farms and farms specializing in dairy and beef cattle, as shown in the following tabulation of income data for West German farms: 1/

Size and type	Average farm income 1982/83	1983/84	1984/85	1985/86	Percentage change, 1985/86 from 1982/83
	----------Deutsche marks----------				
Farm size:					
Small..............	17,169	15,403	17,256	18,365	+7.0
Medium.............	33,333	28,766	32,378	33,719	+1.2
Large..............	58,916	47,606	57,088	56,496	-4.1
Farm type:					
Commercial crops...	42,991	35,902	45,122	42,481	-1.2
Grazing............	30,981	26,998	29,301	32,238	+4.1
Livestock..........	36,431	17,866	41,869	34,900	-4.2
Permanent crops....	41,677	30,758	34,252	30,275	-27.4
Mixed..............	30,858	22,903	29,552	30,320	-1.7

For the 1986/87 crop year, income for small-size, full-time farms is expected to rise 10 percent from that in 1985/86, whereas a 4-percent rise is projected for medium-sized farms and a negligible change for large, full-time farms. 2/

The following tabulation presents data on value added per employee in EC agriculture, which can be used as a proxy for trends in farmworkers' income, 1984-86: 3/

Source	Value added per agricultural worker 1/ 1984	1985	1986 2/
	------------Deutsche marks----------		
Netherlands	44,361	41,829	42,498
Belgium	42,392	41,248	39,021
Denmark	40,307	37,713	36,301
United Kingdom	29,766	24,442	25,419
Luxembourg	22,127	22,007	21,127
France	20,281	19,512	19,708
West Germany	20,104	17,642	19,177
Spain	17,756	17,962	17,136
Italy	16,360	16,062	15,854
Greece	12,585	12,717	12,526
Ireland	12,548	11,683	10,830
EC average	19,752	18,821	18,840

1/ Net value added, per person employed in agriculture, in real Deutsche marks (deflated by the price index of the Gross Domestic Product and converted to Deutsche marks at constant 1980 exchange rates).
2/ Estimated.

1/ "West German Farm Incomes To Show Only Slight Rise This Year", Agra Europe, Apr. 24, 1987.
2/ Ibid.
3/ "German Farmers In Lower Half Of EC Farm Income Table", Agra Europe, Apr. 24, 1987.

Average EC farm income edged up only slightly from 1985 to 1986, but remained significantly below such income in 1984. The high level in 1984 is attributed to an abundant cereal crop, and the drop in 1985 is believed due to a drop in overall agricultural output and in real prices of agricultural products. 1/ The 1985 farm income level is reported to be the lowest in 15 years. In addition, the sharp fall in farm income from 1984 to 1985 is attributed to wage and salary increases, which account for an estimated 50 to 60 percent of farm income. 2/

Overview of the EC Oilseed Crushing Sector

Production, trade, and apparent consumption

Oil and meal production.--Between crop years 1977/78 and 1986/87, oilseed crush in the EC rose 47 percent, from 18.4 million metric tons to an estimated 27.1 million metric tons (table 4-6). In crop year 1986/87, soybeans accounted for 49 percent of the total crush, followed by olive, rapeseed, sunflowerseed, and cottonseed with 16, 15, 11, and 2 percent, respectively. The bulk of the increase in crush throughout the period was accounted for by olives, rapeseed, and sunflowerseed. Oilmeal production rose 18 percent from 1977/78 to 1986/87, totaling an estimated 15.5 million metric tons in the latter crop year, with soybean meal accounting for two-thirds of the total and rapeseed and sunflowerseed most of the remainder (table 4-6). In 1986/87, West Germany was the largest EC producer of oilmeal, accounting for 26 percent (by quantity) of the total; other important producers included the Netherlands, Spain, Italy, and Belgium (table 4-7). EC oil production rose from 5.5 million metric tons in 1977/78 to 6.7 million in 1986/87, representing an increase of 22 percent, with soybean, rapeseed, and sunflowerseed, together accounting for three-fourths of total production (table 4-8). West Germany, Spain, and Italy were the primary EC oil producers in recent years, with significant production found in all other member countries (except Ireland).

Trade.--EC exports of oilseeds rose sharply between 1977/78 and 1986/87, increasing by over 500 percent during the 10-year period to 2.9 million metric tons (table 4-5). As a share of production, such exports increased from about one-fourth in 1977/78 to over one-third in 1986/87. EC imports of oilseeds, meanwhile, showed a slightly declining trend during the decade, and the 1986/87 import level of 17.6 million metric tons was only slightly below the 10-year average of 17.9 million metric tons. As a share of apparent consumption in the EC, imports declined from 93 percent in 1977/78 to 77 percent in 1986/87. The principal supplier of EC oilseeds imports has been the United States.

In contrast to oilseed exports, EC oilseed meal and oil exports generally rose during the past decade. Meal exports nearly doubled between 1977/78 and 1982/83, to a record 7.3 million metric tons, then declined slightly to 6.7 million metric tons in 1986/87, for an overall increase of approximately 80 percent during the decade. As a share of production, meal exports rose from 29 percent in 1977/78 to 50 percent in 1983/84, then fell back to 43 percent in 1986/87. Oil exports increased by about 60 percent between 1977/78 and

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1/ "EC Farm Incomes In 1985 Worst in Fifteen Years", Agra Europe, Apr. 18, 1986.
2/ Ibid.

1986/87, to 3.6 million metric tons in 1986/87. As a share of production, such exports rose from 41 percent in 1977/78 to approximately 55 percent in each of the last 4 years.

EC imports of oilseed meal and oil also increased during the last decade, to supplement rising production in response to increasing demand for meat products and oil-containing food products. Meal imports increased by more than 50 percent during the 9-year period ending 1985/86, peaking at 20.7 million metric tons in the latter year, then dropped back slightly to 19.3 million metric tons in 1986/87; imports accounted for an increasing share of apparent consumption of meal through 1983/84, peaking at 73 percent from 60 percent in 1977/78, before dropping back slightly to 68 percent by 1986/87. Important meal suppliers to the EC market include Brazil and the United States. Imports of oil increased nearly as fast, rising by approximately 45 percent during the decade, to 4.6 million metric tons in 1986/87. Imports accounted for over one-half of apparent consumption of oil throughout the period, rising from 51 percent in 1977/78 to over 60 percent in 1984/85 and 1985/86, and 59 percent in 1986/87. Malaysia was the principal source of the increased EC imports of oil in recent years.

Processing systems and technology

Historically, the EC was a net importer of oilseeds and products. Since there was no significant domestic oilseed production, most of the processors were private, multinational firms with processing plants established at or near customs' ports of entry for the processing of mostly imported oilseeds. Although most of the original plants were for crushing soybeans only, an increase in the production of other oilseeds in recent years has led to the construction of plants designed to crush other types of oilseeds and to a number of older plants being converted to facilitate the crushing of rapeseed or sunflowerseed as well as soybeans.

According to U.S. Government sources, 1/ processing facilities and technology in the Netherlands are believed to be the most advanced in the world. Overall soybean crushing facilities in the EC are described as mostly modern, efficient, solvent-type plants of economical size, having been constructed in recent years by experienced processors. Since 1980, the EC oilseed crushing industry has undergone significant restructuring, with the closing of some plants, 2/ the sale or reorganization of others, 3/ and the use of joint ventures in foreign markets. 4/

1/ Conversation between Commission staff and staff of the U.S. Department of Agriculture, Mar. 15, 1987.
2/ "Bulk Fats Refinery To Close", Financial Times, London, England, Nov. 10, 1986, p. 6.
3/ See "P&G Swings To Rapeseed", World Food & Drink Report, May 21, 1987, p. 5; "Cargill Inc. Is Expanding Asia Operations", Minneapolis Star & Tribune, Apr. 22, 1987, p. M-2; "Unilever Sells Three Crushing Plants To ADM", Food Trade Review, Aug. 10, 1986, p. 397; and "Company News: Cargill To Buy A Soya Bean Plant From Continental", Agricultural Supply Industry, Jan. 3, 1986, p. 1.
4/ "Simon-Rosedown In Chinese Rice Bean Oil Facility Venture", Milling & Baking News, Apr. 28, 1987, pp. 37-40.

Oilseed processing capacity.--Oilseed crushing capacity is believed to be underutilized within the EC, with utilization rates falling in recent years. EC soybean crushing capacity was reported to have increased from 14.4 million metric tons in 1980 to 15.6 million metric tons in 1984, with the capacity utilization rate falling from 78 percent to 60 percent during this period. 1/ In 1986, estimated capacity utilization of the EC oilseed crushing capacity amounted to between 73 to 88 percent, according to industry sources. Although data on the exact size of the oilseed crushing sector are not available, the above data imply that industrywide annual capacity stands at somewhere between 25 and 30 million metric tons.

EC crushing capacity for individual oilseeds is not easily estimated, since many countries use press-type plants that vary in size and number and some of these operate for only a few months each year. Most of the EC crushing capacity is located in West Germany, the Netherlands, Spain, Italy, Belgium, and France which together are believed by trade sources to account for over 80 percent of EC capacity.

The number of enterprises engaged in the manufacture of vegetable and animal oils and fats fell 15 percent from 245 in 1976 to 209 in 1983, with the number of workers employed in such enterprises falling 13 percent during the same period (table 4-9).

Cost structure of oilseed crushing.--The Commission received data on production costs for European soybean mills owned by U.S.-based oilseed crushers. These data were aggregated for EC countries and are summarized in tables 4-10 and 4-11. To process one metric ton of soybeans, the average EC crusher paid $321.52 in 1986. The principal cost item was the purchased soybean, accounting for $287.19, or 89 percent, of the total cost. Processing costs (labor, solvent, and the like) accounted for the bulk of the remainder and totaled $21.46 per metric ton.

When the data in table 4-11 are disaggregated by mill-size class, distinct cost differences appear. These disaggregated data are presented in table 4-12. Total costs per metric ton incurred by crushers in 1986 ranged from a low of $261.91 for a small mill to a high of $399.64 for a large mill. This range is a result entirely of a difference in the cost of soybeans, itself partly a result of higher prices paid by large mills. Insufficient information exists to explain the reason for this differential; possible explanations include differing geographic location and/or time of year when most soybeans were purchased.

Evidence of economies of size appears in the data on total processing costs, which are higher for the smallest mill size class than either of the two larger size classes. The primary cause of this cost difference lies in "other" processing costs, which unfortunately tell little about the nature of the cost difference, or the source of any size economies.

1/ The Consultants International Group, Inc., and Abel, Daft & Earley, A Study of the Effects of Subsidies on the Oilseed Processing Complex in Key Countries, Mar. 26, 1986.

Transportation factors

Since the EC has long been a significant market for imported oilseeds, a number of processing facilities were constructed near coastal import ports. In recent years, domestic oilseed production has been transported to these plants for processing. For the most part, EC farmers and processors are able to use existing channels of distribution (e.g., canals and railways) currently used for transporting other agricultural crops, without the additional costs involved in establishing new methods of transportation and other infrastructure.

Data on EC transportation costs for oilseeds are not available; such costs, however, are believed by U.S. industry sources to be much lower for EC-produced oilseeds than for imported products.

EC Agricultural and Trade Policies

The EC has established domestic programs designed to manage farm production and prices, to influence farm employment and income, and to regulate exports and imports. The most important, and certainly the most comprehensive, program covering agricultural production in the EC is the Common Agricultural Policy (CAP), created at meetings of the six original EC members prior to signing the 1957 Treaty of Rome establishing the EC, and refined in subsequent negotiations between the Council of Agricultural Ministers and the individual EC member Governments. EC members believed that the relative poverty of much of the agricultural and rural population throughout the Community could only be improved by the use of protective price policies together with social reconstruction policies for agriculture. The EC has gradually changed from a net importer to a net exporter of major agricultural commodities since the CAP was established. At the present time, the CAP covers virtually all agricultural products.

The basic aim of the CAP was to provide efficient farmers an income comparable with their counterparts in industry, and to provide consumers with adequate food supplies at reasonable prices. Historically, the incomes of most agricultural producers in the EC have been supported by the CAP, with CAP decisions centered around a number of basic principles, including common pricing, community preference, and common financing. Various other provisions included direct payments for construction financing, with some producers and consumers also provided with national subsidies by certain member countries.

Price supports for all commodities (except oilseeds) are linked to target prices, with minimum import prices so linked in an effort to keep the price support system from being undercut by lower-priced imports. 1/ Variable levies, amounting to the difference between minimum import prices and the minimum c.i.f. offer price, were added to imports of such commodities. In addition, intervention prices are linked to target prices, with intervention agencies of the member countries required to purchase commodity surpluses whenever the prevailing market prices fall below the intervention prices.

1/ Government Intervention in Agriculture-Measurements, Evaluation, and Implications for Trade Negotiations, Economic Research Service, U.S. Department of Agriculture, Staff Report No. AGES 861216, Jan. 1987.

Common pricing means that prices are regulated to establish a single market within the EC and to encourage the movement of various agricultural commodities across member-country borders. Since increasing farm income was a stated purpose of the CAP and has been a politically sensitive issue, target prices on many agricultural commodities (including oilseeds) historically have been set at the highest prevailing EC market price, resulting in over-production and surpluses. Also, there have been wide disparities in income, varying by region, farm type, and farm size. The use of target prices, constructed on a regional basis, resulted in the movement of goods into those areas of greatest demand. Such pricing structures are no longer used. However, exchange-rate fluctuations between national currencies and the European Currency Unit (ECU), the unit in which the target prices are now expressed, have resulted in significant differences in real prices.

Tariffs on oilseeds were bound at zero duty during the Kennedy Round of the Multilateral Trade Negotiations (MTN), resulting in the use of lower priced imported oilseeds, rather than higher-priced domestic oilseeds covered by the CAP, by feed companies located near ports of entry. As a result, deficiency payments have been provided to EC producers to encourage domestic oilseed production. In recent years, the EC has attempted to establish a soybean tariff in exchange for concessions on grains. Also, the EC has proposed trade management through market sharing, wherein countries agree to stabilize production and exports, regardless of any comparative advantage. The current EC oilseed policy is intended to encourage increased domestic output of oilseeds, and to ensure that such oilseeds are crushed and used to displace oilseeds and products from non-EC countries.

The principle of common financing dictates that the costs associated with administering the CAP are shared by all EC members. The use of export credits remains in the hands of individual member countries, resulting in certain programs providing export subsidies in addition to programs managed by the EC Commission. Commercial policy for market development and promotion is also handled by each member country. According to industry sources, the EC is being pressured, both from within the EC membership and from major trading partners, to modify its trade and price support policies because of escalating budgetary and consumer costs. 1/ In 1986, agricultural budget costs were estimated at $23 billion, with future increases expected because of declining world prices and rising surpluses.

Although food costs as a share of total expenditures were down recently, it is believed that EC consumers pay more for food than consumers in most other countries, partly because of the added costs of maintaining artificially constructed prices under the CAP through variable levies. Import levies accounted for an estimated 85 percent of total government assistance to producers during 1982-84, followed by export subsidies and direct payments at 13 percent and 2 percent, respectively. It is believed that the cost to EC farmers of liberalizing trade through elimination of the variable levy system, direct payments, and export subsidies could be significant for most agricultural commodities, whereas the benefits to consumers and taxpayers could be substantial. According to some sources, 2/ many EC consumers favor a system of direct payment to farmers over subsidizing inefficient producers with high price supports.

1/ Ibid.

2/ EC Cap: Goals, Problems, and Results, Foreign Agriculture, Sept. 1980.

Community preference designates the EC both as the preferred market for member country products and as the preferred supplier for each member's needs. To encourage the use of domestic products over imports, variable levies (sometimes changed on a daily basis) are imposed to make imported goods more expensive, or more scarce, than comparable EC products whenever world market prices fall below the established EC minimum import price.

Oilseed processors generally secure their oilseeds either from purchases on the local market or by taking futures contracts for soybean meal and oil. For local market purchases, prices are generally somewhat above the intervention price but the same as, or slightly below, the target price. The processor must then sell the oil and meal products in the spot market, with the crushing margin fixed and guaranteed. The use of futures positions for soybean meal and oil in the foreign currency in which the transaction takes place is a much riskier alternative source of raw material. With an internal oilseed price above the intervention price during any month, a set crushing margin would also be locked in, provided the price of rapeseed or sunflowerseed oil and meal relative to soybean oil and meal remained at a premium or discount. Such premiums may vary more than the price of the soybeans, however.

In France, feed companies use a futures market for premiums to reduce the risk to oilseed processors. These are based on weekly published subsidy rates for oilseeds, calculated to cover the difference between the high EC oilseed prices and lower world prices. The subsidy rates are based on U.S. spot prices for soybeans, meal, and oil, along with current trade reports of market trends in oilseeds and products. According to industry sources, the rates are set high enough to insure that most EC oilseeds are crushed in the first few months of each marketing year, before oilseeds or products are available from other (primarily South American) producers.

The EC soybean program, first established in 1974, provides a soybean guide price and minimum price; in 1984/85, the guide price was 570.1 ECU's (1 ECU=$1.16) per ton and the minimum price 501.7 ECU's per ton. The EC periodically sets a world soybean price and processors are paid the difference between the world price and the guide price for all EC-produced soybeans for which the processor can show he paid the minimum price. The use of subsidies by processors of EC soybeans requires substantial paperwork, including producer/processor contracts stating the area sown, quantities produced and delivered, and prices paid. Subsidies are also available for oilseed processors buying seed in one country and crushing it in another.

Although the EC has no official export subsidies on oilseed products and no tariff refunds on vegetable oils, it is believed that France does provide limited export credits for oil and meal. The overall effect of such credits is believed negligible or nil, since such exports account for a very small percent of total vegetable oil exports. However, according to industry sources, France does provide government assistance to builders (or purchasers) of oilseed processing plants. Since 1983, the Government of France reportedly has offered a US$6 million grant for investment capital in the restructuring of a bankrupt oilseed crushing firm, and a US$1 million subsidy for the construction of a new sunflowerseed crushing plant.

EC oilseed production support prices, currently equivalent to about three times the world prices, have risen substantially in recent years with an accompanying rise in EC oilseed production. Between 1980/81 and 1985/86, oilseed expenditures rose from 2.7 billion to over 5.4 billion ECU's;

estimated expenditures for 1986/87 are 6.1 billion ECU's. In an effort to generate revenues for financing its oilseed support system, the EC approved a proposal for the establishment of a consumption tax on fats and oils. 1/ Such a tax, covering all vegetable and marine oils used for human consumption, was to be included as a part of the 1987/88 EC agricultural price package Commissionwide; the tax would apply to Portugal and Spain following the end of their accession transition period (1990).

The fats and oils tax would amount to the difference between the current year's price and a reference price (the average EC refined soybean oil price in 1981-85). In each succeeding year, the previous year's average price would be compared with the reference price and, when the reference price was greater, a flat tax, equal to the difference between the two prices, would be levied. The resulting tax, amounting to an estimated 330 ECU's per metric ton in 1987, would be applied either at the refinery or at the border (for imported products), and would also apply to the oil content of imported processed foods. During those years when the previous year's average price exceeded the reference price, a subsidy would be paid to crushers and refiners. If approved by the 12 Commission-member agricultural ministers, the tax would have become effective July 1, 1987, and would remain in effect through December 31, 1988. The use of the tax would be decided on an annual basis thereafter, and could not exceed the tax levied during the initial period.

In early 1987, 7 of the 17 EC commissioners were opposed to the tax proposal, with additional opposition coming from a number of the EC's major trading partners. Two leading British consumer organizations, the Food and Drink Federation and the Seed Crushers' and Oil Processors' Association, voiced their disapproval of the tax. 2/ Among other things, these organizations stated that "a tax on oils and fats would increase the cost of living by raising prices of a wide range of basic foodstuffs which incorporate oils and fats as essential ingredients. Margarines, shortenings, and cooking oils would be particularly badly affected, with retail price increases of up to 50 percent. This would, in particular, hit low income groups where per capita consumption of margarine is highest, and also people who prefer alternatives to butter for dietary and health reasons." 3/ Numerous other groups, including the British Biscuit, Cake, Chocolate, and Confectionery Alliance; the American Soybean Association; the Argentine Agriculture Minister; and Argentina's national grain board, also voiced their opposition. 4/ The EC Commissioners voted, on June 29, 1987, not to enact the proposal.

U.S. oilseed exports to the EC have fallen in recent years as EC expenditures, in an effort to achieve self-sufficiency in the oilseed sector, have risen. In addition, future EC import demand will be further reduced by recent policies of promoting alternative feed crops (e.g., beans, peas, and dairy products). The EC is currently a net exporter of soybean, sunflowerseed, and rapeseed oils.

1/ "EC Adopts Andriessen's Oils/Fats Tax Proposal", The Public Ledger, Feb. 21, 1987.
2/ "EC Oils/Fats Tax Condemned By UK Consumer Groups", The Public Ledger, Feb. 12, 1987.
3/ Ibid.
4/ See The Public Ledger: "EC Adopts Oils/Fats Tax Proposals and Other Measures", Feb. 17, 1987; "Opposition Mounts to EEC Oils/Fats Tax Proposals", Feb. 18, 1987; "FOSFA to Fight EEC Oils and Fats Tax Proposals", Feb. 21, 1987; "EEC Oils/Fats Tax to Put 2p On a Packet of Biscuits", Feb. 26, 1987.

Table 4-1
Oilseeds: EC production, by selected oilseed, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Crop year	Rapeseed	Sunflower-seed	Soybean	Cotton-seed	Flax-seed	Peanut	Total
1977/78.....	928	517	12	405	62	8	1,932
1978/79.....	1,180	605	21	286	46	8	2,146
1979/80.....	1,211	732	31	258	56	8	2,296
1980/81.....	2,050	807	28	309	48	7	3,249
1981/82.....	2,020	901	33	324	30	7	3,315
1982/83.....	2,663	1,512	30	244	43	5	4,497
1983/84.....	2,448	1,757	89	270	32	5	4,601
1984/85.....	3,432	2,298	145	353	42	5	6,275
1985/86.....	3,634	2,696	334	413	51	6	7,134
1986/87.....	3,617	3,038	831	466	44	7	8,003

1/ Crop year runs from October 1 to September 30 of the following year.

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

Table 4-2
Oilseeds: EC production, by country, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Crop year	Bel-gium	Den-mark	France	West Ger-many	Greece	Ire-land	Italy	Neth-er-lands	Por-tugal	Spain	United King-dom	Total
1977/78.....	8	77	504	282	311	0	61	36	7	504	142	1,932
1978/79.....	9	91	679	331	222	1	50	28	15	565	155	2,146
1979/80.....	9	150	727	321	176	0	63	22	12	618	198	2,296
1980/81.....	8	225	1,379	377	200	1	65	33	23	638	300	3,249
1981/82.....	6	290	1,424	363	204	2	103	37	8	553	325	3,315
1982/83.....	17	335	1,844	535	148	5	103	42	13	875	580	4,497
1983/84.....	16	309	1,781	599	210	9	197	41	28	846	565	4,601
1984/85.....	18	474	2,322	662	310	9	264	35	28	1,228	925	6,275
1985/86.....	14	544	2,902	807	359	9	480	24	31	1,069	895	7,134
1986/87.....	20	613	2,924	971	465	9	1,010	34	35	1,022	900	8,003

1/ Crop year runs from October 1 to September 30 of the following year.

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

Table 4-3
Oilseeds: EC harvested area, by selected oilseed, crop years 1977/78 to 1986/87 1/

(In hectares)

Crop year	Sunflower-seed	Rapeseed	Cotton-seed	Soybean	Flax-seed	Peanut	Total
1977/78.....	626	491	265	7	72	3	1,464
1978/79.....	667	503	214	13	76	3	1,476
1979/80.....	780	507	195	26	68	3	1,579
1980/81.....	826	748	207	15	62	3	1,861
1981/82.....	974	920	204	16	44	3	2,161
1982/83.....	1,227	1,031	165	15	52	3	2,493
1983/84.....	1,472	1,117	211	38	51	3	2,892
1984/85.....	1,646	1,175	255	60	62	3	3,201
1985/86.....	1,904	1,277	270	123	71	3	3,648
1986/87.....	2,013	1,275	290	279	63	4	3,924

1/ Crop year runs from October 1 to September 30 of the following year.

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

Table 4-4
Oilseeds: EC harvested area, by country, crop years 1977/78 to 1986/87 1/

(In hectares)

Crop year	Bel-gium	Den-mark	France	West Ger-many	Greece	Ire-land	Italy	Neth-er-lands	Por-tugal	Spain	United King-dom	Total
1977/78.....	11	39	362	105	185	0	47	17	10	633	55	1,464
1978/79.....	9	47	350	121	170	1	38	15	19	642	64	1,476
1979/80.....	9	65	373	127	144	0	46	11	23	707	74	1,579
1980/81.....	9	103	547	138	144	1	42	12	25	748	92	1,861
1981/82.....	7	132	663	154	132	2	56	14	23	853	125	2,161
1982/83.....	14	152	805	189	117	3	59	17	20	943	174	2,493
1983/84.....	11	162	930	232	177	4	103	17	25	1,009	222	2,892
1984/85.....	15	191	975	254	234	4	126	14	38	1,081	269	3,201
1985/86.....	13	217	1,136	268	252	4	202	16	40	1,204	296	3,648
1986/87.....	13	227	1,324	312	307	4	373	17	40	1,008	299	3,924

1/ Crop year runs from October 1 to September 30 of the following year.

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

Table 4-5
Oilseeds and oilseed products: EC production, imports, exports, total supply, consumption, other uses, and ending stocks, by products, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Product and crop year	Production	Imports	Exports	Total supply	Consumption	Other uses 2/	Ending stocks
Oilseeds:							
1977/78...	1,932	16,632	471	18,093	17,936	692	382
1978/79...	2,146	17,989	669	19,466	19,570	856	278
1979/80...	2,296	20,091	617	21,770	21,461	874	847
1980/81...	3,249	16,970	1,112	19,107	19,470	765	484
1981/82...	3,315	19,419	1,228	21,506	21,398	979	592
1982/83...	4,497	19,213	1,720	21,990	21,742	1,130	840
1983/84...	4,601	16,438	1,616	19,423	19,605	899	658
1984/85...	6,275	16,864	2,138	21,001	20,666	1,051	993
1985/86...	7,134	17,622	2,736	22,020	22,035	1,402	978
1986/87...	8,003	17,625	2,864	22,764	22,926	1,511	816
Oilmeal:							
1977/78...	13,128	13,501	3,745	22,884	22,642	22,576	471
1978/79...	14,168	14,667	4,260	24,575	24,616	24,566	430
1979/80...	15,737	15,562	4,924	26,375	26,397	26,397	471
1980/81...	14,119	14,706	5,118	23,707	23,662	23,662	516
1981/82...	15,572	17,341	5,837	27,076	27,103	27,103	489
1982/83...	15,531	18,092	7,291	26,332	26,163	26,163	658
1983/84...	13,997	17,733	6,934	24,796	24,830	24,830	624
1984/85...	14,320	19,979	7,079	27,220	27,218	27,218	626
1985/86...	15,006	20,699	7,024	28,681	28,700	28,700	607
1986/87...	15,505	19,349	6,707	28,147	28,251	28,251	503
Oil:							
1977/78...	5,515	3,209	2,288	6,436	6,298	5,816	976
1978/79...	5,694	3,648	2,408	6,934	6,846	6,686	1,064
1979/80...	6,340	3,626	2,740	7,226	6,958	6,875	1,280
1980/81...	6,135	3,498	2,742	6,891	6,845	6,800	1,326
1981/82...	5,901	4,043	2,915	7,029	7,166	7,166	1,189
1982/83...	6,496	4,205	3,091	7,610	7,223	7,223	1,574
1983/84...	6,086	4,093	3,346	6,833	7,022	7,022	1,385
1984/85...	6,412	4,396	3,544	7,264	7,293	7,293	1,356
1985/86...	6,798	4,716	3,706	7,808	7,664	7,664	1,500
1986/87...	6,727	4,634	3,645	7,716	7,853	7,853	1,363

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Includes industrial or food use and feed waste.

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

Table 4-6
Oilseed products: EC crush and production, by selected oilseed, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Product and crop year	Soybean	Rape-seed	Sunflower-seed	Cotton-seed	All other	Total
Crush:						
1977/78.........	13,170	1,101	1,336	317	2,426	18,350
1978/79.........	14,166	1,562	1,748	253	985	18,714
1979/80.........	15,464	1,839	2,291	191	802	20,587
1980/81.........	13,269	2,279	2,184	264	1,759	19,755
1981/82.........	15,235	2,140	1,967	346	3,705	23,393
1982/83.........	14,769	2,704	2,287	235	5,853	25,848
1983/84.........	12,603	2,897	2,400	239	6,681	24,820
1984/85.........	12,280	3,535	2,892	348	6,364	25,419
1985/86.........	12,778	3,876	2,882	391	6,500	26,427
1986/87.........	13,160	4,053	3,004	434	6,415	27,066
Oilmeal:						
1977/78.........	10,542	630	695	147	1,114	13,128
1978/79.........	11,313	879	909	116	951	14,168
1979/80.........	12,426	1,057	1,226	88	940	15,737
1980/81.........	10,631	1,307	1,178	124	879	14,119
1981/82.........	12,197	1,291	1,046	160	878	15,572
1982/83.........	11,780	1,607	1,217	108	819	15,531
1983/84.........	10,039	1,727	1,317	110	804	13,997
1984/85.........	9,753	2,111	1,555	160	741	14,320
1985/86.........	10,194	2,268	1,536	180	828	15,006
1986/87.........	10,491	2,387	1,597	200	830	15,505
Oil:						
1977/78.........	2,310	447	529	50	2,179	5,515
1978/79.........	2,490	629	685	40	1,850	5,694
1979/80.........	2,716	747	892	30	1,955	6,340
1980/81.........	2,343	912	856	42	1,982	6,135
1981/82.........	2,633	866	775	58	1,569	5,901
1982/83.........	2,576	1,036	924	37	1,923	6,496
1983/84.........	2,255	1,120	982	38	1,691	6,086
1984/85.........	2,204	1,356	1,189	55	1,608	6,412
1985/86.........	2,264	1,486	1,200	62	1,786	6,798
1986/87.........	2,327	1,554	1,254	67	1,525	6,727

1/ Crop year runs from October 1 to September 30 of the following year.

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

Table 4-7
Oilmeals: EC production, by country, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Crop year	Bel- gium	Den- mark	France	West Ger- many	Greece	Ire- land	Italy	Neth- er- lands	Por- tugal	Spain	United King- dom	Total
1977/78....	884	765	1,042	3,709	185	9	1,129	1,975	303	1,914	1,213	13,128
1978/79....	859	744	1,214	3,790	198	7	1,525	2,370	357	1,996	1,108	14,168
1979/80....	803	740	1,254	4,238	213	7	1,476	2,593	393	2,736	1,284	15,737
1980/81....	928	548	973	3,714	233	11	1,170	2,366	389	2,557	1,230	14,119
1981/82....	1,292	522	1,199	3,851	290	5	1,324	2,315	542	2,862	1,370	15,572
1982/83....	1,359	499	1,240	3,918	277	4	1,350	2,284	790	2,897	913	15,531
1983/84....	1,405	493	1,081	3,084	276	6	1,025	2,445	813	2,565	804	13,997
1984/85....	1,316	416	1,168	3,436	346	4	1,319	2,387	922	2,172	834	14,320
1985/86....	1,372	438	1,173	3,831	376	4	1,565	2,313	894	2,243	797	15,006
1986/87....	1,342	429	1,167	4,009	415	4	1,624	2,358	878	2,329	950	15,505

1/ Crop year runs from October 1 to September 30 of the following year.

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

Table 4-8
Oils: EC production, by country, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Crop year	Bel- gium	Den- mark	France	West Ger- many	Greece	Ire- land	Italy	Neth- er- lands	Por- tugal	Spain	United King- dom	Total
1977/78....	212	199	499	1,208	314	12	1,036	536	164	976	359	5,515
1978/79....	191	198	547	1,218	321	9	864	613	203	1,123	407	5,694
1979/80....	199	222	561	1,426	276	6	1,094	646	247	1,219	444	6,340
1980/81....	248	186	502	1,332	379	10	981	622	211	1,236	428	6,135
1981/82....	318	161	534	1,302	306	4	910	605	241	1,096	424	5,901
1982/83....	339	159	518	1,389	393	4	791	643	358	1,546	356	6,496
1983/84....	401	150	523	1,202	305	7	1,122	699	285	1,050	342	6,086
1984/85....	434	132	598	1,354	294	4	716	705	319	1,495	361	6,412
1985/86....	451	163	633	1,546	451	4	1,030	701	303	1,169	347	6,798
1986/87....	455	159	644	1,610	389	4	749	736	311	1,261	409	6,727

1/ Crop year runs from October 1 to September 30 of the following year.

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

Table 4-9
Selected EC data on the manufacture of vegetable and animal oils and fats, by specified country, 1/ 1976-77 and 1982-83

Type and year	West Germany	France	Italy	Nether- lands	Bel- gium	United Kingdom	Ire- land	Den- mark	Total
Number of firms:									
1976..............	32	61	81	15	7	36	5	8	245
1977..............	33	63	80	17	7	32	5	6	243
1982..............	27	49	74	13	8	29	5	6	211
1983..............	26	49	74	13	8	28	5	6	209
Number of workers:									
1976..............	14,471	11,277	6,108	4,695	2,935	9,043	670	2,002	51,201
1977..............	13,774	11,054	5,986	4,694	2,866	8,664	717	1,893	49,648
1982..............	12,822	9,445	5,485	4,612	3,325	7,666	687	1,893	45,935
1983..............	12,221	9,482	5,485	4,288	3,325	7,063	687	1,745	44,296
Labor costs (million ECU's):									
1976..............	197	143	51	62	44	57	5	26	584
1977..............	218	143	55	72	51	57	5	25	626
1982..............	300	214	85	109	74	122	10	25	939
1983..............	314	218	85	116	74	113	10	36	967
Raw material costs (thousand ECU's): 2/									
1976..............	1,694	951	707	691	353	883	35	139	5,453
1977..............	2,087	951	772	967	405	878	41	181	6,282
1982..............	2,618	1,130	1,084	1,381	752	1,335	52	181	8,533
1983..............	2,679	1,255	1,084	1,595	752	1,263	52	211	8,891

1/ No data were reported for Luxembourg throughout 1976-83.
2/ Including costs of industrial services from others.

Note.—In those instances where no data were reported, estimates were made by the Commission staff by inserting those data reported in the previous year.

Source: Eurostat, Structure and Activity of Industry, 1977 and 1983, except as noted.

Table 4-10
EC soybean mills: Average mill costs, production, and prices, 1985 and 1986 1/

Item	1985	1986
Value of output: 2/		
Soybean meal......................1,000 dollars...	57,788	47,291
Crude soybean oil..........................do....	46,977	21,765
Total.....................................do....	104,765	69,056
Cost of goods sold 3/..............1,000 dollars...	105,502	90,608
Manufacturing costs:		
Direct labor...............................do....	888	1,141
Fuel, power, and utilities.................do....	1,926	1,546
Repairs....................................do....	405	682
Solvent....................................do....	152	117
Depreciation and amortization..............do....	705	1,116
Other......................................do....	1,876	2,125
Total manufacturing costs.................do....	5,953	6,770
General, selling, and administrative expenses..................do....	912	1,334
Financial expenses or (income) and corporate overhead..................do....	1,117	1,055
Grand total costs.......................do....	113,284	99,636
Practical annual crush capacity.....................1,000 metric tons...	461	525
Capacity utilization rate.................percent...	91	60
Production:		
Soybeans crushed......................percent...	419	316
Soybean meal for animal feed...............do....	325	247
Crude soybean oil..........................do....	74	54
Average prices paid or received: 4/		
Soybeans........................per metric ton...	$225.06	$212.23
Soybean meal...............................do....	$177.81	$191.46
Crude soybean oil..........................do....	$634.82	$403.05

1/ Data cover U.S.-owned mills in Europe; mills include 1 rapeseed/soybean mill, and all others are soybean mills. Data are simple averages across all reporting mills, except where noted.
2/ Estimated by multiplying the volume of production of meal and oil times the average prices received.
3/ Cost of purchase of soybeans minus inventory change.
4/ Average prices are weighted by volume per reporting mill. Soybean prices are c.i.f. mill. Soybean meal prices are for 44-percent protein meal, f.o.b. mill. Soybean oil prices are f.o.b. mill.

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

Table 4-11
EC soybean mills: Mill costs, production, and prices, 1985 and 1986 1/

(per metric ton)

Item	1985	1986
Value of output 2/	$250.04	$218.53
Cost of goods sold	251.79	286.73
Manufacturing costs:		
Direct labor	2.12	3.61
Fuel, power, and utilities	4.60	4.89
Repairs	0.97	2.16
Solvent	0.36	0.37
Depreciation and amortization	1.68	3.53
Other	4.48	6.72
Total manufacturing costs	14.21	21.42
General, selling, and administrative expenses	2.18	4.22
Financial expenses or (income) and corporate overhead	2.67	3.34
Grand total costs	270.37	315.30

1/ Data cover U.S.-owned soybean mills in Europe; mills include 1 rapeseed/soybean mill, and all others are soybean mills. Averages are simple averages across reporting mills, divided by volume of soybeans crushed.
2/ Combined value of meal and oil.

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

Table 4-12
EC soybean mills: Average costs of production, by mill size, 1986 1/

Item	Capacity (metric tons of beans per year) Under 400	400 to 700	Over 700	All sizes
	Per metric ton processed			
Manufacturing costs:				
Direct labor	$4.31	$3.01	$3.84	$3.61
Fuel, power, and utilities	3.98	5.68	4.64	4.90
Repairs	.91	2.09	3.25	2.16
Solvent	.30	.45	.32	.37
Depreciation and amortization	1.31	4.79	4.13	3.68
Other manufacturing costs	14.83	3.43	4.52	6.73
Total manufacturing costs	25.64	19.45	20.70	21.46
Cost of goods sold 2/	203.27	272.27	373.38	287.19
General, selling, and administrative expenses	5.05	4.57	3.14	4.23
Financial expenses and corporate overhead	5.86	1.49	2.42	2.93
Grand total costs	261.91	297.78	399.64	321.52
	Per metric ton of capacity			
Manufacturing costs:				
Direct labor	$3.17	$2.13	$1.73	$2.17
Fuel, power, and utilities	2.93	4.01	2.08	2.95
Repairs	.67	1.48	1.46	1.30
Solvent	.22	.32	.14	.22
Depreciation and amortization	.97	3.39	1.86	2.21
Other manufacturing costs	10.92	2.43	2.03	4.05
Total manufacturing costs	18.88	13.74	9.31	12.91
Cost of goods sold 2/	149.65	192.42	167.91	172.75
General, selling, and administrative expenses	3.72	3.23	1.41	2.54
Financial expenses and corporate overhead	4.32	1.06	1.09	1.83
Grand total costs	192.82	210.45	179.72	193.40

1/ Data cover U.S.-owned mills in Europe; mills include 1 rapeseed/soybean mill, all others are soybean mills. Calculated by taking weighted averages of mills in stated size categories.
2/ Cost of purchase of soybeans minus inventory change.

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

CHAPTER 5.--OILSEED COMPLEX OF ARGENTINA 1/

General

Argentina is important in world oilseed trade because of its rapid growth as a producer and exporter of oilseeds, oilseed meals, and vegetable oils, much of which competes with U.S. exports for valuable foreign markets. The Argentine oilseed industry produces and processes mainly soybeans and sunflowerseed, with additional significant but smaller production of flaxseed, cottonseed, and peanuts. During the last decade, two-thirds of Argentine oilseed production was milled domestically and processed into oilseed products. These Argentine products are sold mainly in export markets. Argentina has been the focus of recent attention from the U.S. Government for its tax policies and other public policies, which allegedly distort the volume and composition of Argentine exports, to the detriment of U.S. exporters and producers.

Overview of the Argentine Oilseed Farming Sector

Argentina has vast areas of arable land and has long been a major producer of grains and livestock. Declining world markets for wheat and grain encouraged Argentine farmers to shift farmland into oilseed planting. Argentina has great potential for continued future growth, because of both the ability to shift resources out of existing nonoilseed crop production and the availability of large areas of unutilized arable land that can be brought into production if oilseed prices rise enough to justify the development cost.

Production, trade, and apparent consumption

Production.--Total oilseed production in Argentina has increased from about 4 million metric tons in crop year 1977/78 to an estimated 12 million tons in 1986/87 (table 5-1). Argentine production was relatively stable during 1978/79 to 1981/82, averaging around 6 million tons annually; beginning in 1982/83 production rose steadily, reaching 12 million tons in 1986/87. Production of both soybeans and sunflowerseed rose during this period.

Soybean production has expanded during 1977/78-1986/87 mainly as a result of larger harvested acreage, since there was little change in yields. The Argentine soybean yields are equivalent (in U.S. domestic measure) to 32 bushels per acre; in 1986, the U.S. soybean farmers averaged 34 bushels per acre. Argentine soybean production, as indicated earlier, occurs mainly in the Provinces of Santa Fe, Cordoba, and Buenos Aires, which together produced about

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1/ For additional detail on Argentina's oilseed industry, see James Rudolph, (ed.), Argentina A Country Study: Area Handbook Series, American University and U.S. Department of the Army, Washington, DC, Aug. 1985; Inter-American Development Bank (IADB), Economic and Social Progress in Latin America, various issues; U.S. Department of Agriculture (USDA), Argentina-Annual Agricultural Situation Report, and Argentina-Annual Oilseed Report, various issues; and Myles Mielke, USDA, Argentine Agricultural Policies in the Grain and Oilseed Sectors, Sept. 1984.

90 percent of total production in recent years (table 5-2). Argentine soybean production rose most dramatically in 1984/85, a year when sharply higher soybean prices and less favorable wheat prices encouraged a 700,000 hectare increase in soybean plantings.

Sunflowerseed production in Argentina rose by 156 percent, from 1.6 million metric tons in crop year 1978/79 to a projected 4.1 million tons in 1986/87 (table 5-3). The harvested acreage in sunflowerseed rose by about 57 percent, from 2 million to 3.1 million hectares during 1978/79 to 1986/87. Per hectare yields of sunflowerseed rose by 63 percent during this period, reaching 1.3 metric tons in 1986/87, equivalent to 1,200 pounds per acre. In 1986, U.S. sunflowerseed farmers averaged 1,400 pounds per acre.

Trade.--Argentina's large capacity to produce oilseeds enables it to easily meet domestic demand without turning to the import market. Domestic production is in fact much greater than domestic demand, and there are large quantities of oilseeds available for export. Argentine exports of oilseeds rose from less than 1 million metric tons in crop year 1977/78 to nearly 3 million tons in 1979/80, thereafter declining to 1.5 million in 1983/84 (table 5-1). Oilseed exports declined as a result of more domestic crushing activity with meal and oil being exported rather than oilseeds. Since 1984/85, Argentine exports of oilseeds surpassed 3 million tons annually. During the 3 most recent years, Argentina has exported about 30 percent of its oilseed production.

Soybean exports from Argentina increased from 2 million metric tons in crop year 1978/79 to a peak of 3.1 million tons in 1984/85 (table 5-2). Exports of soybeans then declined slightly to 2.7 million tons in 1986/87. Most of the Argentine soybeans are sold in the EC, although the Soviet Union, Mexico, and other Eastern European countries have purchased substantial amounts as well. During 1980-86, the EC purchased 56 percent of Argentine soybean exports, and the Soviet Union about 24 percent (table 5-4).

Apparent consumption.--Oilseed crushers are the sole domestic market for oilseeds in Argentina. Their capacity to crush oilseeds has increased rapidly in recent years; total oilseed crush tripled between 1977/78 and 1986/87 (table 5-1). Growing export markets for Argentine oilseeds and oilseed products have stimulated crushers' demand for oilseeds, which in turn has induced farmers to turn increasingly to oilseed crops. Additionally, as discussed later in this chapter, public policy has played a part in promoting domestic crushing of oilseeds.

Size and location of the oilseed farm sector

Land availability.--The rapid growth in Argentina's oilseed output over the last decade would not have taken place without the vast agricultural land resources in the country. These lands, rivaling in potential farm productivity the best farmlands in the United States, have been the basis of extensive production of grain, oilseeds, and cattle, and in turn have provided the raw materials for agricultural processing industries such as soybean processors.

Approximately 8 percent of the country's arable land area of 277 million hectares is devoted to annual and permanent crops, and the remainder is pastureland (5 percent) and natural grassland (52 percent). 1/ Of the land area planted in annual and permanent crops, cereal crops accounted for about three-quarters, oilseeds for about one-fifth, and the remainder was other crops such as fruits and vegetables.

Argentina has two principal farming regions, the "zona maicera" or the Corn Belt district, and the rest of the pampas exclusive of the Corn Belt district. The Corn Belt district comprises northern Buenos Aires Province, southern Sante Fe Province, and southeast Cordoba Province. The rest of the Argentine pampas is largely composed of the whole of Buenos Aires Province.

Corn, soybean, and wheat dominate farm production in the Argentine Corn Belt region. In this region, the wheat-soybean double-cropping occurs frequently, although single-cropping of soybeans has become more common. Croplands are harvested twice yearly; winter wheat is planted in June and July and harvested in December and January. Soybeans are planted in December and January, and harvested in April and May.

The Argentine pampas is the principal wheat, sorghum, sunflowerseed, and livestock (mostly cattle) region of Argentina. Wheat and sunflower are grown mainly in the central and southern Buenos Aires Province. Farms of the pampas are large, often 1,000 hectares or more in size. Double-cropping is done in the northern portions of the pampas, but because of the shorter growing season in the southern portion, farmers there typically grow one crop annually, usually winter wheat, other winter grains, or sunflower.

Farm practices and soybean output.--With its abundant and fertile farm land, Argentina has historically been one of the world's principal exporters and producers of cereals, grain, oilseeds, and beef. During the past 5 years, Argentina has harvested grain and oilseed crops from 16 to 20 million hectares, as shown in the following tabulation, compiled from official statistics of the U.S. Department of Agriculture, for crop years 1980/81 to 1986/87:

Item	Crop year 1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
	Harvested area (Million hectares)						
Grain	12	13	14	13	12	12	10
All oilseeds	4	5	6	6	7	7	8
Total	16	18	19	20	19	19	18
	Production (Million metric tons)						
Grain	29	27	33	31	32	26	24
All oilseeds	6	7	8	11	11	12	12
Total	35	34	41	41	43	39	36

1/ James Rudolph, op. cit., p. 159.

Argentine production of grain and oilseeds has expanded mostly as a result of an increase in the harvested acreage. For example, during 1977/78-1986/87 yields of grain per hectare ranged from 1.3 to 2.6 metric tons, averaging about 2.2 metric tons for the period. For oilseeds, soybean yields fluctuated sharply between 1.8 and 2.4 metric tons per hectare during 1978/79-1986/87 (table 5-2). Soybean yields in both 1978/79 and 1986/87 amounted to about 2.2 metric tons per hectare.

There has been little increase in total grain and oilseed acreage since the 1930's, although there has been a shift in the types of crops planted. 1/ For example, during 1931-35, about 19 million hectares were planted in grain and oilseeds, virtually the same as that planted during the most current 5 years.

Soybean production in Argentina is concentrated mainly in the Provinces of Santa Fe (42 percent of 1984 production), Cordoba (28 percent), and Buenos Aires (28 percent). Soybeans are cultivated at the present time on the majority of the highest yielding land in these Provinces, so further acreage expansion in soybeans would have to take place on land located in drier regions and with less per acre productivity. 2/

Soybean production in Argentina began on a large scale in the 1970's, following the successful Brazilian experience. The introduction of varieties of short-cycle wheat in the mid-1970's made possible the current pattern of double-cropping of wheat and soybeans in Argentina. 3/ Because of declining wheat prices, farmers have switched to single-crop planting of soybeans; in 1985/86 and 1986/87 for example, single-crop soybeans accounted for about 50 percent of the soybean acreage compared with 30 percent several years before. 4/

Soil fertility in the Argentine Corn Belt district has suffered considerably in recent years. 5/ Soil degradation has resulted from the wheat-soybean double-cropping boom that began in the mid-1970's. Problems with soil erosion and depletion of soil reserves, through continuous soybean cultivation and lack of crop rotation, have occurred as a result. Despite this, wheat and soybean yields have been relatively high, considering the low level of inputs (fertilizer) used by Argentine farmers.

Traditionally, soil structures, fertility, and yields have been maintained by carefully planned crop and livestock rotation, i.e., green fertilizer. But in recent years, crop rotation schemes have been violated. Farmers have depleted the soil's organic content by double-cropping year after year and by eliminating the rotation of croplands with pasture.

1/ Myles Mielke, op. cit., p. 17.
2/ Warney Val, "History and Development of Soybean Production in South America," in R. Shibbles (ed.), World Soybean Research Conference III: Proceedings, Boulder, CO: 1985, p. 1216.
3/ Gary Williams and Robert L. Thompson, "The South American Soybean Industry: Policy Impacts and Issues," in R. Shibbles, (ed.), op. cit.
4/ USDA, "Country Feature Argentina," World Oilseed Situation and Market Highlights, May 1987, p. 35.
5/ Information supplied by Jorge Hazera, USDA, 1987.

As indicated above, Argentine farmers typically double crop or rotate soybeans with other crops--corn, wheat, and pasture in particular. In the Argentine Corn Belt, farmers produce about 45 percent of Argentine soybean production; wheat-soybean cropping accounts for slightly over one-half of the soybean plantings in the Argentine Corn Belt. 1/ Argentine farmers easily switch to alternative crops, particularly the wheat and corn, from soybeans as conditions warrant. The wheat-soybean double-cropping pattern is influenced as well by wheat prices and government support policies relating to wheat. 2/

With regard to land tenancy, Argentine farmers fall into one of three categories: the "chacareros" or small farmers, with average holdings of 70 hectares; the "contratistas" or contractors--farm tractor owner/operators; and the "estancieros" or large landholders, with farms upwards of 1,000 hectares. The chacareros that grow soybeans are mostly found in the Corn Belt district. In the center of the Corn Belt in Pergamino, Argentina, a typical farm averages about 120 hectares in total size. In recent years, the proportion of gross farm sales going to contratistas has risen from 40 to 60 percent in Pergamino, owing in part to rising costs of farm machinery and other farm inputs prices. Many of these small landholders, however, have become absentee landowners, and contract with specialized tenant farmers contratistas that do many of the actual farming operations in exchange for 40 percent of the farm gross sales. The contratista is a machine-operator that usually rents a number of small farms, provides all of the production and management skills, machinery, finances for operating capital for fertilizer, chemicals, seeds, and labor. The contratista is generally heavily capitalized; contratistas grow about 80 percent of all Argentine crops. 3/

Cost structure of Argentine oilseed farming

There are a number of studies on Argentine farm costs, particularly in comparison with those of soybean production in the United States. One study of the costs of producing soybeans and grain in leading exporting countries concluded that Argentina was the lowest cost producer of soybeans in the world, even though its marketing costs were higher than those of U.S. and Brazilian farmers. 4/ In mid-1986, the f.o.b. export port cost of Argentine soybeans was calculated at $185 per metric ton, compared with $249 per ton in the U.S. Corn Belt and $229 per ton on Brazilian wheat-soybean farms, as shown in the following tabulation: 5/

1/ Jorge Hazera, "South American Soybeans and Product Exports to Recover," Oil Crops Situation and Outlook Report, forthcoming Spring 1987.
2/ Williams and Thompson, op. cit., p. 52.
3/ Information supplied by Jorge Hazera, USDA, and Juan Carlos Torchelli, INTA, Argentina (interview, Apr. 23, 1987).
4/ Norman Rask, Gerald Ortmann, and Walter Stulp, Comparative Costs Among Major Exporting Countries, Occasional Paper, Ohio State University, Department of Agricultural Economics, Columbus, Ohio, Jan. 1987.
5/ Ibid., p. 19.

Item	Yield per hectare	Total farm costs			Marketing costs	Total farm and marketing costs
		Variable	Fixed	Subtotal		
	Metric tons	per metric ton				
Argentina........	2.1	$80	$69	$149	$36	$185
Brazil 1/........	1.8	117	67	185	44	229
Brazil 2/........	1.8	122	76	198	44	242
U.S. overall.....	2.0	88	155	243	25	268
U.S. Corn Belt...	2.3	69	155	224	25	249

1/ Includes only farms that double-crop soybeans with wheat.
2/ Includes only farms that single-crop soybeans.

Both Argentina and Brazil have a cost advantage over the United States in producing soybeans; much of this cost advantage, accrues from lower fixed costs, especially land costs. 1/ Variable costs of soybean production were slightly lower in Argentina than in the United States, at $80 and $88 per metric ton, respectively, in 1986. Farmers in the U.S. Corn Belt incurred average variable costs of $69 per metric ton ($1.87 per bushel), the lowest among the three countries. Variable farm costs of production during 1982-85 for Argentine soybeans are shown in table 5-5. Such costs declined from about $108 per metric ton in 1982 to about $76 per ton in 1985.

Concerning costs of Argentine soybeans in key foreign markets, the United States enjoys lower freight costs per ton to Japan and to the EC (Rotterdam), but the production cost advantage for Argentine and Brazilian soybeans offsets this freight cost advantage. Total landed costs in mid-1986 for soybeans are shown in the following tabulation (per metric ton): 2/

Country of origin	Export port	Freight rates to-- Rotterdam	Freight rates to-- Japan	Landed cost at-- Rotterdam	Landed cost at-- Japan
Argentina.............	$185	$18	$32	$204	$217
Brazil................	242	16	34	258	276
United States.........	268	13	26	280	294

Farm technology

Improved cultural practices such as more farm machinery, better seed varieties, crop rotation, and better farm chemicals are responsible for most of the increased agricultural production in Argentina in recent years. Soybean yields rose from an average 1.4 metric tons per hectare in 1970-74 to about 2.1 metric tons per hectare during 1978/79-1987/88. 3/ In the 1960's, hybrid sunflowerseed was introduced, expanding the per-hectare yields of sunflowerseed. Use of largely imported pesticides and herbicides has increased in Argentina, but their use has been limited by their relatively high cost in Argentine currency terms, although recent elimination of some import duties has lowered their costs somewhat.

1/ Ibid.
2/ Ibid., p. 14.
3/ Myles Mielke, op. cit., p. 17.

Increased use of chemical fertilizers has also been instrumental in raising the level of crop yields. Fertilizer use has expanded in Argentina since the 1970's. For example, the share of planted wheat receiving chemical fertilizers was only 2 percent in 1977; this share expanded irregularly to 13 percent by 1983, when Argentine import duties were reduced. With the lower duties, fertilizer prices have fallen and application increased. Currently, only about 15 percent of Argentine wheat area is fertilized compared with 75 percent in the United States. 1/

During 1970-80, agricultural production in Argentina grew 2.5 percent annually with 56 percent of the increase attributed to increased use of unused land, and additional capital. 2/ The contribution of "productivity" increases, which include such factors as changes in the quality of inputs, technological changes, and other labor productivity changes, accounted for 44 percent of the increased Argentine agricultural production. During 1970-80, the economically active population in the agricultural sector declined by 0.4 percent annually, and the planted area in crops and pasture rose by 1.3 percent annually. During 1970-80, agricultural production in Argentina rose annually by 2.3 percent per hectare and by 3.6 percent per worker; fertilizer use per hectare of crop land rose by 2.2 percent annually (below the 6.9 percent experienced in all of Latin America), and the number of tractors per worker rose by 0.4 percent annually, far below the 2.4 percent average rise for all Latin American countries (table 5-6). 3/ Thus, slightly over half of expanded agricultural output in Argentina during 1970-80 can be attributed to use of additional land and capital; the remainder has been attributed to greater labor productivity, better inputs, and technological improvements.

Overview of the Argentine Oilseed Crushing Sector

The oilseed crushing sector in Argentina has expanded greatly in recent years, aided by an expanding export market, Government policies promoting domestic crushing over export of oilseeds, and direct foreign investment by multinational grain trading firms, including some based in the United States. Argentine crushers have become a powerful force in world trade in oilseed products, as evidenced by the country's share of such trade, accounting for 22 percent of world meal exports and 14 percent of world vegetable oil exports in 1986, a rise from 1978 when Argentina's share of world meal and oil exports were 9 and 7 percent, respectively.

Production, trade, and apparent consumption

Production.--Supplied by the growing farm sector, Argentine crushers have expanded sharply during the last several years. Oilseed meal output has more than tripled in the last decade, exceeding 5.5 million metric tons in crop year 1986/87 (table 5-7). Soybean meal now accounts for two-thirds of all oilseed meal output, compared with less than 30 percent in 1977/78. Sunflowerseed made up an additional 27 percent in 1986/87, and other minor oilseeds (as well as fish) provided the remaining total meal output.

1/ Hazera, USDA, op. cit.
2/ IADB, 1986, op. cit., pp. 90-94.
3/ Ibid., p. 93.

As expected from the joint-product nature of oilseed meal and oil, vegetable oil output has followed a similar trend, tripling since crop year 1977/78 to 2.3 million metric tons in 1986/87 (table 5-8). The relatively high oil content of sunflowerseed makes it the dominant source of vegetable oil, accounting for 58 percent of the total in 1986/87 and 50 to 60 percent generally over the last several years. In comparison, soybeans contribute only 32 percent of all vegetable oil, although this share has increased from about 12 percent prior to 1981/82 because of increased soybean processing.

Exports.--Nearly all of the increased meal and oil production during the last decade has been destined for export markets. Exports of oilseed meal increased by 3.7 million metric tons, or by nearly 300 percent, during crop years 1977/78 to 1986/87 (table 5-7). As a share of production, meal exports topped 90 percent in each of the last 4 years, and 70 to 90 percent generally during the last decade. During this period, an average 88 percent of Argentine meal output and 72 percent of vegetable oil output was exported. As expected based on production, soybean and sunflowerseed meal account for over 90 percent of such exports.

Argentine exports of vegetable oil have similarly risen in recent years (table 5-8). Such exports increased by 260 percent, to 1.8 million metric tons, in the decade ending 1986/87. As a share of production, oil exports have averaged 79 percent in the past 3 years, up generally from the 60-to-70 percent share held in previous years.

The important export markets for Argentine oilseed products vary according to product. Most of the soybean meal is destined for the EC and the Soviet Union, and soybean oil is marketed in a variety of countries (table 5-4). The EC purchased 60 percent of Argentina's exports of soybean meal during 1980-86, and Bulgaria and Czechoslovakia together purchased 16 percent. Argentine soybean oil exports went to various countries; the most important markets were Iran (21 percent of 1986 exports), Brazil (14 percent) and India (9 percent). Argentina has a 5-year agreement with the Soviet Union for the purchase of 500,000 tons of soybeans, but since 1984 the Soviets have failed to purchase the full amount. Argentine soybean exports to the Soviet Union and Eastern European countries have fallen from the level of those in 1980, as a result of the U.S. grain and oilseeds embargo.

Apparent consumption.--Domestic demand in Argentina for oilseed meals and vegetable oils has been influenced by two factors during recent years: stagnant real income and abundant and inexpensive beef supplies. Real per capita income has stagnated in Argentina, although the population (currently 31 million) has been growing at a rate of about 1.5 percent annually. The "Austral" plan, which sharply reduced inflation in 1985 and 1986, did little to improve consumer real incomes. The Argentine per capita Gross Domestic Product (in U.S. dollars) fell from $2,540 in 1984 to $2,427 in 1985, and then recovered somewhat to $2,528 in 1986. 1/

Demand for oilseed meals is mainly linked to the demand for animal feedstuffs, primarily poultry, hogs, and cattle. Argentine consumers already have relatively high rates of meat consumption compared with the United States and other developed countries. Per capita consumption of beef and veal in Argentina reached 83 kilos in 1986, approximately 70 percent greater than the

1/ USDA, Argentina-Annual Agricultural Situation Report, op. cit.

corresponding consumption level in the United States. 1/ Argentine cattle are fed mainly on rainfed pasture and hogs on noncommercially produced feed; moreover, production of poultry meat in Argentina has grown only slowly in recent years, and the production of eggs has fallen. As a result, the consumption of oilseed meals in Argentina has grown very little over the past 10 years (table 5-7), and apparent consumption of oilseed meals as a share of production remains low (less than 10 percent in 1986/87).

In contrast to meal consumption, vegetable oil consumption in Argentina has grown faster, rising by approximately 4 percent annually between crop years 1977/78 and 1986/87 (table 5-8). In 1986, per capita consumption of vegetable oils in Argentina reached approximately 12 kilos, compared with about 25 kilos in the United States. Total consumption of vegetable oil has also been influenced by a population growth rate of approximately 1.5 percent annually in recent years. The preferred and primary vegetable oil consumed in Argentina is sunflowerseed oil, which has accounted for three-quarters of domestic consumption of vegetable oils in recent years. Argentine consumers perceive soybean oil as an inferior food oil, according to Argentine trade sources.

Number and size of processing plants

Oilseed crushers in Argentina crush a variety of oilseeds, principally soybeans, sunflowerseed, flaxseed, cottonseed, and peanuts. In recent years, soybeans and sunflowerseed have accounted for over 80 percent of oilseed crushing, with soybeans alone accounting for nearly one-half of Argentine crush. Argentine crushers typically process flaxseed the first 3 months of the crop year (beginning in December), then sunflowerseed during the next 3 to 6 months, and then soybean crushing is used for additional activity. 2/

The number of Argentine oilseed crushing plants declined from 73 in 1977 to 62 in 1986 (table 5-10). The type of plant operating in Argentina has changed; the number of plants using a continuous, mechanical-press-type operation declining from 38 to 16, and the number of the most efficient (and generally larger sized) solvent-extraction plants rose from 27 to 30.

The crush capacity listed in table 5-9 is theoretical capacity, and may considerably overstate actual capacity. A number of the older and smaller plants are very inefficient and for all practical purposes operate for considerably less than 300 days per year (the theoretical crush level). 3/ Some of the plants crush only one minor oilseed for part of the year (such as olives), 3 to 6 months, and then are shuttered the remainder of the year. Moreover, Government labor policies require a full month's vacation for all unionized workers, and many plants shut down during that month. This is further exacerbated by the lack of spare parts, many of which are imported, owing to exchange controls. As plants are modernized in Argentina, actual processing capacity has tended to approach the 300-day standard found in the United States and Western Europe.

1/ USDA, Argentina-Annual Agricultural Situation Report, June 4, 1986, p. 5, and Feb. 27, 1987, table 14, and Agricultural Outlook, various issues.
2/ Information supplied by Jorge Hazera, USDA, 1987 and USDA, Argentina-Annual Oilseeds Report, June 29, 1984, pp. 3-4.
3/ USDA, Oilseeds and Products Data Update-Argentina, Feb. 4, 1985, p. 3, and Oct. 12, 1984, p. 3; USDA, Oilseeds Annual Argentina, June 29, 1984.

For all of these reasons, it is difficult to estimate precisely the actual effective capacity of oilseed crushers in Argentina. A USDA estimate in 1985 of total Argentine oilseed crushing capacity was 9 million metric tons, whereas an authoritative private trade publication estimated crush capacity at 11.5 million metric tons. 1/

The level of crushing activity in Argentina depends in part on the amount of oilseeds sold in the early part of each crop year. By May or June, soybean exporters have purchased or committed soybean supplies away from Argentine crushers so that later in the crop year, crushers often are unable to operate owing to the lack of soybeans. Crushers have generally indicated an aversion to holding large soybean inventories, and thus well before the end of the crop year, available stocks are exhausted.

In the mid 1970's, Argentine soybean production exceeded the theoretical soybean crushing capacity; by 1982, the construction of large, modern soybean plants pushed the Argentine crushing capacity above the size of the harvested soybean crop. As a result, the share of soybeans crushed domestically in Argentina rose irregularly from 17 percent in 1979 to 61 percent in 1986. Soybeans became the leading oilseed crushed in Argentina as soybeans rose from a share of 20 to 50 percent of all oilseeds crushed during 1979-86 (table 5-9).

In 1987, several soybean processing plants are under construction in Argentina, according to trade sources. There was an apparent shift in the size of the plant being built after 1984 with smaller plants, with a daily capacity of 250 to 500 metric tons each, being preferred. 2/ The shift to smaller plants has allowed more regional locations of plants adjacent to growing areas, as well as adjacent to domestic feed mills. Decentralization of the plants also may make possible the reduction of transportation costs.

Oilseed crushing capacity

Oilseed crushing activity.--The level of crushing activity in Argentina has grown sharply as has the production of the oilseeds themselves. Because oilseed processors operate "switch plants," which can crush soybeans and other types of oilseeds such as sunflowerseed, the total crush capacity of all oilseeds must be considered. During the period 1977-86, apparent (theoretical) Argentine soybean crushing capacity rose from about 1.3 million metric tons annually to about 9 million tons (table 5-9). Total oilseed crushing capacity meanwhile rose from 5.6 million metric tons to 11.5 million tons. Based upon listed "soybean crush capacity," the capacity utilization ratio of soybean processing plants rose from 46 percent in 1977 to 71 percent in 1984, and then declined to about 50 percent in 1986.

Ownership structure.--The ownership of the Argentine oilseed industry is very decentralized, with an estimated 40 separate companies owning 62 oilseed crushing facilities in 1986. 3/ The six largest companies, all of which are also multinational grain trading companies, control about 45 percent of the

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1/ USDA, Oilseeds Annual Argentina, May 28, 1985, p. 3, and J. Hinrichsen, Aceites Vegetables Subproducts Oleaginosos y de Molienda de Trigo Borras Y Oleinas, 1985.
2/ USDA, Oilseeds and Products Data Update-Argentina, Oct. 12, 1984, p. 3-4.
3/ J. Hinrichsen, op. cit., 1987, pp. 5-11.

crushing capacity, although none of these companies operate more than three plants each, according to Argentine trade sources. There are nine principal companies (two of which are co-operatives) involved in recent years in the actual exporting of soybeans and grain in Argentina, according to industry sources.

The majority (55 percent) of the Argentine oilseed processing industry is controlled by either Argentine companies or Argentine cooperatives. The purely domestic companies have been gradually receding in importance since they tend to operate at competitive disadvantages relative to the multinational companies that enjoy access to foreign capital and enhanced foreign marketing advantages.

Processing costs

Only limited information on the actual costs of Argentine oilseed crushers is publicly available. According to one source, 1/ direct variable processing costs of oilseeds in 1985 averaged about $20 to $25 per metric ton of oilseed crushed, and other indirect (fixed) costs averaged $5 to $10 per ton. Total Argentine processing costs were about $30 per ton of oilseed crushed.

Several Argentine trade sources indicated to Commission staff in April 1987 that Argentine soybean processing costs amounted to about $20 per metric ton of soybeans crushed. One trade source indicated total soybean processing costs in Argentina in April 1987 averaged about $20 to $22 per metric ton; this source noted that interest costs and the price of hexane solvent were much higher in Argentina than in the United States.

The Commission received data on production costs for several U.S. oilseed crusher-owned soybean mills in Argentina and Brazil. However, to avoid disclosure of firm operations in any one country, these data were aggregated for the two countries and are discussed in the chapter on the Brazilian oilseed complex.

Transportation factors

Argentina's extensive transportation system is probably the best developed in Latin America. Argentine export products are carried largely by ocean-going vessels (91 percent of total volume in recent years), owing largely to the adjacent Rio de la Plata and Atlantic Ocean ports. Internally, about 49 percent of all surface freight transporation occurred by truck, 18 percent by river and coastal transport, 22 percent by natural gas pipelines, and 11 percent by railroad. 2/ Although Argentina has six railroad lines radiating from the principal ports of Buenos Aires, Rosario, Santa Fe, and Bahia Blanca, the track is not of uniform gauge, making cargo flow difficult. Moreover, less than half of the rail system was considered to be in good condition in 1983, with most of the system in only fair to poor condition. The publicly owned rail system has suffered from poor maintenance, outdated equipment, and generally inefficient operations, according to trade sources.

1/ USDA, Argentina-Annual Oilseed Report, pp. 7-8.
2/ James Rudolph, op. cit., p. 150.

Soybeans from the two leading producing Provinces, Santa Fe and Cordoba, go mainly to Rosario, the leading export port. The ports of Buenos Aires and Bahia Blanca are also important to oilseed export trade. Although most grain and oilseed production in Argentina occurs within 200 miles of deep-water ports, transportation costs have represented about 25 percent of the export terminal price in recent years. 1/ In July 1986, Argentine soybean farmers received about 50 percent of the f.o.b. export price of $187 per ton. 2/ Part of the reason for the high cost has been the reliance on trucks for grain and oilseed transport, and inefficient export terminals. A number of the export terminals are Government owned (the Government owned all terminals prior to 1979), and primarily oriented to off-loading railcars rather than trucks. As a result, it is not uncommon for trucks to wait days during harvest time to unload. Ships are thus obligated to delay in port, resulting in high demurrage charges for exports.

The situation has improved since 1979, when private ownership and operation of export port facilities became possible. Several private export elevators were constructed on the Parana River near Rosario, with these facilities being very efficient and designed to accommodate large volumes of truck unloadings. Two Argentine farmer cooperatives, FACA and ACA, also purchased some Government grain terminals in various ports, and with the upgrading of these facilities, marketing costs of grain and oilseeds have been reduced somewhat.

Trade sources indicated in 1986 that the cost of transporting grain by rail in Argentina was about 2.8 cents per ton-kilometer, or twice the comparable rail cost in the United States. 3/ The cost of a 3-day "turn-around" (loading) of an 18,500-ton grain cargo ship in the port of Buenos Aires was 4 times greater than in the neighboring port of Montevideo, Uruguay, 7 times higher than in a leading Brazilian soybean port of Santos, and two-thirds higher than in Hamburg, West Germany.

The marketing costs of transporting soybeans grown in Pergamino to the export port in Argentina in 1986 averaged about $0.99 per bushel, or nearly 50 percent higher than the $0.67 per bushel for U.S. soybeans. 4/ Argentine internal marketing costs represented about 20 percent of the calculated f.o.b. port-of-export cost of $5.04 per bushel of soybeans in 1986, and U.S. internal marketing costs represented about 9 percent of the calculated f.o.b. export cost of $7.29 per bushel.

Government Programs Affecting the Oilseed Sectors 5/

The key Government policies affecting the Argentine oilseed sector have been the export tax system, exchange rate controls, import restrictions on purchased farm inputs, agricultural price supports, agricultural credit

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1/ Jorge Hazera, op. cit.

2/ INTA, Pergamino, Argentina, unpublished 1987 data.

3/ USDA, Argentina-Annual Agricultural Situation Report, June 4, 1986, p. 20.

4/ Norman Rask, et al., op. cit.

5/ This section draws upon: Myles Mielke, op.cit.; Jorge Hazera, USDA, "Shifts in Soybean and Soybean Product Exports from South America," Latin America Outlook and Situation Report, July 1985; Economic Research Service, USDA, Government Intervention in Agriculture, Jan. 1986; National Soybean programs, and general tax policies. 1/ Although a detailed discussion of these policies goes beyond the framework of this study, some key aspects of the more important programs will be highlighted below.

Argentina has changed its agricultural export policies, which until at least the mid-1970's tended to restrict its grain and oilseed exports. According to a USDA study, Argentine policies towards the grain and oilseed sectors tended to restrict exports through internal price ceilings, exchange rates unfavorable to Argentine farmers, and high external taxes and tariffs. 2/

More recently, the Argentine Government has provided differential tax incentives to encourage the domestic processing over the export of soybeans. The Government was reported to have moved rapidly during the U.S. embargo in 1980 to supply the Soviet Union through a long-term agreement, as did the Brazilian Government. 3/ The Argentine Government has also reduced the import duties on fertilizer, liberalized export control quotas, and devalued the currency, in part because of pressure from the International Monetary Fund concerning Argentine foreign debt repayment difficulties. 4/

Export tax system

Through its system of export taxes, the Argentine Government has promoted exports of processed food products over raw farm commodities to increase value added and total export earnings, provide additional employment, bring down inflation, and provide a permanent source of funds for Government programs. The Government imposes higher export taxes on soybeans than on meal and oil; the export taxes on soybeans have averaged 25 percent in recent years, compared with approximately 12 percent on oil and meal. 5/ The goals behind this differential export tax policy have never been officially stated but are presumed to be two-fold: to foster value-added exports to gain additional foreign exchange, and to provide additional employment possibilities. 6/

Since 1983, with the advent of a new Government in Argentina, there have been sizable reductions in export taxes on agricultural products. Export taxes were reduced between February 1986 and April 1987 as follows: 7/

--(cont.) Processors Association (NSPA), Petition to the United States Trade Representative (USTR) Seeking Relief under Section 301 of the Trade Act of 1974, 1983 and Apr. 1986; Response of the Camara de las Industria Aceteria de la Republica Argentina to Petition filed by the NSPA under Section 301 of the Trade Act of 1974 before the USTR, July 1986; and the World Bank, Economic Memorandum: Argentina, 1985.
1/ NSPA, 1986, op. cit., pp. 6-15.
2/ Myles Mielke, op. cit., p. 2.
3/ NSPA, 1983, op. cit., pp. 131-141; and U.S. International Trade Commission, U.S. Embargoes on Agricultural Exports: Implications for U.S. Agricultural Industry and U.S. Exports (USITC Pub. 1461), Dec. 1983, pp. 22-24.
4/ USDA, Soybeans: Background for 1985 Farm Legislation, Dec. 1984, pp. 11-12.
5/ NSPA, 1986, op. cit., pp. 6-15.
6/ USDA, Argentina-Annual Oilseed Report, May 28, 1985, pp. 7-8.
7/ USDA, Argentina-Annual Agricultural Situation Report and Argentina-Annual Oilseed Report, various issues.

Product	September 1983	May 1985	February 1986	April 1987
	---(tax as percent of f.o.b. value)---			
Soybeans.............	25.0	24.5	28.5	15.0
Sunflowerseed........	25.0	26.5	25.5	15.0
Soybean meal.........	10.0	11.5	16.5	3.0
Soybean oil..........	10.0	17.5	16.5	3.0
Sunflower oil........	10.0	15.5	16.5	6.0

The World Bank granted the Argentine Government a "restructuring loan" in order to allow reductions in Argentine export taxes with the provision that a land tax would be substituted, although as of February 1987 no such land tax had been implemented.

The differential export tax has been the subject of two unfair export trade practice complaints filed with the United States Trade Representative (USTR) under section 301 of the Trade Act of 1974 by the U.S. National Soybean Processors Association in 1983 and 1986. 1/ The United States and Argentina have held negotiations over the export tax issue, and on April 24, 1987, the USTR indicated to the President that extended negotiations were warranted. On May 14, 1987, the USTR suspended the section 301 investigation since the Government of Argentina had announced that it would eliminate the export taxes within 180 days. 2/

Price-support program

Argentina's National Grain Board (NGB) administers the Government's price-support program for grains, manages State-owned storage facilities including port elevators, 3/ collects export taxes and special-purpose levies, issues export licenses, and sets export quotas when necessary. 4/ The NGB established a pricing program that fixes a margin between international and domestic prices, with soybean and sunflowerseed farmers guaranteed a certain price. All oilseeds and grain (but not oilseed meals or vegetable oils) are covered by the reference price which is adjusted as export prices change, but generally farmers receive no less than 85 percent of the export price. Reference prices change weekly and are based on the average market price of the three previous days in various domestic markets. This policy prevents export traders from bidding domestic prices too far below the international price, but at the same time does not put a floor under domestic prices.

The index price system is also used to prevent under-invoicing, thus guaranteeing that export taxes are collected from the true selling price. The NGB, which administers the export tax, does not consider depreciation or other indirect costs as legitimate, and hence, index prices may appear to show a

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1/ NSPA, 1983, op. cit.
2/ Federal Register, Vol. 52, No. 95., p. 18685.
3/ The 1979 Grains Law established that grain export facilities could be owned and handled by private operators. Previously, the NGB was the sole owner and operator of all port elevators.
4/ Myles Mielke, op. cit.

profit for crushers, but fall short when complete costs are accounted for. The NGB has attempted to adjust export taxes in an effort to boost farm income and farm prices by reducing the marketing margins allowed for grain traders between the export selling price and the price paid to farmers.

Export and marketing programs

The Argentine Government through the NGB negotiates bilateral trade agreements, although actual sales may be fulfilled either by the NGB or by private exporters. The NGB had bilateral grain agreements with Algeria, Czechoslovakia, Haiti, Angola, and the U.S.S.R., all of which expired in 1985. The Argentine-U.S.S.R. agreement was extended for 5-years in 1985; however, the U.S.S.R. failed subsequently to purchase the minimum agreed amounts of 4 million tons of grain and 0.5 million tons of oilseeds. 1/

Other programs

Among other policy tools the Argentine Government has used to influence its domestic oilseed industry are a value-added tax and a dual-exchange-rate system. The value-added tax level in recent years amounted to 20 percent, which applied to the sale of domestic oilseed products (meal and oil) with the tax paid on the total quantity produced. The tax is rebated through a fiscal credit at the time of the export, with the credit applied on subsequent taxes owed. The differential exchange rate system has at various times been changed to influence exports of agricultural products. 2/

1/ Information supplied by Marcelo Regunaga, Junta Nacional de Granos (NGB), on Apr. 21, 1987.
2/ See for example, U.S. International Trade Commission, The Effects of Developing Country Debt-Servicing Problems on U.S. Trade, (USITC Pub. 1950), Mar. 1987, pp. 74-88.

Table 5-1
Oilseeds: Argentine production, exports, crush, and ending stocks, by type, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Item	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/
Production:										
Soybean..........	1,400	2,700	3,700	3,600	3,500	4,150	4,200	7,000	6,750	7,200
Cottonseed.......	300	414	330	315	170	290	222	326	300	278
Peanuts..........	600	372	672	337	243	270	250	329	260	250
Sunflowerseed....	900	1,600	1,430	1,650	1,260	1,980	2,400	2,200	3,400	4,100
Rapeseed.........	2	5	15	23	5	5	0	0	0	0
Flaxseed.........	617	810	600	743	585	600	765	660	550	484
Total..........	3,819	5,901	6,747	6,668	5,763	7,295	7,587	10,515	11,260	12,412
Exports:										
Soybean..........	623	1,972	2,841	2,726	2,190	2,151	1,338	3,132	2,954	2,600
Peanuts..........	43	49	137	92	74	65	111	121	115	110
Sunflowerseed....	0	189	2	1	25	19	3	146	389	500
Flaxseed.........	0	216	12	52	1	1	8	6	0	5
Total..........	666	3,426	2,992	2,871	2,290	2,236	1,460	3,405	3,458	3,215
Crush: 3/										
Soybean..........	589	685	638	720	1,100	1,907	2,399	3,617	3,445	4,450
Cottonseed.......	278	378	330	300	155	275	195	259	275	255
Peanuts..........	479	280	385	282	147	182	113	123	105	105
Sunflowerseed....	1,088	1,167	1,493	1,626	1,201	1,845	2,319	2,054	3,136	3,400
Rapeseed.........	2	5	15	22	5	5	0	0	0	0
Flaxseed.........	471	653	512	734	496	578	725	645	500	475
Total..........	2,907	3,168	3,373	3,684	3,104	4,792	5,751	6,698	7,461	8,685
Ending stocks: 4/										
Soybean..........	190	147	227	204	235	107	332	278	294	180
Cottonseed.......	15	19	2	2	2	0	3	14	15	14
Peanuts..........	23	4	73	7	13	22	10	24	23	17
Sunflowerseed....	37	236	138	131	136	214	248	204	21	151
Linseed..........	146	47	73	5	43	30	7	9	29	19
Total..........	411	453	513	342	429	373	600	529	382	381

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast.
3/ Crush data represent reported or estimated crush.
4/ Stock data are not included for all commodities, and in most cases are USDA estimates. Where no stock data are available, changes are included in consumption.

Note.--Import data are statistically negligible.

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

Table 5-2
Soybeans and products: Argentine harvested area, yield, production, exports, crush, domestic consumption, and ending stocks, crop years 1978/79 to 1987/88 1/

Crop year	Harvested area	Yield	Production	Exports	Crush	Domestic consumption	Ending stocks
	1,000 hectares	Metric tons per hectare	1,000 metric tons				
Soybeans:							
1978/79.........	1,250	2.160	2,700	1,969	686	871	147
1979/80.........	1,600	2.313	3,700	2,776	639	844	227
1980/81.........	2,030	1.773	3,600	2,726	720	897	204
1981/82.........	1,740	2.011	3,500	2,190	1,081	1,279	235
1982/83.........	1,986	2.090	4,150	2,151	1,907	2,127	107
1983/84.........	2,281	1.841	4,200	1,338	2,399	2,637	332
1984/85.........	2,910	2.405	7,000	3,132	3,617	3,922	278
1985/86.........	3,270	2.064	6,750	2,954	3,445	3,780	294
1986/87.........	3,350	2.179	7,300	2,600	4,450	4,814	180
1987/88 2/......	3,650	2.110	7,700	2,650	4,675	5,045	185
Soybean meal:							
1978/79.........	3/	3/	536	370	3/	156	14
1979/80.........	3/	3/	499	260	3/	244	9
1980/81.........	3/	3/	561	277	3/	277	16
1981/82.........	3/	3/	838	591	3/	241	22
1982/83.........	3/	3/	1,500	1,209	3/	261	52
1983/84.........	3/	3/	1,924	1,765	3/	116	95
1984/85.........	3/	3/	2,893	2,663	3/	206	119
1985/86.........	3/	3/	2,739	2,600	3/	224	34
1986/87.........	3/	3/	3,530	3,150	3/	280	134
1987/88 2/......	3/	3/	3,720	3,450	3/	250	154
Soybean oil:							
1978/79.........	3/	3/	112	59	3/	52	4
1979/80.........	3/	3/	106	102	3/	4	4
1980/81.........	3/	3/	121	88	3/	25	12
1981/82.........	3/	3/	183	84	3/	103	8
1982/83.........	3/	3/	312	220	3/	82	18
1983/84.........	3/	3/	393	298	3/	76	37
1984/85.........	3/	3/	593	504	3/	78	48
1985/86.........	3/	3/	579	540	3/	47	40
1986/87.........	3/	3/	745	620	3/	95	70
1987/88 2/......	3/	3/	780	645	3/	100	105

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast on February 1987.
3/ Not applicable.

Note.--Import data are statistically negligible.

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

Table 5-3
Sunflowerseed and products: Argentine harvested area, yield, production, exports, crush, domestic consumption, and ending stocks, crop years 1978/79 to 1987/88

Crop year	Harvested area	Yield	Production	Exports	Crush	Domestic consumption	Ending stocks
	1,000 hectares	Metric tons per hectare	1,000 metric tons				
Sunflowerseed:							
1978/79........	2,000	0.800	1,600	189	1,167	1,198	236
1979/80........	1,557	0.918	1,430	2	1,493	1,526	138
1980/81........	1,855	0.889	1,650	1	1,626	1,656	131
1981/82........	1,280	0.984	1,260	25	1,201	1,230	136
1982/83........	1,673	1.184	1,980	19	1,845	1,883	214
1983/84........	1,902	1.262	2,400	3	2,319	2,363	248
1984/85........	1,989	1.106	2,200	146	2,054	2,098	204
1985/86........	2,350	1.447	3,400	389	3,136	3,194	21
1986/87........	3,140	1.306	4,100	500	3,400	3,470	151
1987/88 2/.....	2,400	1.250	3,000	250	2,740	2,801	100
Sunflowerseed meal:							
1978/79........	3/	3/	513	481	3/	39	11
1979/80........	3/	3/	643	567	3/	66	21
1980/81........	3/	3/	689	632	3/	51	27
1981/82........	3/	3/	525	469	3/	40	43
1982/83........	3/	3/	797	662	3/	135	43
1983/84........	3/	3/	1,030	965	3/	57	51
1984/85........	3/	3/	943	855	3/	80	59
1985/86........	3/	3/	1,380	1,204	3/	128	107
1986/87........	3/	3/	1,500	1,400	3/	105	102
1987/88 2/.....	3/	3/	1,210	1,110	3/	120	82
Sunflowerseed oil:							
1978/79........	3/	3/	385	161	3/	226	19
1979/80........	3/	3/	518	255	3/	252	30
1980/81........	3/	3/	571	325	3/	241	35
1981/82........	3/	3/	427	207	3/	204	51
1982/83........	3/	3/	683	435	3/	259	40
1983/84........	3/	3/	904	656	3/	240	48
1984/85........	3/	3/	812	560	3/	264	36
1985/86........	3/	3/	1,261	885	3/	319	93
1986/87........	3/	3/	1,360	1,030	3/	320	103
1987/88 2/.....	3/	3/	1,095	795	3/	325	78

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast on February 1987.
3/ Not applicable.

Note.--Imports are negligible.

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

Table 5-4
Soybeans, soybean meal, and soybean oil: Argentine exports, by principal markets, 1980-86

(In thousands of metric tons)

Market	1980	1981	1982	1983	1984	1985	1986 1/
	Soybeans						
EC	1,640	794	538	719	2,311	2,028	2,098
Romania	0	22	0	0	52	85	137
Norway	19	0	0	0	59	58	85
Soviet Union	725	709	687	661	149	454	0
Mexico	0	278	122	0	103	274	46
Brazil	244	262	460	0	162	0	0
All other	72	151	82	54	284	63	238
Total	2,700	2,216	1,889	1,434	3,120	2,962	2,604
	Soybean meal (pellets)						
EC	156	383	673	847	1,330	1,460	1,305
Czechoslovakia	0	0	114	75	331	276	208
Iran	0	0	43	299	230	179	183
Bulgaria	0	0	0	105	109	284	139
Cuba	84	86	85	157	192	189	126
All other	50	47	53	89	326	133	177
Total	290	516	968	1,572	2,518	2,521	2,138
	Soybean oil						
Iran	0	0	31	65	130	176	139
Brazil	14	0	16	37	82	103	94
India	0	0	2	20	95	38	63
Colombia	0	4	20	29	23	41	59
Peru	5	0	19	28	36	15	53
All other	73	66	86	114	118	178	261
Total	92	70	174	293	484	551	669

1/ January-September only.

Source: Camara de la Industria Aceitera de la Republica Argentina (CIARA), Anuario Estadistico de Oleaginosos, 1985 and 1986, pp. 45-57.

Table 5-5
Soybeans: Argentine variable farm costs of production, 1982-85

Product costs	1982	1983	1984	1985
Seed..........................	$21.32	$19.95	$9.84	$10.08
Fertilizer, lime, gypsum, and chemicals...............	7.24	6.09	5.53	5.40
Fuel, lube, and electricity...	8.66	5.93	6.14	7.95
Repairs.......................	10.32	8.31	5.99	8.96
Taxes and insurance...........	13.81	9.26	5.90	8.71
Interest......................	7.07	5.63	4.47	5.63
Other cash expenses 1/........	19.56	13.00	14.28	12.00
Capital replacement...........	9.78	8.03	6.09	8.74
Labor costs...................	10.01	7.93	8.26	8.47
Total variable costs 2/...	107.76	84.13	66.51	75.94

1/ Includes harvesting, drying, and storing expenses. Harvesting expenses are incurred by independent "contractors," who are essentially middlemen who bring the beans to market.
2/ Total production costs are for 150-hectare farms located in Argentina's main producing region, Pergamino, for April-May years (for example, 1982 is April 1981-May 1982).

Source: Secretaria de Argentina, Ganaderia y Pesca (see App. E); submitted to U.S. Trade Representative by CIARA, Dec. 5, 1986, table 2.

Table 5-6
Agricultural technology changes: Measures of annual change in Argentina, Brazil, Latin America, and the United States, 1970-80

(In percent)

Item	Argentina	Brazil	Latin America	United States
Agricultural product growth........	2.5	4.4	1/	3.2
Contribution of inputs..............	56.4	34.8	1/	1/
Contribution of productivity.......	43.6	65.2	1/	1/
Agricultural work force 2/..........	.35	.61	.72	-1.8
Cultivated crop and pasture land per worker......................	1.27	.96	-.10	3/ 3.0
Agricultural product per hectare...	2.34	2.33	2.37	3/ 3.80
Agricultural product per worker....	3.61	3.29	2.27	3/ 5.40
Fertilizer use per hectare.........	2.16	6.63	6.85	4.70
Tractors per worker................	.37	5.07	2.42	4.70

1/ Not available.
2/ Economically active population (EAP) or, in the United States, the number of farmers.
3/ Data are for 1969-78.

Note.--Agricultural product measured in constant currency.

Source: IADB, Economic and Social Progress in Latin America, 1986, pp. 90-93; and U.S. Census Bureau, Census of Agriculture, various issues.

Table 5-7
Oilseed meal: Argentine production, exports, apparent consumption, and ending stocks, by type, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Item	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/
Production:										
Soybean.........	455	536	499	561	838	1,500	1,924	2,893	2,739	3,530
Cottonseed......	119	162	142	130	67	120	86	111	120	110
Rapeseed........	1	3	8	12	3	3	0	0	0	0
Sunflowerseed...	479	513	643	689	525	797	1,030	943	1,380	1,500
Fish............	23	23	23	23	25	22	14	17	18	18
Peanut..........	203	113	157	113	58	73	45	53	43	42
Fish............	300	404	333	467	363	349	471	423	315	310
Total.........	1,580	1,754	1,805	1,995	1,879	2,864	3,570	4,440	4,615	5,510
Exports:										
Soybean.........	268	370	260	277	591	1,209	1,765	2,663	2,600	3,150
Cottonseed......	108	180	146	115	65	93	78	48	100	110
Rapeseed........	1	0	3	2	0	0	0	0	0	0
Sunflowerseed...	414	481	567	632	469	662	965	855	1,204	1,400
Fish............	1	2	2	2	0	1	2	2	2	2
Peanut..........	174	99	178	68	42	41	28	21	25	24
Linseed.........	300	420	410	442	378	347	459	430	308	310
Total.........	1,266	1,552	1,566	1,538	1,545	2,353	3,297	4,019	4,239	4,996
Apparent consumption: 3/										
Soybean.........	198	156	244	277	241	261	116	206	224	280
Cottonseed......	8	5	3	5	5	15	18	57	20	21
Rapeseed........	0	3	5	10	3	3	0	0	0	0
Sunflowerseed...	66	39	66	51	40	135	57	80	128	105
Fish............	22	21	21	21	25	21	12	15	16	16
Peanut..........	15	15	6	25	20	30	18	34	16	18
Linseed.........	8	4	0	0	0	0	0	0	16	0
Total.........	317	243	345	389	334	465	221	392	420	440
Ending stocks: 4/										
Soybean.........	4	14	9	16	22	52	95	119	34	134
Cottonseed......	30	7	0	10	7	30	20	26	26	5
Sunflowerseed...	18	11	21	27	43	43	51	59	107	102
Peanut..........	30	29	2	22	18	8	7	5	7	7
Linseed.........	100	80	3	28	13	15	27	20	11	11
Total.........	182	141	35	103	103	148	200	229	185	259

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast.
3/ Consumption data represent "apparent consumption" and include all disappearance as well as some changes in stocks.
4/ Stock data are not included for all commodities and in most cases are USDA estimates. Where no stock data are available, changes are included in consumption.

Note.—Import data are statistically negligible.

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

Table 5-8
Vegetable and marine-animal oils: Argentine production, exports, apparent consumption, and ending stocks, by type, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Item	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/
Production:										
Soybean.........	96	112	106	121	183	312	393	593	579	745
Sunflowerseed...	357	385	518	571	427	683	904	812	1,261	1,360
Rapeseed........	1	2	6	9	2	2	2	0	0	0
Cottonseed......	40	57	48	45	23	41	30	41	42	39
Peanut..........	127	75	99	77	38	48	29	32	27	26
Linseed.........	145	200	166	229	184	162	221	206	166	150
Fish............	6	6	6	6	6	6	6	6	6	6
Total.........	772	837	949	1,058	863	1,254	1,595	1,659	2,081	2,326
Exports:										
Soybean.........	64	59	102	88	84	220	298	504	540	620
Sunflowerseed...	131	161	255	325	207	435	656	560	885	1,030
Cottonseed......	10	8	28	20	10	15	14	19	20	15
Peanut..........	138	63	115	82	36	38	31	28	23	21
Linseed.........	167	202	184	227	174	160	204	198	170	148
Total.........	510	493	684	742	511	868	1,203	1,309	1,638	1,834
Apparent consumption: 3/										
Soybean.........	33	52	4	25	103	82	76	78	47	95
Sunflowerseed...	220	226	252	241	204	259	240	264	319	320
Rapeseed........	1	2	6	9	2	2	0	0	0	0
Cottonseed......	30	35	30	27	15	26	18	20	20	25
Peanut..........	2	2	0	0	0	0	0	0	0	0
Fish............	6	6	6	6	6	6	6	6	6	6
Total.........	292	323	298	308	330	375	340	368	392	446
Ending stocks: 4/										
Soybean.........	3	4	4	12	8	18	37	48	40	70
Sunflowerseed...	21	19	30	35	51	40	48	36	93	103
Cottonseed......	0	14	4	2	0	2	0	2	4	3
Peanut..........	11	21	5	0	2	8	1	2	1	1
Linseed.........	20	18	0	2	12	14	18	14	6	4
Total.........	55	76	43	51	73	82	104	102	144	181

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast.
3/ Consumption data represent "apparent consumption" and include all disappearance as well as some changes in stocks.
4/ Stock data are not included for all commodities and where included are in most cases USDA estimates. Where no stock changes are available, changes are included in consumption.

Note.--Import data are statistically negligible.

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

Table 5-9
Soybeans and oilseeds: Argentine processing (crush) capacity, 1977-86

Year	Soybean crush capacity	Total oilseed crush capacity	Ratio of-- Soybean crush to soybean capacity	Soybean crushing capacity to soybean production	Share of- Soybean production crushed domestically	Soybean crush to total oilseed crush
	1,000 metric tons		Percent			
1977.....	1/ 1,290	2/ 5,581	46	92	42	20
1978.....	3/	3/	3/	3/	25	21
1979.....	3/	3/	3/	3/	17	19
1980.....	1/ 1,580	2/ 7,515	46	45	20	19
1981.....	3/	3/	3/	3/	31	35
1982.....	4,800	3/	40	116	46	40
1983.....	3/	3/	3/	3/	57	42
1984.....	1/ 5,100	4/ 9,436	71	73	52	54
1985.....	7,200	4/ 11,500	48	107	51	47
1986 5/..	9,000		49	123	61	52

1/ Derived.
2/ Based on a 330-day capacity utilization.
3/ Not available.
4/ Based on a 300-day capacity utilization.
5/ Estimated.

Source: J.J. Hinrichsen, La Industria de Aceites Vegetales e la Produccion de Semillas Oleaginsas, Buenos Aires, Argentina, various issues; Jorge Hazera et. al, U.S. Department of Agriculture, "Shifts in Soybean and Soybean Product Exports from South America," Latin American Outlook and Situation Report, July 1985, pp. 23-25; U.S. Department of Agriculture, FAS Attache Report Argentine Oilseed Annual Report, various issues.

Table 5-10
Oilseed processing plants: Number of Argentine plants, by type of facility, 1977, 1980, 1984, and 1986

Type of plant	1977	1980	1984	1986
Solvent-extraction method:				
With refining operation	18	17	18	1/
Other	9	9	9	1/
Subtotal	27	26	27	30
Simple mechanical press method:				
With refining operations	6	11	11	1/
Other	2	5	4	1/
Subtotal	8	16	15	16
Continuous mechanical press method:				
With refining operations	9	6	1	1/
Other	29	22	13	1/
Subtotal	38	28	14	16
Grand total	73	70	56	62

1/ Not available.

Source: J.J. Hinrichsen S.A., La Industria de Aceites Vegetales e la Produccion de Semillas Oleaginisas, Resumen de la Capacidod Instalada, annual, Buenos Aires, Argentina, various issues.

CHAPTER 6. OILSEED COMPLEX OF BRAZIL

General

Brazil is a major supplier of oilseeds and oilseed products, exporting some 2 million metric tons of oilseeds and 8 million metric tons of oilseed meal and oil in crop year 1986/87. The dominant oilseed is soybeans, although commercially important quantities of cottonseed and peanuts are also grown and processed. These latter commodities, however, are grown in response to demand for fibers and edible peanuts, and their derived meal and oil are byproducts of nonoilseed-related industries.

Brazil has shown more stability in the face of recent changes in world market conditions than its neighbor Argentina, another important world supplier. Domestic production and exports grew moderately through the 1960's, then expanded rapidly in the 1970's in response to rising soybean prices, domestic infrastructure development, and increased wheat planting that was double-cropped with soybeans. During the 1980's, in contrast, the industry has grown very slowly; moreover, recent Government policies have turned the emphasis from exporting to domestic consumption. However, Brazil remains an important source of exports, and its vast areas of underutilized arable land, together with an announced Government program to upgrade its internal transportation bottlenecks, may make it a potentially greater force in world oilseed trade in the future.

Overview of the Brazilian Oilseed Farming Sector

Production, trade, and apparent consumption

Production.--Brazilian oilseed production grew very rapidly from the 1960's until the late 1970's, and thereafter continued a slow, irregular increase. Oilseed production has grown from about 14 million metric tons in crop year 1977/78 to 20 million tons in 1985/86, but drought conditions curtailed output to 15 million tons in 1986/87 (table 6-1). Oilseed production in Brazil in 1987/88 is expected to reach about 19 million metric tons, with all but about 2 million tons consisting of soybeans. Soybeans constitute approximately 90 percent of Brazil's oilseed production, with other oilseeds (cottonseed, peanuts, sunflowerseed, and rapeseed) accounting for the remainder.

1/ For additional detail on Brazil's oilseed complex, see E.E. Broadbent and F. Parry Dixon, Exploratory Study of Brazil Soybean Marketing, University of Illinois, 1976; Gary Williams and Robert L. Thompson, The Brazilian Soybean Industry, U.S. Department of Agriculture (USDA), Oct. 1984; USDA, Brazil-Annual Oilseeds Report and Brazil-Agricultural Situation Annual Report, various years; USDA, Foreign Agricultural Service, World Oilseed Situation and Market Highlights, various issues; Inter-American Development Bank (IADB), Economic and Social Progress in Latin America, 1986; U.S. Department of the Army, Brazil: A Country Study (Area Handbook Series), 1983; and Carlos Augusto Santana, The Impact of Economic Policies on the Soybean Sector of Brazil, unpublished dissertation, University of Minnesota, 1984.

Soybean production in Brazil increased more than sixfold from less than 2 million metric tons in 1970 to 15 million tons in 1980. Farmers in the three southeastern States of Rio Grande do Sul, Parana, and Sao Paulo accounted for nearly all soybean production in Brazil until about 1979, when with the spread of soybean growing to Mato Grosso, production there rose rapidly. In 1987, the two States of Mato Grosso and Mato Grosso do Sul together are projected to be the second leading producing region in Brazil, together supplying one-fourth of the total Brazilian soybean production.

The total harvested area of soybeans increased from 7.8 million hectares to 9.3 million hectares between crop years 1978/79 and 1986/87 (table 6-2). The higher prices for soybeans in the mid to late 1970's induced farmers to shift farmland to soybean production, as well as to double-crop soybeans with wheat. In addition, Brazilian scientists developed new varieties of soybeans better suited to Brazilian land and climate than the varieties previously imported from the United States. As a result, between 1978/79 and 1986/87, soybean yields increased from 1.2 metric tons per hectare (18 bushels per acre) to 1.5 metric tons per hectare (22 bushels per acre). Even with the improvement, however, Brazilian yields remain far below those obtained in the United States and in neighboring Argentina.

Trade.--Brazil is a net exporter of oilseeds. Such exports have fluctuated greatly during the past 10 years, both in absolute volume and as a share of total production, between a low of 664,000 metric tons (6 percent of production) in crop year 1979/80 and a high of 3.5 million metric tons (17 percent of production) in 1985/86 (table 6-1). Virtually all oilseed exports consist of soybeans. Most of the exports are destined for the EC market.

Brazil also imports oilseeds, mainly soybeans, through a so-called drawback program under which crushers may import oilseeds when domestic supplies are low, such as during the offseason, and then re-export the resulting meal and oil. Brazilian crushers tend to pursue crushing activity at full capacity, aiming to process as many domestic soybeans as possible after the March-April harvest. This allows Brazilian exports to reach world markets before October when the new U.S. soybean crop becomes available. Because of this marketing strategy, Brazilian crushers must frequently import soybeans late in the crop year to meet domestic requirements. U.S., Paraguayan, and Argentine soybeans have been imported under this scheme. Since all soybean imports into Brazil are licensed, imports have been alternately increased and decreased, depending on availability of domestic soybeans, generally fluctuating between 100,000 and 500,000 metric tons annually except for rare exceptionally low or high volumes. However, imports have not accounted for a significant portion of the aggregate oilseed supply; only twice in the last decade did imports exceed 3 percent of the domestic oilseed supply.

Apparent consumption.--As in all other major oilseed-producing nations, the crushing sector is the only important domestic market for Brazilian oilseeds. The consumption level of Brazilian crushers is dependent upon the strength of the export market and on the domestic demand faced by crushers for oilseed meal and vegetable oil. Conditions in Brazilian meal and oil markets are discussed in the following section on the oilseed crushing sector.

Size of the Brazilian oilseed farm sector

Farmland availability.--Brazil, geographically one of the largest countries in the world, has extensive agricultural potential far beyond the needs of its domestic market; the value of its agricultural exports in recent years has ranked second only to that of the United States. The oilseed farm sector has only in recent years become a significant part of Brazilian agriculture. Soybeans, the base of the oilseed sector, have been grown in Brazil since 1914; however, they did not become commercially important until the 1960's. 1/ Soybean acreage in Brazil has grown rapidly over the last several years, from less than 200,000 hectares in 1960 to 1.3 million hectares in 1970, then to over 8 million hectares by 1983. According to Brazilian researchers, some of the more important factors motivating increased soybean production in Brazil during this period were "high profitability, subsidized farm credit, double-cropping with wheat, mechanization, active farm cooperative support, and extension support." 2/

The three producing regions for soybeans in Brazil are characterized as traditional, expanding, and potential. 3/ Initial development of the soybean crop took place in the traditional region, composed of the States of Rio Grande do Sul, Parana, Sao Paulo, and Santa Catarina. The expanding region, encompassing the central part of the country, particularly the States of Mato Grosso and Mato Grosso do Sul, Goias, Maranhao, Minas Gerais, and Bahia, is where soybean production has increased since the late 1970's, and the potential region includes large areas of virgin land not yet settled.

Brazilian farmers in the traditional region initially planted soybeans using seed and farming technology imported from the United States. This region has supplied about two-thirds of Brazil's soybean production in recent years, and the expanding region has accounted for nearly all of the remaining soybean production. The technology used in the expanding region has largely been developed by Brazilian scientists.

Most land in the Mato Grosso do Sul section of the expanding region is intrinsically poor for farming, with natural grasses predominating, but it responds well to the use of lime and chemical fertilizers. The soils in the expanding region can be made highly productive for soybeans by such treatment; by one report, soybean farmers in this region "are earning good profits." 4/ In 1983, although the State of Mato Grosso do Sul contained 35 million hectares of available arable land, only about 2 million hectares were planted in soybeans. 5/ In that State, farmers have planted soybeans mainly on previously virgin land in "cerrados" or forests, that require significant amounts of lime, phosphorous, and potash. However, yields of soybeans in that State averaged

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1/ Emidio Bonato and Amelio Dallagnot, "Soybeans in Brazil--Production and Research," and Warney Val, "History and Development of Soybean Production in South America," from World Soybean Research Conference III: Proceedings, Boulder: 1985, Richard Shibbles, (ed.).
2/ Ibid.
3/ Ibid.
4/ Ibid., p. 1251.
5/ John Hopkins, USDA, Soybean Production in the State of Mato Grasso do Sul, FAS telegram, Feb. 28, 1983.

from 1,800 to 2,000 kilos per hectare in 1982-83, although some large farms achieved 2,400 kilos per hectare. Up to 20 million hectares may be suitable for soybean planting. 1/

With sharply higher land prices in the traditional region, there has been extensive migration of soybean farmers into the expanding region where land is considerably less expensive. This region is Brazil's most rapidly developing agricultural region, and it comprises about one-fourth of the land mass, with potentially arable land of 110 million hectares for crops and another 90 million hectares for livestock and forestry. 2/ Only about 10 percent of the arable land in the expanding region is currently under cultivation, although the region has recently accounted for as much as 35 percent of Brazilian soybean production.

Average farm size.--Farm size in Brazil varies by region, with soybean farms in the traditional region ranging from around 30 to 100 hectares. 3/ Farmers in this region typically double-crop soybean plantings with wheat, and there are well-developed farmer cooperatives that market and process soybeans. In the expanding region, farms tend to be much larger, typically 500 hectares; farms of 3,000 hectares are also reported.

Cost structure of oilseed farming

Comparisons of Brazilian and U.S. farm costs of production are difficult because of the problems of exchange rates and economic returns to land, among others. U.S. Department of Agriculture (USDA) researchers in 1985 studied average variable farm costs of production for selected crops, including soybeans in the United States, Brazil, and Argentina. Fixed land costs were excluded, simplifying cost comparisons, but direct comparisons are somewhat misleading because these are not total costs of production. The average variable farm costs of production in soybeans for 1980-82 are shown in the following tabulation (in U.S. dollars per bushel): 4/

Region	1980	1981	1982	1980-82 Average	Ratio of cost to 1980-82 average cost
U.S. average	2.06	2.01	1.83	1.97	100
U.S. Corn Belt/Lake States	1.42	1.51	1.46	1.46	74
Brazil (Southeast)	1.66	1.66	2.20	1.84	93
Argentina (Pergamino)	1.73	1.76	1.70	1.73	88

Another study of soybean production costs in Brazil, Argentina, and the United States found that Brazilian soybean costs, f.o.b. export port, were

1/ Bonato and Dallagnot, op. cit., p. 1255.
2/ USDA, Foreign Agricultural Service, "Three Proposed Railroad Projects and Their Implications for Agricultural Production and Trade," TOFAS telegram, Brasilia, May 6, 1987, p. 2.
3/ Bonato and Dallagnot, op. cit.
4/ Alan Webb, et al., "World Agriculture Markets and U.S. Farm Policy," Agricultural-Food Policy Review, USDA, 1985, p. 101.

$6.58 per bushel in 1986, compared with $7.29 per bushel in the United States, as shown in the following tabulation (in U.S. dollars per bushel): 1/

Soybean cost item	Argentina	Brazil	United States
Variable costs	$2.17	$3.32	$2.41
Fixed costs 1/	1.88	2.08	4.21
Total production cost	4.05	5.40	6.62
Marketing costs	.99	1.18	.67
F.o.b. cost to export port	5.04	6.58	7.29
Ocean freight to Rotterdam	.50	.45	.34
F.o.b. delivered cost to Rotterdam	5.54	7.03	7.63
Ocean freight to Japan	.88	.93	.70
F.o.b. delivered cost to Japan	5.92	7.51	7.99

1/ Included in fixed costs are land rents as follows in U.S. dollars per bushel: Argentina $.61, Brazil $1.16, and The United States $1.72.

In 1984, the Brazilian oilseed processors' association published an estimate of the farm costs of production of soybeans for average farmers in the principal producing region of southeastern Brazil. The Brazilian farm variable costs of production in 1984 amounted to the equivalent of US$3.42 per bushel, fixed costs were US$5.17 per bushel, and total f.o.b. export costs were US$6.98 per bushel, as shown in the following tabulation: 2/

Item	Per ton	Per bushel
Farm cost of production:		
Variable:		
Machine operation	$23.23	$0.63
Seeds	14.87	.40
Fertilizer	23.14	.63
Chemicals	16.03	.44
Labor	1.35	.04
Other	47.20	1.28
Subtotal	125.82	3.42
Fixed:		
Machinery	4.52	.12
Labor	1.04	.03
Other	58.43	1.59
Total farm cost	189.82	5.17
Marketing cost (f.o.b. export port):		
Freight	22.43	.61
ICM tax	29.68	.81
Other taxes	6.67	.18
Shipping losses	1.13	.03
Commissions	.98	.03
Port charges	5.90	.16
Total marketing cost	66.79	1.82
Grand total cost, f.o.b. export port	256.61	6.98

1/ Gerald Ortmann, et al., Comparative Costs in Agricultural Commodities Among Major Exporting Countries, Occasional Paper, Department of Agricultural Economics, Ohio State University, Columbus, Ohio, Jan. 1987, App. 3.
2/ Associacao Brasileira das Industries de Oleos Vegetais (ABIOVE), Alimentos para o Brasil, Brasilia, 1984.

Transportation costs

Transportation costs exert a key influence on Brazilian soybean production and exporting. The ports of Santos, Paranagua, Porto Alegre, and Rio Grande are the most important export points. In the past decade, storage and export port facilities have been modernized and upgraded to handle increased soybean production. The weakest and mostly costly link in the Brazilian marketing infrastructure has consistently been the transport of soybeans from the farm to the processor or the port. 1/ The majority of the soybeans move by truck, as the rail system is inadequate and there are few navigable rivers. Brazilian trade sources indicate that nearly one-half of the locomotives serving the principal soybean processors have recently been out of service because of a lack of spare parts and inadequate maintenance. The acute lack of rolling stock in the Brazilian rail system creates tight bottlenecks during the peak marketing period. Farm-to-port transport costs were four times more expensive in Brazil than in the United States during the late 1970's and early 1980's, with most soybeans moving in 25-ton truck lots. 2/

U.S. soybeans appear to have a transportation cost advantage over Brazilian soybeans for export shipments to ports in Japan and Western Europe. 3/ Part of the U.S. cost advantage is attributed to the high-cost inland transportation system in Brazil where producers incur trucking costs of $0.50 to $0.75 per bushel.

High transportation costs are a major constraint to additional growth in soybean production in the expanding region of Mato Grosso do Sul. Paving of roads into this region would lower these costs, as the existing rail line is not adapted to carrying soybeans to ports and plants, and most farmers must rely on trucks to haul soybeans. The soybean farms in central Mato Grosso are about 550 miles from the nearest ports; in 1983 the truck shipping costs amounted to US$0.82 to US$1.37 per bushel of soybeans, or 14 to 23 percent of the f.o.b. cost at the port. 4/

A 1986 study indicated that the costs of transporting soybeans from the traditional region to port averaged $1.18 per bushel, or 18 percent of the calculated f.o.b. port cost. 5/ In the United States, the comparable cost of transportation of soybeans from the farm to the principal export port (New Orleans) was US$0.67 per bushel in 1986, or 9 percent of the calculated f.o.b. U.S. port cost of $7.29 per bushel.

In 1986, the Government of Brazil announced a major investment plan to build three railroad lines, improve the leading ports' facilities, and undertake a river navigation project to enhance soybean marketing. 6/ The first railroad expansion project (called the "soybean railroad") would link

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1/ USDA, Brazil-Annual Oilseeds Report, Mar. 30, 1983, p. 16.
2/ Williams and Thompson, op. cit., p. 9.
3/ Tenpao Lee, et al., "The Impact of Transportation Rates on World Soybean Trade Competition," in R. Shibbles (ed.), op. cit.
4/ John Hopkins, op. cit., p. 4.
5/ Gerald Ortmann, et al., op. cit.
6/ USDA, Brazil-Agriculture Situation 1986, p. 19; "Oilseeds and Products," World Production and Trade, May 20, 1987, p. 2; and TOFAS telegram, Brasilia, op. cit., May 6, 1987.

producers in the States of Parana and Mato Grosso do Sul to Brazil's largest soybean port, Paranagua, through a 1,263 kilometer track; this rail line would significantly reduce transport costs. A second railroad project is aimed at the cerrados region, by building two rail lines from Gojas and Mato Grosso to the export port of Tubariao, State of Espiritx Santo. A separate river improvement project was proposed. Total costs of these programs are estimated at $2.3 billion. A 1,600 kilometer north-south rail line would also be constructed through unsettled portions of central Brazil to a northeastern port, connecting to an already existing rail line ending in a port in Maranhas.

Government policies

The main Brazilian Government policies affecting oilseed production are the rural credit system, which applies to all farm commodities and the minimum price system. The rural credit system, funded through Government banks, has over the years provided farm credit at interest rates well below market rates; however, the overall size of the credit program has been sharply reduced recently. The amount of credit available depends on the size of the farm, and it is adjusted frequently with inflation. Three forms of credit exist: production credit during the growing cycle, investment credit for fixed farm facilities, and marketing credit. 1/ The production credit loans are used for variable costs of production (so-called VBC loans), and repayment is made during the 6 months following each harvest. The VBC for soybeans, estimated for a "model" (average) farm with a yield of 1.75 to 2.0 metric tons per hectare, is as in the following tabulation: 2/

Year	Brazilian cruzeiros (cruzados)	U.S. dollar equivalent 1/	Exchange rate conversion (cruzeiros per U.S. dollar)
1983/84......	106,700	158	674
1984/85......	407,000	189	2,150
1985/86......	2/	2/	2/
1986/87......	2,340	170	13.77

1/ Converted at average prevailing exchange rate.
2/ Not available.

On this basis, the average variable cost of soybean production on this "model" farm for 1986/87 was $170 per 1.8 metric tons, or $2.57 per bushel of soybeans.

The minimum price system is similar to the U.S. price-support system wherein the Government provides loans either directly to farmers or indirectly through producer cooperatives for crop storage after harvest. The minimum price system is based upon a price for soybeans established by the Government prior to harvest; a "marketing loan" normally lasting 90 to 180 days is made using the stored soybeans as collateral. When a farmer receives such a loan, any production credit previously received must be repaid.

1/ See USDA, Brazil-Annual Oilseeds Report, and Brazil-Agricultural Situation, various years, for a full discussion on the complex details of this program.
2/ Conselho Monetario Nacional (CMN).

Recent policy changes.--With the new administration in 1985, the Government shifted its support policies away from the production of soybeans and other export crops, and towards the production of basic food crops intended for domestic consumption, particularly corn, rice, manioc, and dry edible beans. 1/ The policy encompasses land reform, research and extention programs, credit, and price supports. The research and extension programs have been reorganized to assist the smaller farmers that traditionally grow the domestic food crops. Government loan programs have reduced credit to the larger soybean farmers and have shifted support to food crop production, resulting in more corn and fewer soybeans planted in crop year 1986/87. Strict price controls were also imposed on all consumer products, including food; inflation was temporarily abated, but there were shortages of many products as a result of growing demand.

The change in the Brazilian price-support program adversely affected soybean production. However, the support price for the 1986 soybean crop of $4.13 per bushel, although below the world price for soybeans, still provided price support for Brazilian soybean farmers in the more remote expanding region of Mato Grosso do Sul. Brazilian support prices and comparable U.S. prices are shown in the following tabulation (per metric ton): 2/

Source	1985/86	1986/87
Brazil:		
Soybeans	$152	$147
Corn	96	98
Soybean/corn ratio	1.58	1.50
United States:		
Soybeans	184	1/ 175
Corn	100	1/ 76
Soybean/corn ratio	1.84	1/ 2.32

1/ Estimated.

Since the implementation of the Government's policies emphasizing production of basic food crops, there has been an increase in the soybean support price with that in domestic inflation; in March 1987, it was approximately $149 per metric ton ($4.05 per bushel). The Government usually purchases soybeans from farmers located in the remote Mato Grosso and northwest regions where transportation costs are high; in 1987, an estimated 2 million tons of soybeans will be purchased by the Government. 3/

Long-term Government soybean policies.--In 1986, the Brazilian Government established a long-term "Plan of Goals," which has specific relevance to the soybean sector. The Plan anticipates that by 1989 Brazilian soybean acreage will increase by 700,000 hectares over the average 8.6 million hectares planted during 1981-85. The Plan also envisions major Government infrastructure investments in transportation, irrigation, and storage, all of which would enhance the competitiveness of the domestic soybean farm sector.

1/ Ed Allen, "Brazilian Policy Shifts Supported U.S. Farm Act," Agricultural Outlook, USDA, Sept. 1986, p. 18.
2/ Ibid.
3/ USDA, Brazil-Agriculture Situation 1986, pp. 19-20.

Processor policies.--Brazilian Government policies have generally favored exports of soybean products over those of beans, primarily through the use of the differential export tax system, but no direct subsidies have generally been paid. The value-added tax, the ICM tax, is 13 percent on soybean exports, and soybean meal and oil are taxed at 11.1 and 8 percent, respectively. 1/ Soybean oil for domestic use is taxed at a rate of 16 percent within the State where produced and 11 percent when it is sold for consumption in other States.

In 1983, the Brazilian Government made available 1-year loans to soybean processors at below market rates of interest; the amount of financing available was up to 9 percent of the previous year's value of exports of refined soybean oil and 7 percent of that of crude soybean oil and of soybean meal exports. The Government previously provided credit for the importing of soybeans under a drawback scheme, which meant that the soybeans were processed into meal and oil, which in turn were exported. This drawback financing is being eliminated, and imports of soybeans are being sharply reduced. In the late 1970's and early 1980's, the Brazilian Government also provided credit with interest rates at below market rates for the construction of some soybean oil mills. 2/

Brazilian export controls.--The Brazilian Government has also employed an extensive export registration program, largely to ensure that adequate domestic supplies of soybean oil and meal are provided by soybean processors. 3/ The Government has alternately tightened and loosened its export controls, depending largely on the availability in a given year of soybean supplies. By late 1986, for example, export registrations were closed for soybeans and products to ensure adequate supplies until the 1987 crop was available.

U.S. soybean processors (the National Soybean Processors Association (NSPA)) lodged a complaint in 1983 under section 301 of the Trade Act of 1974 against Brazilian (as well as Argentine and Malaysian) trade policies, alleging that unfair trade practices have injured U.S. exports. 4/ Differential export taxes were the principal programs cited in the complaint; following reductions in the differential taxes, the dispute was resolved bilaterally.

Domestic price controls.--There have been extensive price controls over the domestic sale of vegetable oils in Brazil, as well as quantitative controls with regard to the sale of soybean meal. Price controls over the sale of vegetable oils have been enacted to control the upward spiral of food prices within Brazil. The most recent Brazilian policy with this regard was the "Cruzado plan," begun in 1986, which imposed price controls over all products and services, as well as wages. In essence, the domestic price controls acted to keep Brazilian domestic vegetable oil prices below that of world market prices. In 1987, domestic price controls were relaxed for many consumer goods, and prices began increasing at a monthly rate of 16 to 20 percent; retail vegetable oil prices were also allowed to rise subject to certain maximum profit margins for retailers. 5/

1/ USDA, Brazil-Annual Oilseeds Report, Mar. 30, 1983, pp. 13-14.
2/ Carlos Augusto Santana, op. cit., p. 42.
3/ USDA, Government Intervention in Agriculture, Jan. 1987, pp. 30-31.
4/ Petition Seeking Relief Under Section 301 of the Trade Act of 1974, as Amended, of the National Soybean Processors Association, before the United States Trade Representative, Apr. 6, 1983.
5/ In May 1987, the Brazilian Government had strict price controls on bread, milk, and sugar; other food products are "subject to maximum allowable profit margins," including vegetable cooking oil, rice, and coffee. See USDA, "Retail Food Prices," TOFAS telegram, Brasilia, May 5, 1987.

Net Government policies in Brazil.--In evaluating the net effects of Government measures on soybeans and products, a 1987 USDA study of farm support and tax policies in Brazil indicated that soybean products were taxed at a net rate of 1 to 9 percent on a producer subsidy equivalent basis. 1/

A study in 1984 using econometric analysis of world soybean markets concluded that Brazilian Government policies affecting its soybean and soybean products markets during the 1970's and early 1980's may have actually resulted in significantly larger, rather than smaller, U.S. production and exports of soybeans, meal, and oil. 2/ The Brazilian policies may have caused a shift in the destination of Brazil's soybean product exports but did not diminish the overall volume of U.S. soybean oil and meal supplied to total world markets, according to this analysis. The Brazilian policies also may have tended to increase the total amount of meal and oil entering world markets and diminish the total amount of soybeans entering world markets (entering instead in the form of meal and oil).

Technology

In general, Brazilian soybean farmers use equipment and technology very comparable to those of U.S. farmers. Initially, soybean seed was introduced directly from the southern United States into the traditional producing regions of Brazil, along with U.S. farming machinery and cultural techniques. Since then, Brazilian scientists have developed soybean seed varieties (cultivars) and cultural practices that have improved soybean yields both in the traditional and the expanding cerrados regions. Brazilian soybean yields increased from about 1,100 kilos per hectare in the 1960's to about 1,700 kilos per hectare in the 1980's (table 6-2). The higher yields tend to reflect soybean cultivars better adapted to local conditions, improved cultural practices, and the shift of soybean production to the more fertile, virgin soils of the cerrados.

Brazilian researchers have developed most of the cultivars used in the expanding region, as well as other cultural practices. Brazil has an extensive research establishment with about 300 scientists engaged in full or part-time soybean research in Brazil. The scientists have developed cultivars adapted to the tropical environment and have pioneered the adapted cultural practices that now are the basis of the expansion in soybean production. 3/

Overview of the Brazilian Oilseed Crushing Sector

Production, trade, and apparent consumption

Production.--Brazil's production of oilseed meal has shown stability during the 1980's. From annual production levels of about 7 million metric tons in the mid-1970's, meal output shot up to 11.3 million tons in crop year 1981/82, and has since fluctuated around 10 to 12 million metric tons per year (table 6-3). The level of meal production depends on the crush of soybeans as does vegetable oil production.

1/ USDA, Government Intervention in Agriculture, op. cit., pp. 30-31.
2/ Williams and Thompson, op. cit.
3/ Bonato and Dallagnot, op. cit., p. 1253.

Following a rapid rise during the late 1970's, Brazil's production of vegetable oil stabilized in the 1980's at 2.5 to 2.9 million metric tons annually (table 6-4). In crop year 1985/86, vegetable oil production hit a record 3.0 million metric tons, but a drought cut back soybean supplies and caused oil output to fall sharply in the following year to 2.5 million tons. The level of aggregate vegetable oil output depends almost entirely on the crush of soybeans, the source of about 90 percent of all vegetable oil since 1980/81.

Trade.--During crop years 1978/79 to 1986/87, about 75 percent of the Brazilian output of soybean meal and 33 percent of soybean oil output was exported (table 6-2). Brazil's exports of vegetable oil have fallen off considerably from early 1980's levels; from a record 1.39 million metric tons in 1980/81, exports declined by nearly 60 percent during the next 5 years, to 609,000 tons in 1985/86 (table 6-4). Exports have since recovered slightly to 662,000 metric tons in 1986/87. As sharply rising demand within Brazil for vegetable oil curtailed export availability, exports of soybean oil fell to 21 percent of production in 1985/86, the lowest level in several years. The share was only slightly higher, at 26 percent, in 1986/87, still far below the levels of 40 to 50 percent just a few years earlier. Vegetable oil imports into Brazil have increased; soybean oil imports reached nearly 10 percent of domestic consumption in 1986/87. Brazil imports vegetable oil to supply domestic shortages in the latter part of some marketing years, when it oversells abroad early in the year, and fails to maintain adequate domestic inventories.

Brazil's exports of oilseed meal have performed better. Such exports totaled 7.1 million metric tons in crop year 1986/87, only 12 percent below the 1980-87 average of 7.9 million tons (table 6-3). Brazil's principal export markets for oilseed meal are the EC and Eastern Europe.

Export competition.--Brazilian exports of soybeans, meal, and oil have expanded as a result of a variety of factors, predominantly lower prices, but also such things as the effects of the U.S. grain embargo against the Soviet Union. There are few differences between U.S. and Brazilian soybean products, although the commonly traded U.S. soybean meal is 44-percent protein, and the Brazilian is 45 to 46 percent. There is some indication that certain European feed manufacturers prefer Brazilian meal (pellets) over U.S. meal, and pay a slight premium for it. 1/

Competition between Brazilian soybean products and those from the United States and elsewhere occurs mainly on a price basis. Since crop year 1979/80, U.S. and Brazilian soybean prices have been moving together. Brazilian crushers and exporters use the commodity hedging of the U.S. futures and mercantile markets, and thus their prices tend to reflect, very quickly, any price changes in the U.S., EC, or Japanese markets.

Export unit values showing comparable U.S., Brazilian, and Argentine prices for soybeans and products are shown in the following tabulation, compiled from data of the USDA (per metric ton): 2/

1/ Commission staff interview with ABIOVE staff, Apr. 30, 1987.
2/ Jorge Hazera, "South American Soybean and Product Exports to Recover," Oil Crops Outlook and Situation Report, USDA, Apr. 1987.

Item and year	United States	Brazil	Argentina
Soybeans:			
1981	$283	$278	$262
1982	244	247	225
1983	261	238	225
1984	278	291	273
1985	221	219	197
1986	202	203	1/
Soybean meal:			
1981	250	240	218
1982	227	209	182
1983	235	211	207
1984	227	192	182
1985	185	134	139
1986	206	181	1/
Soybean oil:			
1981	579	508	514
1982	521	447	416
1983	539	431	456
1984	751	702	681
1985	737	632	565
1986	468	361	1/

1/ Not available.

Apparent consumption.--As in other countries, the principal determinants of domestic Brazilian demand for oilseed products are population growth, real income, and the relative prices of meat products. During the last several years, Brazil's population has grown at an annual rate of about 2.5 percent, reaching 135 million in 1985. 1/ Real wages declined between 1981 and 1984, but have since recovered, increasing by 3 percent in 1985 and by 8 to 9 percent in 1986. 2/

Per capita consumption of meat and vegetable oil is about one-third of that in the United States, but it has been growing in recent years, as shown in the following tabulation (in kilos per capita): 3/

Item	Brazil			United States		
	1984	1985	1986	1984	1985	1986
Poultry meat	8	9	10	30	32	33
Red meat	21	22	21	79	79	78
Total meat	29	31	31	109	111	111
Vegetable oil	13	12	15	23	25	26
Eggs	70	93	95	261	255	252

1/ IADB, op. cit., p. 220.
2/ Ibid., p. 220, and USDA, Brazil-Agriculture Situation 1986, Mar. 1, 1987, pp. 2-4.
3/ USDA, World Indices of Agriculture and Food Production, 1976-85; and USDA, Brazil-Agriculture Situation, 1986, p. 34; Agricultural Outlook, Mar. 1987; World Agricultural Situation and Outlook, Mar. 1987, pp. 13-14.

Apparent consumption of vegetable oil in Brazil increased from 1.2 million metric tons to 2.1 million tons during crop years 1977/78 to 1986/87, or by about 6.9 percent annually (table 6-4). Consumption of oilseed meals also increased by 6.9 percent during this period (table 6-3). Soybean oil is a staple of the Brazilian diet, and its price and availability are key policy variables for the Government. The consumption of soybean meal in Brazil has risen largely as Brazilian poultry production expanded sharply, with a good share of that poultry also destined for export. In 1986/87, as a result of the sharp rise in real wages (resulting from the Cruzado plan), beef supplies became very scarce, and consumers turned to poultry (broilers). As broiler production rose, it boosted demand for soybean meal by about one-third over 1985/86. 1/

Oilseed crushing industry

Until the mid-1960's, the dominant oilseeds crushed in Brazil were peanuts and cottonseed, with cottonseed accounting for over one-half of the crush. The crushing industry was composed largely of small- and medium-sized, family-owned plants that crushed cottonseed, peanuts, and castor beans. 2/ When soybean production began its rapid growth in the late 1960's, these crushers turned to soybeans. Since 1971, soybeans have accounted for the majority of oilseeds crushed in Brazil; by 1986, they accounted for over 90 percent of the crush of all types of oilseeds. The older oilseed industry was gradually replaced by more modern and larger facilities that employed the efficient, continuous solvent-extraction method used by most plants in the United States.

Multinational corporations have operated for a number of years in Brazil; thus, the transfer of technology and managerial skills from the United States to Brazil was relatively simple. There are four multinational companies operating in Brazil that also operate in the United States, according to trade sources.

Number and capacity of oilseed crushers

The number of companies in Brazil processing oilseeds amounted to about 130 in 1977. 3/ In 1987, there were an estimated 90 companies processing oilseeds. 4/ In 1978, about 34 percent of Brazil's soybean processing capacity was owned by multinational companies, 52 percent by private Brazilian firms, and the remaining 14 percent by farmer cooperatives. 5/ Over the past 15 years, the larger plants (with daily crush capacity of 1,500 metric tons or larger) have been expanded, as shown in table 6-5. Most of the older and smaller plants are owned by private Brazilian firms, and a number of these

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1/ Commission staff interview with ABIOVE staff, Apr. 30, 1987.
2/ Williams and Thompson, op. cit., pp. 4-9; Carlos Augusto Santana, op. cit., pp. 37-42; and Karen Gulliver, The Brazilian Soybean Economy: An Econometric Model With Emphasis on Government Policy, unpublished dissertation, University of Minnesota, 1981, pp. 33-38.
3/ Williams and Thompson, op. cit., p. 7.
4/ ABIOVE, op. cit., p. 52 and Commission staff interview with ABIOVE staff, Apr. 30, 1987.
5/ USDA, Brazil: Soybean Crushing Capacity, FAS telegram, June 1, 1978.

smaller, less efficient plants did not operate year round. Meanwhile, the large soybean plants operated at rates of 85 percent (or 300 days per year). 1/ In 1984, there were 90 firms processing soybeans in Brazil, and total daily plant capacity was 92,000 metric tons as estimated by ABIOVE and shown in the following tabulation: 2/

State	Daily nominal installed capacity Metric tons per day	Share of total Percent
Rio Grande do Sul.........	34,600	38
Parana....................	30,700	33
Sao Paulo.................	17,000	19
Santa Catarina............	7,700	8
Goias.....................	800	1
Minas Gerais..............	700	1
Mato Grosso do Sul........	700	1
Rio de Janeiro............	100	1/
Total.................	92,000	100

1/ Less than 0.5 percent.

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

In 1976, the total oilseed crushing capacity in Brazil was about 10.4 million metric tons, with most of this held by plants each with a daily crush capacity of less than 600 tons (table 6-5). Since 1977, the number of oilseed crushing firms declined to about 90, with the total crush capacity increasing sharply to 27 million tons by 1984. Most of these new plants built since the mid-1970's have been financed either by the larger companies, which raised their own capital, or partly by Government loans. A number of the loans provided through Government assistance carried negative real interest rates. 3/ Data on the size of Brazilian crushing capacity are limited, but it is believed that the crushing capacity has remained since 1984 at around 27 million tons annually with older plants in the traditional areas closing, and new plants opening mainly in the expanding region (tables 6-6), based upon estimates by USDA and the Brazilian oilseed crushers association, ABIOVE. 4/

Most of the additional crushing capacity has been of the modern continuous solvent extraction process, with individual plant capacity exceeding 1,500 metric tons daily; 11 million tons out of the 17 million tons in capacity added during 1976-84 occurred in plants each sized at 1,500 or more tons daily. In comparison, most U.S. soybean processing plants have a similar capacity ranging from 1,200 to 2,000 metric tons daily. The Brazilian plants are believed to be equipped with processing equipment comparable or identical to that of U.S. plants. 5/

1/ Carlos Augusto Santana, op. cit., p. 41.
2/ ABIOVE, op. cit., p. 52 and Commission staff interview with ABIOVE staff, Apr. 30, 1987.
3/ Carlos Augusto Santana, op. cit., p. 40.
4/ ABIOVE, op. cit., p. 52.
5/ U.S. and European manufacturers of oilseed processing equipment operate in Brazil either through subsidiaries or licensing arrangements, and therefore oilseed processing equipment is largely identical to that available in the United States or Europe.

Most of the crushers are located in the traditional producing States of Rio Grande do Sul, Parana, and Sao Paulo, which together accounted for 90 percent of known Brazilian crushing capacity in 1982. Lack of crushing capacity in the Mato Grosso and other northwestern regions requires transport of the beans over substantial distances to the mills in these three States. Many of the processing mills are located either adjacent to ocean export terminals, or to rail lines to ports, however, so that downstream transport costs of exporting meal and oil are minimized.

The sharp expansion in Brazilian oilseed crushing capacity was brought about chiefly by Government policies which favored the domestic processing of soybeans and the exporting of the processed products, as well as by the tremendous surge in domestic soybean production. In 1970, the utilization of crushing capacity in Brazil was 66 percent, and by 1975 about 89 percent of Brazil's crushing capacity was utilized (table 6-6). However, with the construction of the larger mills, the utilization ratio of soybean mills in Brazil began to decline, reaching 49 percent in 1986, meaning that nearly one-half of apparent Brazilian crushing capacity was unutilized in that year. In that year, 89 percent of Brazil's soybean output was crushed domestically.

Cost structure of oilseed processing

In 1984, the Brazilian oilseed crushers association estimated the processing costs of Brazilian soybean crushers in early 1984 at about US$16 per metric ton (exclusive of soybean purchases); individual cost items are as shown in the following tabulation (per metric ton of soybeans crushed): 1/

Item	Cost
Variable costs:	
Fuel oil	$4.30
Hexane solvent	2.36
Electricity	1.14
Labor	1.12
Coal	.36
Wood	.35
Other materials	.92
Services	.16
Subtotal	10.71
Fixed costs:	
Labor	2.92
Other	2.83
Total	16.46

According to these data, the single most important cost was fuel oil, which was $4.30 per metric ton, or 26 percent of total processing costs. Other significant costs were fixed labor (administrative, etc.) (18 percent) and hexane solvent (14 percent).

The Commission received detailed revenue, cost, and production data from U.S.-based firms on their Brazilian and Argentine soybean milling operations for 1985 and 1986. To avoid disclosure of certain firms' operations in any one country, these data were aggregated for both countries, and are summarized in tables 6-7 and 6-8.

1/ Data from ABIOVE. Assumes a 60 percent capacity utilization rate.

The "average" reporting mill in this set of U.S.-owned mills produced output of meal and oil valued at an estimated $57.3 million in 1986, down from $62.1 million in 1985. The value came mostly from meal, which although lower unit valued, accounted for over 80 percent of the volume of the mill's output. Declining volumes of meal and oil output, combined with a drop in average crude oil prices, caused the decline in the mill's output value.

The principal cost incurred by soybean mills is for soybeans, total purchases of which in 1986 amounted to $48.4 million, or about $155 per metric ton. 1/ This cost increased over the 1985 level because of sharply higher average prices for soybeans.

Crushers are a middle stage in the production chain for oilseed products, and as such are concerned less with gross revenues or soybean costs than with the gross margin, the difference between gross revenue and cost per unit processed. Revenue and cost data on a unit basis are presented in table 6-8. The gross margin in 1986 totaled $28.55 per metric ton of soybeans crushed, or 16 percent of estimated output value. However, for mill operations in 1986 the net margin was negative because total processing costs per metric ton were $33.13, leaving a net loss of $4.58 per metric ton. The principal cause of this drop from the positive net margin of $11.01 in 1985 was not rising processing costs (which with overhead actually decreased), but the squeeze on the gross margin caused by the increased soybean price and reduced oil price.

1/ USDA reported that the f.o.b. Rio Grande, Brazil price of soybeans was $215 per metric ton in 1984/85 and $196 per ton in 1985/86.

Table 6-1
Oilseeds: Brazilian production, exports, imports, crush, and ending stocks, by type, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Item	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/
Production:										
Soybeans........	12,513	9,541	10,240	15,156	15,200	12,835	14,750	15,540	18,280	13,700
Cottonseed......	977	844	1,076	1,057	1,120	1,164	1,198	995	1,630	1,085
Peanuts.........	324	340	465	545	310	305	250	220	325	270
Sunflowerseed...	3	3	5	23	35	27	4	3	3	3
Rapeseed........	0	0	0	3	12	12	1	1	1	1
Total.........	13,817	10,728	11,786	16,784	16,677	14,353	16,212	16,759	20,239	15,059
Exports:										
Soybeans........	2,581	659	638	1,577	1,502	797	1,316	1,580	3,456	1,200
Peanuts.........	36	20	26	38	43	18	10	12	20	30
Rapeseed........	0	0	0	0	8	8	0	0	0	0
Total.........	2,617	679	664	1,615	1,553	823	1,326	1,592	3,476	1,230
Imports:										
Soybeans........	0	89	253	474	930	1,252	34	154	428	350
Peanuts.........	0	0	0	0	0	15	0	0	15	0
Total.........	0	89	253	474	930	1,267	34	154	443	350
Crush: 3/										
Soybeans........	8,661	8,882	9,094	13,007	13,796	12,728	12,873	12,517	13,774	12,200
Cottonseed......	909	774	1,001	983	1,043	1,087	1,121	909	1,555	1,000
Peanuts.........	220	230	353	432	190	252	190	160	285	190
Sunflowerseed...	3	3	5	22	34	26	3	2	2	2
Rapeseed........	0	0	0	0	2	2	0	0	0	0
Total.........	9,793	9,889	10,453	14,444	15,065	14,095	14,187	13,588	15,616	13,392
Ending stocks of soybeans 4/.....	1,090	1,057	923	1,091	1,037	704	230	681	1,001	599

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast on March 1986, except for soybeans, which is forecast on February 1987.
3/ Crush data represent reported or estimated crush.
4/ Stock data are not included for all commodities, and in most cases are USDA estimates. Where no stock data are available, changes are included in consumption.

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

Table 6-2
Soybeans and products: Brazilian harvested areas, yield, production, imports, exports, crush, domestic consumption, and ending stocks, crop years 1978/79 to 1987/88 1/

Year beginning Feb. 1--	Harvested area	Yield	Production	Imports	Exports	Crush	Domestic consumption	Ending stocks
	1,000 hectares	Metric tons per hectare	1,000 metric tons					
Soybeans:								
1978/79.....	7,782	1.226	9,541	89	659	8,882	9,720	1,057
1979/80.....	8,256	1.240	10,240	253	638	9,094	9,989	923
1980/81.....	8,774	1.727	15,156	474	1,533	13,009	13,929	1,091
1981/82.....	8,501	1.788	15,200	934	1,502	13,796	14,686	1,037
1982/83.....	8,202	1.565	12,835	1,252	797	12,728	13,623	704
1983/84.....	8,136	1.813	14,750	34	1,316	12,873	13,942	230
1984/85.....	9,421	1.650	15,541	154	1,580	12,517	13,664	681
1985/86.....	10,153	1.800	18,278	428	3,456	13,774	14,930	1,001
1986/87.....	9,275	1.477	13,700	350	1,200	12,200	13,252	599
1987/88 2/..	9,300	1.774	16,500	50	2,000	13,500	14,596	553
Soybean meal:								
1978/79.....	3/	3/	6,842	0	5,368	3/	1,461	151
1979/80.....	3/	3/	7,040	0	5,038	3/	1,971	182
1980/81.....	3/	3/	9,968	0	6,936	3/	2,595	619
1981/82.....	3/	3/	10,607	0	8,562	3/	2,271	393
1982/83.....	3/	3/	9,879	0	7,822	3/	1,956	494
1983/84.....	3/	3/	9,960	0	7,994	3/	2,169	291
1984/85.....	3/	3/	9,714	0	7,690	3/	1,952	363
1985/86.....	3/	3/	10,668	0	8,626	3/	2,100	305
1986/87.....	3/	3/	9,450	0	6,900	3/	2,600	255
1987/88 2/..	3/	3/	10,500	0	7,500	3/	2,900	355
Soybean oil:								
1978/79.....	3/	3/	1,629	0	522	3/	1,110	97
1979/80.....	3/	3/	1,669	123	459	3/	1,309	121
1980/81.....	3/	3/	2,463	3	809	3/	1,516	262
1981/82.....	3/	3/	2,585	0	1,212	3/	1,490	145
1982/83.....	3/	3/	2,392	22	873	3/	1,505	181
1983/84.....	3/	3/	2,408	43	947	3/	1,575	110
1984/85.....	3/	3/	2,353	144	920	3/	1,580	107
1985/86.....	3/	3/	2,587	107	935	3/	1,590	276
1986/87.....	3/	3/	2,290	160	420	3/	1,950	356
1987/88 2/..	3/	3/	2,525	50	550	3/	2,000	381

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Projected as of February 1987.
3/ Not applicable.

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

Table 6-3
Oilseed meal: Brazilian production, exports, imports, apparent consumption, and ending stocks, by type, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Item	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/
Production:										
Soybean..........	6,616	6,842	7,040	9,968	10,600	9,879	9,960	9,714	10,668	9,450
Cottonseed.......	445	433	568	563	587	609	633	509	871	560
Rapeseed.........	0	0	0	0	1	1	0	0	0	0
Sunflowerseed....	1	1	2	10	15	12	1	1	1	1
Fish.............	27	22	20	26	25	25	28	29	29	29
Peanut...........	85	89	137	167	74	93	72	61	108	72
Total..........	7,174	7,387	7,767	10,734	11,302	10,619	10,694	10,314	11,677	10,112
Exports:										
Soybean..........	5,329	5,368	5,038	5,938	8,562	7,822	7,994	7,690	8,626	6,900
Cottonseed.......	22	23	30	50	44	86	179	103	150	140
Sunflowerseed....	0	0	0	2	0	7	0	0	0	0
Fish.............	1	3	0	0	0	5	10	8	7	7
Peanut...........	48	53	86	102	44	42	37	13	64	20
Total..........	5,400	5,447	5,154	7,092	8,650	7,962	8,220	7,814	8,847	7,067
Apparent consumption: 3/										
Soybean..........	1,255	1,461	1,971	2,595	2,271	1,956	2,169	1,952	2,100	2,600
Cottonseed.......	423	410	538	513	543	475	502	406	625	500
Rapeseed.........	0	0	0	0	1	1	0	0	0	0
Sunflowerseed....	1	1	2	8	10	5	1	1	1	1
Fish.............	26	19	20	26	25	20	18	21	22	22
Peanut...........	37	36	51	65	30	51	35	48	44	52
Total..........	1,742	1,927	2,582	3,207	2,880	2,508	2,725	2,428	2,792	3,175
Ending stocks of soybean meal 4/..	138	151	182	619	393	494	291	363	305	255

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast on March 1986, except for soybean meal which is forecast on February 1987.
3/ Consumption data represent "apparent consumption" and include all disappearance as well as some changes in stocks.
4/ Stock data are not included for all commodities, and in most cases are USDA estimates. Where no stock data are available, changes are included in consumption.

Note.--Import data of oilseed meals are statistically negligible.

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

Table 6-4
Vegetable and marine-animal oils: Brazilian production, exports, imports, apparent consumption, and ending stocks, by type, crop years 1977/78 to 1986/87 1/

(In thousands of metric tons)

Item	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87 2/
Production:										
Soybean..........	1,585	1,629	1,669	2,463	2,585	2,392	2,408	2,353	2,587	2,290
Palm.............	12	15	16	13	17	16	18	21	22	24
Sunflowerseed....	1	1	2	8	12	9	1	1	1	1
Rapeseed.........	0	0	0	0	1	1	0	0	0	0
Cottonseed.......	136	129	168	166	173	181	187	151	259	170
Peanut...........	62	65	100	128	54	81	60	46	83	55
Fish.............	1	0	1	1	2	2	2	2	2	2
Total..........	1,797	1,839	1,956	2,779	2,844	2,666	2,676	2,574	2,954	2,512
Exports:										
Soybean..........	560	522	459	1,212	873	947	920	935	420	550
Palm.............	0	0	0	0	4	6	4	6	6	7
Sunflowerseed....	0	0	0	3	6	4	0	0	0	0
Cottonseed.......	22	14	35	52	93	92	78	95	110	80
Peanut...........	49	61	81	120	50	76	57	26	73	25
Fish.............	0	0	1	0	0	0	0	0	0	0
Total..........	631	597	576	1,387	1,026	1,125	1,059	1,062	609	662
Imports of soybean oil..............	0	0	123	3	0	22	43	144	107	160
Apparent consumption: 3/										
Soybean..........	1,025	1,110	1,309	1,516	1,490	1,505	1,575	1,580	1,590	1,950
Palm.............	12	15	18	13	13	10	14	15	16	17
Sunflowerseed....	1	1	2	5	6	5	1	1	1	1
Rapeseed.........	0	0	0	0	1	1	0	0	0	0
Cottonseed.......	114	115	133	114	80	89	82	83	115	124
Peanut...........	13	4	19	8	4	5	3	20	10	30
Fish.............	1	0	1	1	2	2	2	2	2	2
Total..........	1,166	1,245	1,482	1,657	1,596	1,617	1,677	1,701	1,734	2,124
Ending stocks of soybean meal 4/..	100	97	121	262	145	181	110	107	276	356

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Forecast on March 1986, except for soybean oil which is forecast on February 1987.
3/ Consumption data represent "apparent consumption" and include all disappearance as well as some changes in stocks.
4/ Stock data are not included for all commodities and in most cases are USDA estimates. Where no stock changes are available, changes are included in consumption.

Note.--Other than soybean oil, the only significant vegetable oil imported was olive oil. Imports of olive oil amounted to an estimated 11,000 metric tons annually during 1977/78 to 1986/87.

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

Table 6-5
Oilseed processing industry: Brazilian crushing capacity, by size of firm and States, 1976, 1979, and 1982-84

Item	1976	1979	1982	1983	1984
	Million metric tons				
Daily crush capacity of plant:					
0-599 metric tons	5.78	5.74	6.48	6.48	6.48
600-1,499 metric tons	2.75	3.95	7.55	7.72	8.02
1,500 metric tons and larger	1.89	2.88	12.96	12.96	12.96
Total	10.42	12.47	27.09	27.27	27.57
	Percent of total capacity				
Share of crush technology:					
Continuous solvent process	1/	1/	88	88	88
Noncontinuous solvent process	1/	1/	11	11	11
Mechanical press	1/	1/	1	1	1
Total	100	100	100	100	100
Location of plants:					
Rio Grande do Sul	2/ 39	1/	39	1/	38
Parana	2/ 30	1/	33	1/	33
Sao Paulo	2/ 25	1/	19	1/	19
Santa Catarina	2/ 5	1/	9	1/	80
All other	2/ 1	1/	1	1/	2
Total	100	100	100	100	100

1/ Not available.
2/ Data are for 1977.

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

Source: Data of Associcao Brasileira do Industria de Oleos Vegetais (ABIOVE), quoted in USDA, Brazil-Annual Oilseeds Report, Mar. 30, 1983; Gary Williams and R.L. Thompson, The Brazilian Soybean Industry, Oct. 1984, p. 7.; ABIOVE, Alimentos: Um Desafio para o Brazil, 1984, p. 52 (based on a 300-day operating year).

Table 6-6
Soybeans: Brazilian crushing capacity, crush, and capacity utilization, 1970-87

Year	Oilseed crush capacity	Crush of soybeans	Capacity utilization ratio	Ratio of crushing capacity to soybean production	Share of the soybean production crushed domestically
	1,000 metric tons		Percent		
1970........	1,405	932	66	93	62
1971........	2,040	1,700	83	98	82
1972........	2,671	2,132	80	81	65
1973........	3,306	2,714	82	66	54
1974........	5,000	4,302	86	63	55
1975........	6,200	5,516	89	63	56
1976........	8,200	6,374	78	73	57
1977........	12,000	8,661	72	96	69
1978........	14,000	8,882	63	147	93
1979........	15,000	9,094	61	146	89
1980........	18,000	13,009	72	119	86
1981........	20,000	13,796	69	134	92
1982 1/.....	23,000	12,728	55	180	99
1983........	27,000	12,873	48	183	87
1984........	27,000	12,517	46	174	81
1985........	27,000	13,774	51	147	75
1986........	27,000	12,200	45	182	89
1987 2/.....	27,000	13,500	50	152	82

1/ Interpolated between 1981 and 1983.
2/ Forecast.

Source: Gary Williams and R.L. Thompson, op. cit., Karen Gulliver, The Brazilian Soybean Economy... (unpublished dissertation), University of Minnesota, 1981, p. 33; Carlos Augusto Santana, The Impact of Economic Policies on the Soybean Sector of Brazil, University of Minnesota, 1984, p. 39; USDA, Brazil-Annual Oilseed Report, various issues, and Foreign Agriculture Circular on Oilseeds and Products, various issues.

Table 6-7
South American soybean mills: average mill output value, costs, production, and prices, 1985 and 1986 1/

Item	1985	1986
Value of output: 2/		
Soybean meal............................1,000 dollars...	34,577	39,688
Crude soybean oil..................................do....	27,489	17,635
Total.......................................do....	62,066	57,323
Cost of goods sold 3/..............................do....	44,772	48,388
Manufacturing costs:		
Direct labor.......................................do....	424	482
Fuel, power, and utilities.........................do....	1,208	1,169
Repairs..do....	334	432
Solvent..do....	209	192
Depreciation and amortization......................do....	1,235	1,313
Other..do....	608	832
Subtotal...do....	4,018	4,420
General, selling, and administrative expenses.....do....	3,287	3,540
Financial expenses or (income)		
and corporate overhead.........................do....	5,152	1,958
Grand total costs..............................do....	58,323	58,757
Practical annual crush capacity.......1,000 metric tons...	522	589
Capacity utilization rate.......................percent...	65	53
Soybeans crushed......................1,000 metric tons...	340	313
Production:		
Soybean meal for animal feed.......................do....	261	245
Crude soybean oil..................................do....	63	58
Average prices paid or received: 4/		
Soybeans..............................per metric ton...	$129.79	$143.11
Soybean meal.......................................do....	$132.48	$161.99
Crude soybean oil..................................do....	$436.33	$304.05

1/ Data cover U.S.-owned soybean mills in Brazil and Argentina. Averages are simple averages except where noted.
2/ Estimated by multiplying the volume of production of meal and oil times the average prices received.
3/ Cost of purchase of soybeans minus inventory change.
4/ Average prices are weighted by volume per reporting mill. Soybean prices are c.i.f. mill. Soybean meal prices are for 44 percent protein meal, f.o.b. mill. Soybean oil prices are f.o.b. mill.

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

Table 6-8
South American soybean mills: mill output value, costs, production, and prices, per metric ton of soybeans crushed, 1985 and 1986 1/

(Per metric ton)

Item	1985	1986
Value of output 2/	$182.55	$183.14
Cost of goods sold	131.68	154.59
Manufacturing costs:		
Direct labor	1.25	1.54
Fuel, power, and utilities	3.55	3.73
Repairs	0.98	1.38
Solvent	0.61	0.61
Depreciation and amortization	3.63	4.19
Other	1.79	2.66
Subtotal	11.82	14.12
General, selling, and administrative expenses	9.67	11.31
Financial expenses or (income) and corporate overhead	15.15	6.26
Grand total costs	171.54	187.72

1/ Data cover U.S.-owned soybean mills in Brazil and Argentina. Averages are simple averages across reporting mills (taken from table 6-7), divided by volume of soybeans crushed.
2/ Combined value of meal and oil.

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

CHAPTER 7.--OIL PALM INDUSTRY OF MALAYSIA

Introduction

Malaysia is in a unique position in global trade in oilseeds and oilseed products. In contrast to the United States, Brazil, Argentina, and the European Community (EC), Malaysia is a major force in vegetable oils, rather than oilseeds and oilseed meals. Palm oil is the country's largest crop and has made Malaysia the world's leading producer and exporter of vegetable oils. The flesh of the oil palm fruit produces palm oil but no meal; the kernel of the fruit produces palm kernel oil and a low protein meal much less commercially important than other oilmeals in world trade.

Malaysia's crop is produced for its oil value, competing with the least emphasized part of the oilseed complex of most other countries, but has become dominant mainly because of its volume of production and exports. The emergence of Malaysia has created an entirely new competitive force for the U.S. soybean industry to deal with, unlike any other rival country thus far.

Geographically there are two parts to Malaysia, West (Peninsular) and East. Currently, the vast majority of the palm oil production and processing occurs in West Malaysia because the industry is still in the developmental stage in East Malaysia. For purposes of this discussion, no distinction will be made between all of Malaysia and West Malaysia.

Product description and uses

Because palm oil production and products differ from the oilseed complexes of the previous countries, it is appropriate to discuss the description and uses of the products of the oil palm industry. This section also includes a brief description of the production process.

Description.--The oil palm 1/ is a perennial tree crop which, although indigenous to West Africa, has thrived in Southeast Asia (primarily Malaysia and Indonesia), where climate and soil conditions are ideal for its cultivation. Oil palm trees produce a small (fig-sized), oleaginous fruit in bunches of 1,000 to 3,000 fruits each, with a bunch weighing 20 to 30 kilograms (45 to 65 pounds). The trees produce fruit year round, although in a seasonal pattern that peaks in September and October.

Oil palm trees are germinated from seed and grown in a nursery for 10 to 12 months prior to field planting. Oil palm trees begin to yield commercial quantities of oil at about 2.5 years, with yields rising rapidly to a peak at 8 to 10 years, and then slowly declining thereafter. The economic life of an oil palm tree is 20 to 30 years. In recent years, replanting has been done at about 21 to 23 years, depending on the tree's production and the economic condition of the plantation on which it is grown. In Malaysia, the average yield of fruit at the palm's maturity is 18 to 25 tons per hectare; the average oil yield is 6 tons per hectare on a fully mature plantation.

1/ The reader should note the difference between "oil palm," the tree, and "palm oil," the product processed from the fruit of the oil palm.

The yield of palm fruit per hectare varies by tree variety. The dominant oil palm is the Tenera variety of the species Elaesis guineensis, which yields an oil-to-fruit bunch ratio of 22 percent. For a single fruit, the fleshy pulp (mesocarp), which surrounds the nut (pericarp and kernel), contains about 50 percent oil, and the kernel contains about 46 to 57 percent oil, by weight.

Uses.--The fruit's pulp is processed into a vegetable oil similar to soybean oil. A heavily saturated lauric oil similar to coconut oil is obtained from the kernel. The residual cake from the kernel is, like other cakes and meals, used in the manufacture of animal feed. Palm and palm kernel oils are used for some of the same purposes as other vegetable oils, which is a cause of controversy in the United States. U.S. soybean industry interests maintain that consumers incorrectly perceive all palm-derived oil and coconut oil as unsaturated vegetable oil, to the detriment of producers of soybean, sunflowerseed, and other oilseed-based vegetable oils. Currently, the U.S. industry is involved in a promotional program designed to increase consumer awareness of the nutritive differences between various types of vegetable oils. 1/

Methods of production.--Oil palm trees are grown on plantations, usually in combination with other crops such as rubber, cocoa, or coconut. The first plantations were located on the west coast of Peninsular Malaysia, where growing conditions are best, then spread to the east coast and interior locations, and finally to East Malaysia. The Malaysian plantation sector is characterized by a combination of good management practices, extensive research, favorable soils, substantial rainfall and sunshine, political stability, and a detailed infrastructure, all of which helped make it a world leader in the production of oil palm and natural rubber. 2/

The cultivation of oil palm, which in Malaysia was initiated in 1917, was originally limited to the plantation (private) sector because of a need for a high level of organization and capital investment. Cultivation was expanded to small landholders (so-called smallholders) in the 1960's through the Government land resettlement schemes, started under the primary direction of the Federal Land Development Authority (FELDA). These Government schemes were started partially to fulfill other development goals; one goal being to place the native Malay on the land with homes and jobs. FELDA is the primary Government agency promoting palm oil production.

As soon as oil palm trees begin to yield fruit, plantation workers begin a 10- to 15-day rotation checking on trees for ripe fruit. Once picked, oil palm fruit is extremely perishable and must be processed within 24 hours to avoid build up of free fatty acids and enzymes that cause quality deterioration. The fruit is also easily bruised and the quality of the oil from damaged fruit is lower than that from undamaged fruit. To minimize these problems, processing facilities are located directly on the plantations.

The crude palm oil that onsite processing plants produce is not very perishable and is transported offsite for further refining into vegetable oil. Palm oil refineries are reported to enjoy significant economies of size, and the trend in recent years has been for larger plants, that are located at or near export ports to minimize transport costs for refined products.

1/ Petition to the Food and Drug Administration and other materials from the American Soybean Association on the labeling of tropical oils.
2/ Gary Ender, U.S. Department of Agriculture (USDA), Economic Research Service, International Economics Division, Malaysia's Production of Palm Oil with Projections to Year 2000, Staff Report No. AGES850710, Sept. 1985.

Overview of the Oil Palm Industry

Unlike the oilseed complexes of other countries, the oil palm industry of Malaysia is a single sector of palm growers/processors. Thus, there is no market for and no export trade in oil palm fruit. Data are seldom presented on palm fruit production because such production is intended solely for crude and processed palm oil production and only exists for a short period of time (usually less than a day) before being converted into palm oil.

Palm oil is an extremely important agricultural product in Malaysia. Total area planted in oil palm, 1.5 million hectares in 1986, was second only to rubber (1.9 million hectares). Production of palm oil was 4.5 million metric tons in 1986, followed by rice with 1.9 million, rubber with 1.5 million, and palm kernels with 1.3 million.

Exports of palm oil amounted to 4.3 million metric tons in 1986, followed by rubber exports of 1.6 million, and palm kernel oil exports of 520,000. The export earnings of palm oil and products represented 12.6 percent of the 1985 total of $15.1 billion (at US$1.00=M$2.53), whereas export earnings of rubber were 7.5 percent. Palm oil and products' export earnings were 6.3 percent of the 1985 Gross National Product (GNP) of $30.4 billion, while those of rubber were 3.7 percent. 1/

Production, trade, and apparent consumption

Production.--Malaysian production of palm oil increased from 151,000 metric tons in 1965 to 4.8 million in crop year 1985/86 (table 7-1). Production is usually greatest during July-October and least in January and February. Virtually all crude palm oil produced is refined domestically. Low production in 1983 was widely attributed to plant stress associated with unusually high output from the 1982 crop, the first year in which the Cameroon weevil played a significant role. (The weevil aids in tree pollination.) Other contributing factors included lower fertilizer use because of low palm oil prices in 1982, along with dry weather conditions in various regions in early 1983. These factors, which negatively affected yields in 1983 and early 1984, were not particularly important in the last half of 1984. 2/

The palm oil processing industry has grown to become the most important agro-based industry in Malaysia. The downstream processing of palm oil results in output, currently mostly in the form of processed palm oil products, such as RBD (refined, bleached, and deodorized) palm oil, and RBD palm olein and RBD palm stearin (liquid and solid fractions, respectively, of palm oil). More than 90 percent of the industry's total output is processed palm oil, reflecting the dominant presence of refining operations.

Palm kernel production in Malaysia increased from 553,000 metric tons in 1980 to 1.3 million in 1986 (table 7-2). Production has grown in general with increased fruit bunch production, but not to the same extent owing to differing percentages of palm kernel produced by each oil palm tree variety. The crush of palm kernels has also increased, from 513,000 metric tons in 1980 to

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1/ Profile of the Primary Commodity Sector in Malaysia, Ministry of Primary Industries, Mar. 1986.
2/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates.

1.4 million in 1986. Crushing tends to be greatest in the latter half of the year. Production of palm kernel oil has increased with increasing crush, from 222,000 metric tons in 1980 to 415,000 in 1984.

Trade.--The Malaysian palm oil industry is highly export oriented. Since 1975, when crude palm oil was first processed locally, output of processed palm oil and related products has undergone phenomenal growth resulting in a corresponding decline in crude palm oil exports. Today, more than 95 percent of the output of the palm oil processing industry is exported.

Malaysia does not import any palm oil. Exports of palm oil have risen substantially from 141,000 metric tons in 1965 to nearly 4.0 million in crop year 1985/86 (table 7-1). Exports of palm kernel oil also increased from 215,000 metric tons in 1980 to 376,000 in 1984 (table 7-2).

Exports of processed palm oil and palm oil-based products grew steadily at a 34-percent average annual growth rate during 1975-84. Palm oil and palm olein, together, represented more than 75 percent of total processed palm oil exports, with the relative contribution of each varying annually because of the price sensitivity of the export duty exemption scheme. 1/

World production of palm oil increased from 5.9 million metric tons in crop year 1981/82 to 8.1 million in 1985/86 (table 7-3). The primary producer of palm oil was Malaysia; Indonesia accounted for the next largest share and grew in importance. During the same period, world exports of palm oil increased from 3.4 million metric tons to 5.3 million; Malaysia was the largest exporter, followed again by Indonesia. The five major export markets for processed palm oil from Malaysia were India, Singapore, Pakistan, the United States, and Japan (table 7-4). Total exports increased from 2.7 million metric tons in 1982 to 4.4 million in 1986.

The major vegetable oil consuming countries are also the major palm oil importers. World imports of palm oil increased from 3.2 million metric tons in crop year 1981/82 to 5.4 million in 1985/86 (table 7-5). India was the largest importer of palm oil, followed by Pakistan and the United States.

Apparent consumption.--Domestic demand in the palm oil industry can be viewed from two different angles: demand for finished products and demand for palm oil and palm kernel oil to manufacture finished products for local and export markets. Malaysia's low domestic demand for finished products is mainly due to its small population. In 1975, the domestic demand for palm oil for downstream product production was only 90,000 metric tons, but by 1984 was estimated to have increased to 318,000 metric tons.

Malaysian apparent consumption of finished products has been relatively low, but increased from 6,000 metric tons in 1968 to an estimated 543,000 in 1985/86. The increasing output of cooking oil reflects the trend among Malaysian consumers to readily accept palm oil as a cooking medium. Apparent worldwide consumption of all palm oil increased from 5.5 million metric tons in 1981/82 to 7.8 million in 1985/86 (table 7-6). India was the leading consumer of palm oil, followed by Nigeria, Indonesia, Malaysia, and Pakistan.

1/ Palm Oil Registration and Licensing Authority, Ministry of Primary Industries Malaysia, Palm Oil Update--"A Review of the Malaysian Palm Oil Industry 1985," Kuala Lumpur, Malaysia, Jan. 1986.

There is a high local consumption of palm kernel oil in producing countries other than Malaysia. Although the use of palm kernel oil is low in Malaysia, there is great potential for increased usage. The palm kernel oil edible market is highly quality conscious.

There is limited domestic demand in Malaysia for other oilseed meals and oilseed-based vegetable oils. Unlike its palm oil production, Malaysia's soybean production is practically nonexistent, because of unfavorable climatic conditions for raising soybeans. Some soybeans and soybean meal are imported to supply Malaysia's livestock and food processing industries. A rising domestic demand for soybean meal has been met increasingly from locally crushed production of imported soybeans. Malaysian consumption of soybean oil is minimal, since vegetable oil consumption is based on locally produced palm oil.

Malaysian imports of soybeans ranged from 261,000 metric tons in crop year 1980/81 to 173,000 in 1984/85. The United States was the leading supplier until 1984/85, when China became the primary source and imports from the United States were insignificant.

Influences on trade

Palm oil competes directly with more than 16 major oils and fats, mainly soybean, sunflowerseed, rapeseed, and marine oils, and its use depends more on its cost and availability relative to other oils than on its specific attributes. Other factors influencing its use include the reliability of supply and the supplier's adherence to quality standards. 1/ Aside from the need to address specific price and quality requirements of importing countries, the ability to provide longer credit periods is becoming increasingly important in the competitive oils and fats trade. Unlike palm oil, palm kernel oil competes basically with coconut oil which is produced mainly in the Philippines and Indonesia.

Since the late 1970's, the major feature of world imports of palm oil has been the decline in the relative importance of imports into industrialized countries and a corresponding expansion among a number of developing countries. Per capita consumption in developed countries has leveled off and, very often, palm oil is not able to meet the very stringent technical and quality requirements. Consequently, palm oil has to be priced at a steep discount to other vegetable oils in order to compete. Oilseed supplies continue to grow in developed countries, particularly in the EC, making it increasingly difficult for Malaysia to find a market for its oil. 2/

In the last decade, developing countries such as India and Pakistan have absorbed most of Malaysia's palm oil supplies. These countries are now trying to save foreign exchange and have aggressively encouraged domestic production of oilseeds to replace imports. Further, many potentially large markets in developing countries, particularly in Africa, are faced with huge debt problems and are unable to buy edible oils.

1/ World Bank, Commodity Studies and Projections Division, Economic Analysis and Projections Department, Palm Oil Handbook, June 1985; discussions with Government and industry representatives in Malaysia, Apr. 1987.
2/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates.

Malaysia's success in exporting larger quantities of palm oil will largely depend upon oilseed production and vegetable oil import policies of key developing countries, particularly in Asia. 1/ The low relative price of palm oil products, coupled with their technical suitability, have made them readily acceptable in Third World markets. Virtually all of Malaysia's palm kernel meal exports go to Europe, to be used as a major ingredient in cattle feed, although an increasing amount is being used in Malaysia by Government-sponsored beef feed lots.

As in many other industries, protectionist trends have developed in the world oils and fats market. Some countries, such as the EC, claim their duty structure is tailored mainly to counteract the different export duties imposed for crude and processed palm oil by Malaysia. The Malaysians strongly oppose the proposed EC vegetable oil tax system, although they doubt it will become an actuality. Other reported forms of protection include preferential foreign-exchange allocations for other types of vegetable oils and fats and the nonrecognition of palm oil as an edible product. 2/

Malaysian palm oil producers have been able to compete effectively with other major oils and fats, partly because of their efficient refining operations and the cost advantages of palm oil vis-a-vis other oils. Palm oil may be used as is, or in fractionated forms, depending upon intended applications, and may compete directly with, or become complementary to, liquid oils (such as soybean and sunflowerseed oil) or solid fats (such as lard or tallow). 3/

The importance of countertrade is steadily growing in Malaysia. Through the middle of 1985, the Government reported that countertrade deals had reached US$175 million. Although the public sector initially dominated these deals, they are of major interest to the private sector as well. In the Government sector, the primary commodities have been rubber, palm oil, and timber. Those countries participating in countertrade deals with Malaysia include Poland, Japan, France, West Germany, Jordan, Yugoslavia, and Romania. 4/

Size and ownership structure

Because the oil palm is a perennial tree crop that produces a highly perishable fruit that is incapable of withstanding extensive transport, it is a quite different commodity from soybeans and has resulted in a different industry structure from the soybean complex in other countries.

The oil palm fruit must be processed quickly to avoid quality deterioration, severely limiting the distance the fruit can be transported. As a result, all large plantations own mills to process oil palm fruit to crude

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1/ Malaysian Industrial Development Authority (MIDA) with the United Nations Industrial Development Organization (UNIDO) for the Government of Malaysia, Medium and Long Term Industrial Master Plan Malaysia, Volume II, Part 2--Palm Oil Products Industry, Report No. II-2-4, Aug. 1985.
2/ Ibid., and discussions with Government and industry representatives in Malaysia, Apr. 1987.
3/ Ministry of Primary Industries Malaysia, Palm Oil Research Institute of Malaysia and Palm Oil Registration and Licensing Authority, Oil Palm in Malaysia, 1986.
4/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates.

palm oil, and essentially combine the farming and processing sectors that are separate in the soybean industry. Small landholders that are not large enough to own their own mills must have access to one nearby.

Thus, the structure of the palm oil industry differs from the soybean industry in the larger scale of most operations and the integration of the farming and processing sectors. This structure is the result of the nature of the oil palm tree and fruit and not the type of ownership.

However, this structure has resulted in the dominance of certain types of ownership (table 7-7). The industry has private and public components; all private ownership represented 57 percent of the total in terms of planted area in 1985. Most private ownership is in the form of large estates (a plantation with a mill); these estates accounted for 49 percent of total planted area in 1985 (the top nine publicly traded estates represented 16 percent of total production in 1984). The other type of private ownership is the smallholder.

The primary public ownership is by FELDA which accounted for 29 percent of total planted area in 1985. The rest of the public ownership was made up of various other Government agencies involved in palm oil to a lesser extent than FELDA. The public sector in palm oil has the dual objectives of increasing production of palm oil and achieving the social goal of employing the native Malay population. The FELDA operations, or schemes, are similar to the large estates as they incorporate both a plantation and a mill.

These ownership patterns apply to the plantation, where oil palm is farmed, and the mill, where fruit is processed. The refinery, where crude oil is further processed, is a separate part of the palm oil industry that has not developed along these ownership lines. Also separate are the operations that process the palm kernel, the other product of the fruit. The kernel, produced in the mill along with crude palm oil, does not have the perishability problems of the fruit and can be transported further. In most cases, the kernels are shipped to a separate crushing facility where crude palm kernel oil is produced and then sent to a refinery for further processing.

Private.--Of the private estates, the top five in 1985 by total planted area were Kumpulan Guthrie, Harrisons Malaysian Plantations, Sime Darby Plantations, Highlands and Lowlands, and Barlow Boustead Estate Agency. In 1984 (the last year for which complete data are available), the top nine quoted (publicly traded) plantations' total oil palm planted area was 181,000 hectares (table 7-8). Of these plantations, Harrisons Malaysian Plantations was the largest in 1985 by total titled area, followed by Kuala Lumpur Kepong, Consolidated Plantations, and Dunlop Estates. The top nine quoted plantations own 42 palm oil mills, 4 palm oil refineries, 5 palm oil factories, and 2 palm oil bulking installations.

Processed palm oil products are divided into edible and inedible uses. United Plantations, the most efficient palm oil producer, has its own refinery, where 70 percent of production consists of palm olein (used to make cooking oil) and 30 percent consists of palm stearin (used for industrial purposes). 1/

The output of palm products from the top nine quoted plantations increased from 1981 to 1984 (table 7-9). The fruit bunch harvest ranged from 2.6 million metric tons to 2.9 million; production of palm oil from 520,000 metric tons to

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1/ USITC staff interview with United Plantations staff in Malaysia, Apr. 1987.

585,000; and, production of palm kernels from 112,000 metric tons to 170,000. Consolidated Plantations was the major producer of all products. Sales of palm products for the top nine quoted plantations increased from US$273 million in 1981 to US$444 million in 1984; Consolidated Plantations was the leader in sales, followed closely by Harrisons Malaysian Plantations (table 7-10).

The common initial mill capacity is 30 tons of fruit bunches per hour, with expansion to twice that as the plantation matures; this enables most mills to process a monthly peak of 12 percent of the projected annual fruit bunch production (25 days at 20 hours per day). Combined mill and bulk storage capacity for oil is generally about 30 percent of annual production. 1/

Average utilization of palm oil milling capacity in 1985 was estimated at 63 percent. The total number of mills (public and private) increased from 46 in 1970 to 272, with a peak capacity of 8.3 million metric tons of fruit bunches per hour, in 1985 (table 7-11). Of this total, 229 mills were in operation and 43 were either in the planning or construction stages.

The palm oil refining sector performed well in the 1970's, but declining profit margins during 1980-83 resulted in the closure of 18 out of 53 refineries. The performance of the refining sector improved in 1984, reflecting the fact that, being an export-oriented industry and having to compete with 16 other major oils and fats in the world market, the performance of these refineries will continue to be dictated by market forces. Over the years, total investment in the refining sector has shown rapid growth. 2/

There were 55 palm oil refining and fractionation plants in 1984, but only 35 in production. These 55 refineries in 1985 had a capacity of 6.6 million metric tons of crude palm oil per year, however, only 37 were in operation and 2 were still in implementation. At the end of 1986, there was substantial surplus capacity in these refineries.

A Malaysian Industrial Development Authority survey in 1983 stated that the paid-up capital of 38 refineries, out of 53 total implemented projects, was 55 percent Malaysian shareholding (including 27 percent Bumiputra (native Malay)). Of 55 refineries existing in 1985, 47 are expected to have majority Malaysian equity by 1990 as stipulated in the manufacturing licenses. 3/

The operating size of the various refineries appears to have a significant impact on the profitability. In recent years, the palm oil refining industry has been plagued with the problem of excess capacity. The negative effects of this problem are felt mainly by refiners with small-sized plants.

At the end of 1984, there were 51 Government-approved palm kernel crushers and 8 crude palm kernel oil refining and fractionation plants. However, only 27 kernel crushers and 4 crude palm kernel oil refineries were in operation.

All the major plantations were once foreign controlled, mainly by British companies. In the National Policy of 1982, the ownership structure required is at least 30 percent Bumiputra, 40 percent other Malaysian, and at most 30 percent foreign for private plantations; currently, most follow this policy. The Government goal is to have this ratio in effect industrywide by 1990.

1/ Dr. Harcharan Singh Khera, The Oil Palm Industry of Malaysia-An Economic Study, Penerbit Universiti Malaya, Kuala Lumpur, 1976.

2/ MIDA and UNIDO, op. cit.

3/ Ibid.

This National Policy to increase Malaysian ownership of private estates seems to have been very successful. According to United Plantations, the Malaysians have been very fair in buying out the ex-colonial interests at a fair price. 1/ Today, foreign involvement is very low in private estates. The only remaining foreign owners of any significance are the Kuwait Investment Office, with 28 percent ownership, and Danish investors, with 10 percent, in United Plantations; and Harrisons & Crosfield PLC with a residual 30 percent ownership in Harrisons Malaysian Plantations. 2/

As a result of Government money and agencies involved in the "Malaysianization" of private estates, the Bumiputra Trust Agency Permodalan Nasional Berhad (PNB) has become the largest owner in the private sector. The PNB, either directly or indirectly, controls the management of three of the largest quoted (publicly traded) plantations, Harrisons Malaysian Plantations, Consolidated Plantations, and Highlands and Lowlands, as well as the largest unquoted (privately held) plantation, Kumpulan Guthrie (which controls its quoted subsidiary Guthrie Ropel). 3/

Public.--FELDA essentially operates as a private enterprise, but channels profits back into settlers' programs. Settlers purchase the land (currently, shares in the land) in scheme settlements and receive incomes based on market prices. For oil palm, each settler has a share in 10 acres of land; the typical scheme has 400 to 500 families on 5,000 acres of land. Land in Malaysia is State-owned, and FELDA must apply for it and stipulate where the development is to take place. Settlers receive a loan from FELDA in order to purchase their share of the land. When the loan is paid off, the settler can sell the share, but only with the approval of the State government (the titles are 99-year leases). 4/

Through its land development schemes, which place settlers on oil palm plantations and provide them with the necessary equipment and services to produce palm oil, FELDA has become Malaysia's single largest palm oil producer. FELDA currently has 274 oil palm schemes and owns 58 oil palm mills, 3 palm oil refineries, 3 palm kernel crushing plants, and 3 port installations. 5/

Even though FELDA schemes operate as private entities, the 90,000 families in these schemes are a government liability, because when prices are low, FELDA must make payments to maintain the guaranteed minimum income. Private estates are better able to adjust to lower prices because of diversified portfolios, but are suffering after the windfall profits achieved during the early 1980's. 6/

1/ USITC staff interview with United Plantations staff in Malaysia, Apr. 1987.
2/ Merrill Lynch Capital Markets, Securities Research and Economics Divisions, International Research Department, various reports on Malaysian plantation stocks and plantation companies, 1986.
3/ Ibid.
4/ Discussions with FELDA staff in Malaysia and FELDA Annual Report 1985.
5/ Ibid.
6/ Discussions with Government and industry representatives in Malaysia, Apr. 1987.

Cost structure

Costs of production for palm oil are generally lower than soybean oil because oil yields of the fruit are higher than soybeans. However, the relationship between these costs is considerably more complicated. A direct comparison of the costs of production of palm and soybean oil cannot be made because soybean oil is a coproduct of the meal produced from soybeans, whereas palm oil is in itself the main product. However, an idea of the cost of production of soybean oil can be arrived at by apportioning a fractional cost to the meal and oil components.

The following tabulation shows comparative costs of production for major vegetable oils (1986 estimates): 1/

Country	Type of oil	US$/metric ton
Indonesia	palm	150
Malaysia	palm	230
United States	soybean	330
Canada	rapeseed	650
EC	rapeseed	850

Although costs of production are lower, production decisions are not as flexible and palm oil producers must continue production in cases when soybean oil producers could stop. Because oil palm is a perennial tree crop, output is not responsive to short-run price movements unlike soybeans, which are an annual crop. Despite these factors, Malaysian palm oil's low production costs and proximity to export markets make it a strong competitor for soybean oil.

Costs of production for palm oil can be examined first in terms of estimates of total costs and breakeven costs. Estimates are available from both the private and public sectors.

The Agricultural Attache in Kuala Lumpur notes that breakeven costs are about US$270 per metric ton, and in general the industry feels they could survive at this price. According to the Agricultural Attache, one of the most efficient estates' costs were US$175 to $192 per metric ton, and the largest estate company's costs were US$210 to $220 in 1984. United Plantations' costs, which are the lowest in the industry, increased from US$168 per metric ton in 1980 to US$176 in 1984, but its current costs are about US$250 per metric ton.

FELDA reportedly has higher costs of about US$250 to $270 per metric ton; they believe at US$270 to $288 settlers are just above the poverty level and a price of US$346 would provide well for settlers. According to the Agricultural Attache, costs of production are difficult to assess for FELDA because the management consists of civil servants. Palm Oil Research Institute of Malaysia officials believe a minimum price of US$270 per metric ton is required for the long-term viability of the industry and estimate production costs at about US$154 to $192. 2/

1/ Merrill Lynch, Malaysian Tropical Plantation Stocks, op. cit.
2/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates, and discussions with Government and industry representatives in Malaysia, Apr. 1987, currency converted.

Palm oil costs of production were one subject of the International Oil Palm/Palm Oil Conference held in Kuala Lumpur, Malaysia, in June 1987. Production costs were compared for private estates, Government schemes, and smallholders (table 7-12). Capital is the largest portion of Government schemes' costs, and fertilizer and labor are the highest portions of smallholders' costs. Overall costs are lowest for private estates.

Production costs were also compared for Malaysia and other palm oil producing countries (table 7-13). Capital costs are the largest item for every country, and are highest for Indonesia. Fertilizer costs are lowest for the Ivory Coast, but probably because not enough is used. Overall costs are lowest for Malaysia but highest for Indonesia, which has the lowest labor costs.

Costs of production can be broken down in other ways as well. One way is the order in which costs are encountered, giving three main types of costs incurred in the cultivation of oil palm and production of palm oil products: immature agricultural costs, including felling and clearing jungle, weeding and upkeep, drainage, fertilizing, disease and pest control, nursery development, and providing amenities to labor; capital costs of establishing the mill, including the building, boilers, and specialized machinery; and oil production costs, including general costs, field upkeep, harvesting and tools, internal transport, and mill, throughput, and forwarding and installation costs. 1/

The table below presents World Bank estimates of the breakdown of costs of production for mature areas (trees at least 8 years old) (in percent): 2/

Cost item	Mean	Approximate range
Agricultural:		
General upkeep	12	8-16
Manuring	22	12-32
Pollination	4	narrow
Collection:		
Harvesting and transport	34	22-46
General:		
Management and supervision	10	7-13
Depreciation and maintenance of facilities	3	1-5
R&D, advisory	1	wide
General	14	11-17

Certain categories of production costs for palm oil, although similar to those for other vegetable oils, are of particular importance in influencing overall costs. For example, as oil palm grow taller, harvesting costs increase so that after about 20 years it becomes more profitable to remove old trees and replant the fields. Replanting provides an opportunity to use new higher and earlier yielding varieties.

Labor is a substantial portion of production costs because manual labor is still the most common method of harvesting oil palm fruit because of the trees' physical characteristics. Besides direct wages, private estates typically provide other benefits to workers. For example, United Plantations provides

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1/ Khera, op cit.
2/ World Bank, Finance and Agro Industry Unit, Agriculture and Rural Development Department, Agro-Industry Profiles-Oil Palm, FAU-03, Sept. 1985.

free housing (including utilities), as well as old age benefits, payments to workers' widows, and education scholarships, among others. FELDA also provides other benefits to workers; for example, schemes usually have their own primary schools and if not, children are transported to the nearest one.

Another major cost is fertilizer, which is generally about 20 percent of total production costs. Fertilizer costs are currently about US$48 per hectare per year for coastal clay soils versus about US$142 for inland soils. An estimated US$58 to $77 of fertilizer per hectare is needed to bring inland soil yields up to those of coastal soils. Prices close to or below the breakeven point discourage fertilizer use; applications are cut either to reduce costs, or to avoid compounding the problem of overproduction through higher yields. The impact of lower fertilizer use is not felt until 12 to 18 months after the reduction starts. 1/

Costs of production can be broken down further, but these estimates are not as readily available. And it is difficult to establish average cost and revenue figures as there are large differences in estate sizes, planting materials, soil structure, methods of transport, fertilization policies, and wage rates.

As an example of private estates, United Plantations provides low-cost comparisons. United Plantations is the most efficient producer of palm oil and products, and is the most vertically integrated operation from plantation to refinery. It also spans a much smaller physical area than most other operations, serving to reduce field to mill transportation costs.

Production costs for various oil palm products from United Plantations remained relatively stable from 1980 to 1985 (table 7-14). For palm oil, the cost f.o.b. Penang (port location) of refined oil ranged from US$264 per metric ton in 1982 to US$396 in 1984, and the cost ex-estate of crude oil ranged from US$166 per metric ton in 1982 to US$190 in 1983. The crude palm kernel oil ex-estate cost increased from US$43 per metric ton to US$52, and the cost for palm kernel meal f.o.b. Penang decreased from US$654 to US$492 per metric ton.

United Plantations provided a breakdown of production costs for oil palm for immature areas, mature areas, and the mill (table 7-15). It should be noted that many of the cost items for immature and mature areas are actually in part labor costs. The shares of the various cost items remained steady in 1984 and 1985.

Vertical integration

The palm oil industry is expanding in an effort to remain competitive; horizontally, by expanding plantation acreage, and vertically, by increasing the number of estates that own their own refineries, and expanding the product line of refineries to include oleochemicals.

Initially, a general lack of interest by oil palm plantations in crude palm oil processing resulted in the rapid growth of refiners that had little or no link with the plantation and milling sector. This situation has now changed; many independent refiners have integrated backwards with the

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1/ Ibid., currency converted.

plantation sector through mergers and acquisitions and, to a lesser degree, through new investments in oil palm cultivation. The transformation of an independent refining sector into an integrated sector has been motivated by market forces. 1/

Malaysia has been very successful in terms of forward integration as well. The healthy financial performance of palm oil refineries in the 1970's, along with the prospects of increasing availability of crude palm oil supplies, provided a tremendous boost to initial development of the local refining and fractionation industry. A significant characteristic of the newer companies is that all activities related to the downstream processing of refined palm oil and the further processing of crude palm kernel oil are being undertaken by companies that also operate palm oil refineries.

The potential for further integration exists mainly for the palm kernel crushing sector, which is quite separate from other sectors of the industry. Most new capacity is from expansion projects and thereby limits the additional investments required to develop a crude palm kernel oil processing sector. Palm kernel crushing is the primary activity subject to licensing requirements under the Industrial Co-ordination Act. The current level of exemption for licensing of manufacturing activities is M$1 million (US$385,000) in shareholders' funds and less than 50 full-time workers. 2/

Government Programs

According to the Agricultural Attache in Kuala Lumpur, Government programs are insignificant in the industry. As a Government policy, expansion in palm oil production in Malaysia will most likely continue, and production of fractionated products is a recognized downstream activity that will continue to be encouraged.

Government policies with respect to palm oil are generally concerned with promoting production and exports, and encouraging the local processing industry. Government agencies besides FELDA involved in the palm oil industry are the Palm Oil Registration and Licensing Authority, which licenses all aspects of palm oil, and the Palm Oil Research Institute of Malaysia, which conducts research in all aspects of the palm oil industry.

Government policies, namely an export tax system favoring processed goods, have been a driving force behind one of the most significant developments in Malaysian palm oil exports, which was the switch to exporting in more processed forms, along with the development of a local palm oil processing industry. Within ten years, beginning in the early 1970's, a processing industry was built up enough to generate exports of over 90 percent processed palm oil.

Palm oil's rise to importance as an export commodity is partly due to the large variety of end uses to which it is suited. The Malaysian Government supports such uses by creating economic incentives to invest in refining and fractionating facilities and by supporting research on end uses. The Government also works with the private sector in developing markets and servicing users.

1/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates.
2/ Palm Oil Update, op. cit.

Marketing Malaysia's rapidly increasing supply of palm oil is a major challenge. Currently, there is no unified marketing promotion plan for palm oil. Although various Government agencies have become involved in marketing development, the private sector has not spent heavily on marketing promotion, although it benefits from Government projects. 1/

Export duty system

The export duty scheme encourages the processing of crude palm oil locally into higher value-added products, and has been a primary factor promoting the local processing industry. The scheme has two basic features: as the price of palm oil increases, the rate of duty increases; and, the rate of duty is inversely proportional to the degree of processing. There are no exemptions or rebates for crude palm oil, and the reduction in the export duty for processed palm oil is based on a relatively complicated set of formulas.

The Gazetted 2/ crude palm oil price is used to compute the crude palm oil export duty. For processed palm oil, a price of M$500 per metric ton is assessed no duty (this level has remained the same); however, formulas are used to compute the amount of the duty when prices rise above this level. 3/

The export duty scheme provides a disincentive to export crude palm oil, thereby creating a large and low-priced source of supplies for local processors to purchase. Under the scheme, a heavier burden was imposed on crude palm oil for the explicit purpose of protecting and advancing a domestic processing and refining industry.

The objective of encouraging processing has been achieved, with more than 98 percent of Malaysian palm oil currently processed locally. But continued adherence to the scheme may work against long-term interests of industry because of inherent weaknesses in the scheme, such as its being directly dependent on price, which tends to distort prices of various palm oil products in the market and give rise to "cocktailing" or reconstituting of palm oil; the historical practice of announcing Gazetted prices, for a particular month, on the first day of the month which necessitates excessive speculation, especially when future contracts are common; and, the lack of additional advantage to producing further downstream products (such as fat products and oleochemicals) than those having undergone five stages of processing (such as RBD olein) because of the 100-percent export duty rebate granted to the latter products. 4/

Traditionally, Malaysia has been a producer and exporter of crude palm kernel oil, with very little further processed locally into higher value-added products. To encourage the establishment of a palm kernel oil processing sector, the Malaysian Government modified export duties for palm kernel oil in 1984, creating the same preference for the export of more highly refined products that exists for palm oil. 5/

1/ Khera, op cit., and MIDA and UNIDO, op. cit.
2/ An f.o.b. price that is the average of actual f.o.b. prices of all crude palm oil exported during the preceding month, which is the basis for determining export duty levels.
3/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates.
4/ MIDA and UNIDO, op. cit.
5/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates.

"Cocktailing" is the mixing of Malaysian palm olein (usually) or oil with Indonesian palm oil, a practice backed primarily by India and often conducted in Singapore. Malaysian exporters cannot guarantee its quality although consumers are told it is Malaysian palm oil, which could have potentially adverse effects on the Malaysian reputation for quality. 1/

The huge transshipment business done through Singapore was encouraged by the export duty structure, which also encourages cocktailing. Even with no incentive for cocktailing, Singapore will continue to be an important transshipment port, as it is able to provide much more attractive shipping schedules and other services for many destinations. 2/

Export Credit Refinancing

Export Credit Refinancing (ECR) was established in 1977 to help promote exports of manufactured goods; in 1986, it was revised to include certain primary commodities, including palm oil. Eligibility is based on a list of goods not covered by ECR; however, not being on the list does not result in automatic eligibility for financing (the product must be a bona fide export and the National Bank of Malaysia must approve all applications). The program is aimed at small exporters without access to credit. 3/

The National Bank provides preferential export financing to exporters for up to 3 months prior to and 3 months after shipment at favorable interest rates. In recent years, the interest rate charged on this export financing was about 6 percent, as compared with commercial rates of 10 to 12 percent.

Some refiners utilize ECR for their shipments of refined palm oil. When interest rates are sufficiently high, this program allows exporters to earn money on the amount of the sale for 6 months. Effectively, this program allows sellers to sell their refined oil at prices below the costs of refining. ECR is only a supplementary means of financing.

In the palm oil industry, very few are using ECR. According to the National Bank, only 36 percent of the palm oil industry uses ECR, representing only about 27 percent of palm oil exports. According to industry members, plantations are conservative investors who do not like to borrow; refiners do not use ECR because trading with traditional customers is on a cash basis and with others is with a letter of credit.

Loans

One important function of the Malaysian Government in the oil palm industry is the provision of funds (loans) for FELDA's development projects. Through the end of 1985, financing of all FELDA activities (including oil palm) required total loan withdrawals of US$1.9 billion (table 7-16). Of the total, 90 percent came directly from the Malaysian Government and the rest from

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1/ Discussions with industry representatives in Malaysia, Apr. 1987.
2/ Agricultural Attache Reports from Kuala Lumpur, Malaysia, various dates.
3/ Discussions with Government and industry representatives in Malaysia, Apr. 1987.

outside sources, the largest being the World Bank (7 percent). The rapid development of smallholder oil palm production was financed primarily by World Bank loans and secondarily by loans from the Asian Development Bank and the Malaysian Government itself. These loans are provided at interest rates well below prevailing commercial rates. 1/

International lending institutions play a major role in the world palm oil production expansion. Projects are currently underway (or proposed) in Africa, Latin America, and Asia. The World Bank plays a significant role in Asian projects where increasing production has had a major impact on world vegetable oil markets. The amount of World Bank financing for oil palm development has been substantial. The loans cover land settlement, plantings of oil palm, construction of processing and refining capacity, and research.

The World Bank loans are usually at a relatively low interest rate since the Bank borrows at favorable rates; these rates are probably no more than the lowest rates available in international money markets. 2/ According to industry sources, the loans from the World Bank varied in interest rates, with the earliest made at 6 to 6.5 percent, then at 8 percent, and currently at a floating rate. In comparison, Malaysian Government loans started at 6 percent, then went to zero, and now are at 4 percent (which is the rate settlers pay on the loans made to them by FELDA). 3/

1/ The Consultants International Group, Inc. and Abel, Daft & Earley, A Study of the Effects of Subsidies on the Oilseed Processing Complex in Key Countries, Mar. 26, 1986.
2/ Ibid.
3/ Discussions with government and industry representatives in Malaysia, Apr. 1987.

Table 7-1
Malaysia: Palm oil supply and utilization, marketing years 1965-86

(In thousands of metric tons)

Marketing year	Production	Beginning stocks	Total imports	Supply/ distribution	Total exports	Total consumption	Ending stocks
1965.........	151	9	0	160	141	11	8
1966.........	190	8	0	198	181	9	8
1967.........	226	8	0	234	189	11	34
1968.........	283	34	0	317	286	6	25
1969.........	352	25	0	377	357	6	14
1970.........	431	14	0	447	402	11	34
1971.........	589	34	0	623	573	8	42
1972.........	729	42	0	771	697	10	64
1973.........	813	64	0	877	797	21	59
1974.........	1,046	59	0	1,105	902	73	130
1975.........	1,258	130	0	1,388	1,160	62	166
1976.........	1,392	166	0	1,558	1,335	81	142
1977.........	1,613	142	0	1,755	1,427	135	193
1978.........	1,786	193	0	1,979	1,514	130	335
1979.........	2,188	335	0	2,523	1,901	213	409
1979/80 1/...	2,540	320	0	2,860	2,174	269	417
1980/81......	2,693	417	0	3,110	2,434	419	257
1981/82......	3,351	257	0	3,608	2,654	433	521
1982/83......	3,179	521	0	3,700	2,869	513	318
1983/84......	3,322	318	0	3,640	2,821	383	436
1984/85......	3,817	436	0	4,253	3,256	504	493
1985/86 2/...	4,800	493	0	5,293	3,975	543	775

1/ Marketing year changed to beginning in October.
2/ Estimated.

Source: U.S. Department of Agriculture, Foreign Agriculture Circular, Oilseeds and Products: World Oilseed Situation and Market Highlights, Supplement 5-86, May 1986, p. 49.

Table 7-2
Palm kernels and palm kernel oil: Malaysian production, crush, and exports, 1980-86

(In thousands of metric tons)

Year	Palm kernel		Palm kernel oil	
	Production	Crush	Production	Exports
1980	553	513	222	215
1981	587	570	243	242
1982	910	802	336	333
1983	834	874	372	362
1984	1,044	968	415	376
1985	1,213	1,153	1/	1/
1986	1,334	1,356	1/	1/

1/ Not available.

Source: Data on palm kernel production and crush were compiled by the staff at the U.S. embassy in Kuala Lumpur, Malaysia (from Malaysian Department of Statistics). Data on palm kernel oil production and exports are from the Government of Malaysia, Profile of the Primary Commodity Sector in Malaysia, Mar. 1986.

Table 7-3
Palm oil: World production and exports, crop years 1981/82-1985/86 1/

(In thousands of metric tons)

Country	1981/82	1982/83	1983/84	1984/85	1985/86 2/
Production:					
Malaysia	3,351	3,179	3,322	3,817	4,772
Indonesia	884	983	1,150	1,208	1,350
All others	1,714	1,748	1,822	1,926	1,946
Total	5,949	5,910	6,294	6,951	8,068
Exports: 3/					
Malaysia	2,654	2,869	2,821	3,254	4,092
Indonesia	302	407	247	652	695
All others	450	405	475	513	559
Total	3,406	3,681	3,543	4,419	5,346

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Preliminary.
3/ Excludes transshipments through Singapore.

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

Source: U.S. Department of Agriculture, Foreign Agriculture Circular, Oilseeds and Products, various issues.

Table 7-4
Malaysia: Processed palm oil exports by destination, 1982-86

(In thousands of metric tons)

Destination	1982	1983	1984	1985	1986
India	402	605	597	608	856
Singapore	525	404	791	968	774
Pakistan	262	345	199	201	641
United States	96	145	107	140	302
Japan	127	145	146	179	220
Soviet Union	252	256	163	160	178
South Korea	69	85	52	96	172
Iraq	44	92	73	66	152
Netherlands	161	121	133	129	143
United Kingdom	109	38	44	48	118
All others	640	568	554	643	887
Total	2,690	2,804	2,858	3,237	4,442

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

Source: Oil World, No. 11, vol. 30, Mar. 13, 1987, p. 87, and 1987 Annual Statistics Update.

Table 7-5
Palm oil: Imports 1/ by destination, crop years 1981/82-1985/86 2/

(In thousands of metric tons)

Importer	1981/82	1982/83	1983/84	1984/85	1985/86 3/
India	410	597	557	730	794
Pakistan	273	349	328	466	575
United States	99	140	168	169	277
United Kingdom	186	200	163	218	260
Netherlands	151	199	174	185	225
All other	2,114	2,022	2,001	2,544	3,316
Total	3,233	3,507	3,391	4,312	5,447

1/ Excludes transshipments through Singapore.
2/ Crop year runs from October 1 to September 30 of the following year.
3/ Preliminary.

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

Source: U.S. Department of Agriculture, Foreign Agriculture Circular, Oilseeds and Products, various issues.

Table 7-6
Palm oil: Apparent consumption, crop years 1981/82-1985/86 1/

(In thousands of metric tons)

Consumer	1981/82	1982/83	1983/84	1984/85	1985/86 2/
India	410	587	497	730	774
Nigeria	693	651	605	630	700
Indonesia	573	607	893	666	695
Malaysia	433	513	347	506	597
Pakistan	266	337	332	456	585
All other	3,122	3,274	3,178	3,631	4,488
Total	5,497	5,969	5,852	6,619	7,839

1/ Crop year runs from October 1 to September 30 of the following year.
2/ Preliminary.

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

Source: U.S. Department of Agriculture, Foreign Agriculture Circular, Oilseeds and Products, various issues.

Table 7-7
Malaysia: Oil palm planted area, by type of ownership, 1983-85

(In thousands of hectares)

Year/ area	Small- holders	Federal Land Develop- ment Authority	Federal Land Con- solida- tion and Rehabil- itation Authority	Rubber Industry Small- holders' Develop- ment Authority	State schemes/ Govern- ment Agency	Private estates	Total
1983:							
West	82	367	21	24	40	594	1,129
East	2	18	0	0	51	59	129
Total	84	385	21	24	91	653	1,258
1984:							
West	97	375	29	26	55	614	1,196
East	3	27	0	0	61	62	153
Total	100	402	29	26	116	676	1,349
1985:							
West	112	398	50	28	60	645	1,292
East	3	27	0	0	66	77	173
Total	115	425	50	28	126	722	1,465

Source: Palm Oil Registration and Licensing Authority, Malaysia.

Table 7-8
Top 9 quoted plantations: Oil palm planted area, 1984, titled area and facilities, 1985

Plantation	Oil palm planted area, 1984	Titled area, 1985 1/	Palm oil facilities
	Hectares		
Harrisons Malaysian.....	37,229	102,350	10 mills, 1 bulking installation
Kuala Lumpur Kepong.....	37,217	67,828	1 refinery, 7 mills
Consolidated............	32,731	63,513	1 refinery, 6 mills
Dunlop Estates..........	13,712	42,070	1 refinery, 3 mills
Highlands and Lowlands..	19,112	31,068	6 mills
Guthrie Ropel...........	14,419	25,055	5 mills
United Plantations......	14,803	19,327	3 factories, 1 refinery, 1 bulking installation
Batu Kawan..............	6,564	16,281	3 mills
Malaysian Plantations...	5,226	9,592	2 factories and mills

1/ All crops.

Source: Merrill Lynch Capital Markets, Securities Research and Economics Divisions, International Research Department, various reports on Malaysian plantation stocks and plantation companies, 1986.

Table 7-9
Output of palm products of top nine quoted estates, 1981-84

(In thousands of metric tons)

Plantation	Product	1981	1982	1983	1984
Consolidated Plantations....	Fruit bunches...........	628	744	723	711
	Palm oil................	125	143	174	157
	Palm kernels............	26	34	48	46
Harrisons Malaysian.........	Fruit bunches 1/........	593	573	679	582
	Palm oil 1/.............	119	114	135	117
	Palm kernels 1/.........	26	31	38	34
Kuala Lumpur Kepong.........	Fruit bunches...........	368	437	373	471
	Palm oil 1/.............	74	87	74	85
	Palm kernels 1/.........	16	22	20	24
Highlands and Lowlands......	Fruit bunches...........	276	308	243	308
	Palm oil 1/.............	55	62	50	62
	Palm kernels 1/.........	10	15	12	16
Dunlop Estates..............	Fruit bunches...........	176	213	178	263
	Palm oil................	36	42	35	48
	Palm kernels............	8	12	10	14
Guthrie Ropel...............	Fruit bunches...........	199	242	196	235
	Palm oil................	39	48	40	46
	Palm kernels............	9	14	11	14
United Plantations..........	Fruit bunches 1/........	246	265	208	230
	Palm oil................	49	53	42	46
	Palm kernels............	12	16	13	15
Batu Kawan..................	Fruit bunches...........	55	65	79	68
	Palm oil 1/.............	11	13	15	12
	Palm kernels 1/.........	2	3	4	3
Malaysian Plantations.......	Fruit bunches...........	62	67	58	63
	Palm oil................	12	12	11	12
	Palm kernels............	3	4	4	4
Total 2/................	Fruit bunches...........	2,603	2,914	2,737	2,932
	Palm oil................	520	574	576	585
	Palm kernels............	112	151	160	170

1/ Estimated.
2/ Total for these nine estates only.

Source: Merrill Lynch Capital Markets, Securities Research and Economics Divisions, International Research Department, various reports on Malaysian plantation stocks and plantation companies, 1986.

Table 7-10
Palm products sales: Top nine quoted estates, 1981-84

(Millions of dollars)

Plantation	1981	1982	1983	1984
Consolidated Plantations	64	73	68	105
Kuala Lumpur Kepong	42	40	42	74
Dunlop Estates	17	17	29	73
Harrisons Malaysian Plantations 1/	52	53	57	63
Highlands and Lowlands	33	33	31	46
United Plantations	31	30	29	39
Guthrie Ropel	20	20	20	26
Batu Kawan	7	7	9	10
Malaysian Plantations	6	7	7	9
Total 2/	273	280	291	444

1/ Estimated (excluding refinery sales).
2/ Total for these nine plantations only.

Source: Merrill Lynch Capital Markets, Securities Research and Economics Divisions, International Research Department, various reports on Malaysian plantation stocks and plantation companies, 1986, currency converted.

Table 7-11
Palm oil mills: Approvals by Palm Oil Registration and Licensing Authority, 1985 1/

Area	In operation		Under planning and construction		Total	
	Number	Capacity 2/	Number	Capacity 2/	Number	Capacity 2/
West Malaysia States:						
Johore	59	2,045	15	325	74	2,370
Selangor	29	794	5	55	34	848
Pahang	53	1,964	11	320	64	2,284
Perak	30	852	4	50	34	902
Negri Sembilan	12	346	-	-	12	346
Trengganu	10	439	2	94	12	533
Kelantan	6	141	-	-	6	141
Penang	5	98	-	-	5	98
Malacca	2	40	-	-	2	40
Kedah	2	40	1	20	3	60
Total	208	6,759	38	864	246	7,622
East Malaysia States:						
Sabah	16	434	5	164	21	598
Sarawak	5	125	-	-	5	125
Total	21	559	5	164	26	723
Total, all Malaysia	229	7,318	43	1,028	272	8,345

1/ Including Federal Land Development Authority mills.
2/ Metric tons of fruit bunches per hour.

Source: Palm Oil Registration and Licensing Authority, Ministry of Primary Industries Malaysia, Palm Oil Update--"A Review of the Malaysian Palm Oil Industry 1985," Kuala Lumpur, Malaysia, Jan. 1986.

Table 7-12
Costs of production of Malaysian crude palm oil, 1985

Item	Private estates	Government schemes	Smallholders	National average 1/
Capital:				
Dollars per metric ton.....	48.8	80.5	35.9	61.7
Percent of total...........	27.1	35.0	16.3	30.1
Fertilizer:				
Dollars per metric ton.....	44.8	55.8	69.9	51.0
Percent of total...........	24.9	24.2	31.6	24.9
Labor:				
Dollars per metric ton.....	41.8	42.5	60.2	43.8
Percent of total...........	23.3	18.5	27.3	21.4
Other 2/:				
Dollars per metric ton.....	33.4	26.8	12.7	29.3
Percent of total...........	18.6	11.6	5.8	14.3
Net processing:				
Dollars per metric ton.....	10.9	24.6	42.0	19.3
Percent of total...........	6.1	10.7	19.0	9.3
Long-run cost:				
Dollars per metric ton.....	179.7	230.1	220.7	205.1
Short-run cost 3/:				
Dollars per metric ton.....	131.0	149.6	184.8	143.3

1/ Assumes the ratio of private estates to Government schemes to smallholders is 49:43:8.
2/ Includes development, vehicles, salaries, administration, and social services costs from years 4 to 25 of the trees.
3/ Obtained by deducting capital cost from long-run cost.

Note.--Currency converted using 1985 exchange rate US$1.00=M$2.50.

Source: Tan Bock Thiam, Cost of Palm Oil Production in Major Producing Countries, University of Malaya, from the 1987 International Oil Palm/Palm Oil Conference--Progress and Prospects, Conference II: Technology, June 1987.

Table 7-13
Comparative costs of production for crude palm oil, 1985 1/

Item	Malaysia	Indonesia 2/	Thailand	Ivory Coast
Capital:				
Dollars per metric ton......	61.7	125.6	81.4	88.7
Percent of total............	30.1	51.9	35.5	40.0
Fertilizer:				
Dollars per metric ton......	51.0	53.5	53.8	26.1
Percent of total............	24.9	22.1	23.5	11.8
Labor:				
Dollars per metric ton......	43.8	22.9	48.2	43.8
Percent of total............	21.4	9.5	21.1	19.8
Other 3/:				
Dollars per metric ton......	29.3	19.0	22.2	42.0
Percent of total............	14.3	7.8	9.7	18.9
Net processing:				
Dollars per metric ton......	19.3	21.0	23.3	21.0
Percent of total............	9.3	8.7	10.2	9.5
Long-run cost:				
Dollars per metric ton......	205.1	242.0	228.9	221.6
Short-run cost 4/:				
Dollars per metric ton......	143.3	116.4	147.5	132.9

1/ The prevailing exchange rate in 1985 was used for currency conversions. US$1.00=M$2.50; US$1.00=1080 Indonesian Rupiah; US$1.00=27.20 Thai Baht. Ivory Coast figures were obtained in U.S. dollars.
2/ The Indonesian data used were obtained before the currency devaluation in September 1986.
3/ Includes development, vehicles, salaries, administration, and social services cost from years 4 to 25 of the trees.
4/ Obtained by deducting capital cost from long-run cost.

Source: Tan Bock Thiam, Cost of Palm Oil Production in Major Producing Countries, University of Malaya, from the 1987 International Oil Palm/Palm Oil Conference--Progress and Prospects, Conference II: Technology, June 1987.

Table 7-14
Palm oil, palm kernel oil, and palm kernel meal: Costs of production, 1980-85 1/

(Per metric ton)

Product	1980	1981	1982	1983	1984	1985
Palm oil:						
F.o.b. Penang...........	$351.34	$317.97	$264.46	$265.36	$396.50	$335.72
Ex-estate...............	168.00	175.50	166.36	190.33	175.40	176.03
Palm kernel oil, ex-estate...............	43.06	47.17	49.17	61.44	54.44	51.62
Palm kernel meal, f.o.b. Penang...........	653.77	604.29	493.84	556.93	2/	491.83

1/ Not including depreciation.
2/ Not available.

Note.--Currency converted, exchange rates used US$1.00=M$2.20 (1980); US$1.00=M$2.30 (1981-83); US$1.00=M$2.50 (1984); US$1.00=M$2.40 (1985).

Source: United Plantations Annual Report 1985.

Table 7-15
Palm oil: Costs of production, 1984 and 1985 1/

Cost items	1984	1985	Share by section	Share of total
	Per metric ton		Percent	
Immature oil palm acreage:				
Clearing/replanting	9.46	10.33	30.01	2/
Upkeep/cultivation	8.07	9.44	27.42	2/
Fertilizing	3.86	4.04	11.75	2/
Joint estate	9.57	10.61	30.82	2/
Total	30.96	34.42	100.00	12.30
Mature oil palm acreage:				
Upkeep/cultivation	25.14	27.07	14.42	2/
Fertilizing	30.94	37.18	19.81	2/
Harvesting/collection	43.23	43.80	23.33	2/
Transportation	18.60	19.13	10.19	2/
Joint estate	54.50	60.52	32.25	2/
Total	172.12	187.70	100.00	67.04
Mill (processing):				
Management	6.93	7.84	13.57	2/
Labor	7.53	8.10	14.00	2/
Labor welfare	1.16	1.14	1.97	2/
Fuel	1.98	2.20	3.79	2/
Maintenance	11.91	12.31	21.28	2/
Depreciation	12.69	14.70	25.42	2/
Chemicals	2.79	2.78	4.81	2/
Effluents	.62	.76	1.31	2/
Laboratory	.50	.55	.94	2/
Packing	1.14	.98	1.69	2/
Office expenses	1.24	1.01	1.74	2/
Security	.64	.72	1.24	2/
Rents/rates	3.23	4.31	7.46	2/
Research	.20	.45	.78	2/
Total	52.54	57.84	100.00	20.66
Grand total	255.91	279.97	2/	100.00

1/ Exchange rate conversions made at the rate of US$1.00=M$2.50 (84) and M$2.40 (85); units are metric tons of crude palm oil.
2/ Not applicable.

Source: Based on materials provided by officials of United Plantations, Teluk Intan, Perak, Malaysia.

Table 7-16
Federal Land Development Authority: Sources and withdrawals of funds

Sources	Withdrawals to end of 1985 1/	Percent of total
Federal Government	$1,717,134,481	90.0
Through Federal Government:		
World Bank	135,372,167	7.1
Asian Development Bank	2,716,841	.1
Kuwait Fund	15,643,486	.8
Saudi Fund	28,463,765	1.5
Overseas Economic Cooperation Fund	10,896,945	.6
New Planting Grants	5,328,084	.3
Rubber Replanting Grants	2,457,755	.1
Total	1,918,013,524	100.0

1/ Calculated at the rate of US$1.00=M$2.53 by the staff of U.S. International Trade Commission.

Source: Federal Land Development Authority Annual Report 1985.

CHAPTER 8. STATUS OF U.S. COMPETITIVENESS

Introduction

After several decades of expansion and dominance over U.S. and foreign markets, the U.S. oilseeds and oilseed products industry is in decline. During the 1980's, the industry has lost much of its dominant position in foreign markets to rapidly growing foreign rivals. The U.S. market is still secure: U.S. producers supply virtually all U.S. consumption of oilseeds and oilseed meal and most U.S. consumption of vegetable oils. However, the export markets for these products have traditionally supplied much of the industry's earnings, and these markets have become increasingly competitive. Foreign production and exports of soybeans and other oilseeds and their products are rising, and the long-run growth in world demand has slowed as a result of macroeconomic fluctuations and international recession.

Weak foreign markets have pushed down prices in important U.S. export markets, and, as a result, have upset the price structure of the U.S. soybean complex. U.S. producers and exporters cannot simultaneously maintain high export prices and keep the quantity of exports up; thus, export volume has been sacrificed in order to maintain the key element of the price structure of the soybean complex, the soybean price. This price is the target of the loan-support program of the U.S. Department of Agriculture (USDA), a program which has become increasingly difficult to maintain in the face of declining export prices. The USDA has withdrawn soybean supplies from the market in an effort to prop up prices, causing a decline in U.S. exports of soybeans and putting a high floor under raw material costs incurred by U.S. soybean crushers and exporters of soybean meal and oil.

Many of the same factors that propelled the U.S. industry to its peak have contributed to its subsequent decline. U.S. Government support of farm incomes and financing of research and development (R&D), the dominance of large multinational firms in U.S. and world oilseed trade, and other factors in U.S. industry development have inadvertently assisted foreign producers as well as domestic producers, creating competition for U.S. exporters in foreign markets. A widely held view would also include past U.S. trade embargoes as a contributing factor in stimulating foreign competition with U.S. exports.

Other factors in the decline are not directly related to the industry. The most important of these are exchange rates and other macroeconomic fluctuations in international trade, including those caused by the debt burden of developing countries.

This chapter examines more closely the significant factors suggested in previous chapters that affect U.S. producers and exporters in international markets for oilseeds and oilseed products. An attempt is made to tie them in with the structure of the U.S. industry and of its important rivals, and to evaluate their impact on U.S. competitiveness. The following section examines each important factor found to affect U.S. competitiveness. The remaining two sections of the chapter present information on adjustment efforts that U.S. soybean crushers have made or plan to make in response to increased foreign competition, and the views of U.S. industry members on U.S. competitiveness as expressed in industry testimony, the trade press, and other sources.

The Changing Structure of Oilseed Product Markets and the Loss of U.S. Market Share

The U.S. share of world markets

A basic indicator of U.S. performance as a world supplier of oilseeds and oilseed products is the changing U.S. share of world markets for such commodities. Declining market shares can be symptoms of declining health of the industry, either absolutely or relative to foreign competitors. Used in conjunction with other performance indicators, such as costs of production, market shares can be helpful in comparing the economic condition of the U.S. industry with that of its rivals in the market.

A set of measures of U.S. market share is presented in table 8-1. By any of these measures, the U.S. share of important world markets for oilseeds, meal, and oil fell in the 1980's from the levels of the late 1970's. The following discussion examines some of the reasons for these declining market shares.

Macroeconomic effects on U.S. export performance

A variety of macroeconomic and international economic policies and events have had important effects on U.S. agricultural trade, including oilseeds and oilseed products. The most important of these include the following: volatile exchange rates; stagnant world economic growth in recent years; and the foreign debt crisis experienced by several developing countries. Because these effects apply to a number of agricultural markets, the following discussion is directed at U.S. agricultural exports in general. However, except where noted, these effects apply particularly to U.S. trade in soybeans and/or soybean products as well.

The value of the U.S. dollar.--The U.S. dollar appreciated between 1980 and 1985, and then depreciated in 1986 against the currencies of a number of major exporters of oilseeds and oilseed products (table 8-2). Two points should be emphasized about the effects on agricultural trade caused by the dollar's appreciation during the early 1980's. First, as discussed below, the debt problem of the less developed countries (LDC's) caused the depreciation of many LDC currencies vis-a-vis the dollar. In the early 1980's, as interest rates increased and terms of trade for the LDC's fell, countries such as Argentina, Brazil, and Mexico were forced to abruptly devalue their currencies not only to generate the trade surpluses necessary to service their debt, but in the cases of Argentina and Brazil, to stimulate their exports of oilseed products and other commodities. As a result of this depreciation, the LDC's reduced their imports of U.S. agricultural goods. Second, the appreciation of the dollar against all major currencies reduced the ability of U.S. exporters to compete against major agricultural exporters. 1/ By lowering the relative price of competitors' exports, the dollar's appreciation allowed these competitors to bid away sales from the United States. This decline in the

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1/ Mathew Shane and David Stallings, Trade and Growth of Developing Countries Under Financial Constraint, USDA, June 1987.

level and market shares of U.S. agricultural exports contrasts with the growth during the 1970's when the sustained depreciation of the dollar against other currencies served to boost U.S. exports of farm products.

Table 8-3 presents estimates of the effects on U.S. agricultural (wheat, corn, and soybeans) exports resulting from changes in the value of the U.S. dollar. These estimates support expectations regarding the negative effects on U.S. trade caused by the dollar's appreciation and the positive effects of its depreciation. With respect to soybeans, it was estimated that the dollar's appreciation during 1980-82 and 1984-85 depressed the real (inflation-adjusted) price and both the volume and real value of U.S. exports of soybeans during those periods (table 8-3). The dollar's depreciation in 1986, on the other hand, drove up the real price and the volume and real value of such exports.

Stagnant world economic growth.--Between 1980 and 1983, the rate of growth of real income for both developed and developing countries declined from the rates experienced during the 1970's (table 8-4). Indeed, in 1982, the industrial countries experienced negative rates of growth for real gross national product (GNP). The world recession that occurred during this period can be attributed, in part, to tight monetary policies and major industrial restructuring.

A USDA study examined the effect of income growth on U.S. exports of soybeans and soybean meal, wheat, and coarse grains. 1/ Contrary to conventional belief, the study found that the declines in real per capita GNP that occurred between 1980 and 1983 had a positive, although small effect on the level of U.S. exports. However, the study also found that had real income continued to grow at the rates experienced during the 1970's, the level of farm exports would have been higher. In particular, the United States would have exported 0.6 million metric ton more of soybeans and meal between crop years 1980/81 and 1982/83. Corn and wheat exports would have been greater by 0.7 million tons and 2.8 million tons, respectively.

To understand the factors that led to the world recession of 1981-83, it is necessary first to examine the oil shocks of 1973-74 and 1979-80. The developed countries responded to the first oil shock with expansionary monetary policies to avoid injuring their own economic growth. The change in trade flows (from oil-importing countries to members of the Organization of Petroleum Exporting Countries (OPEC)), combined with the expansionary monetary policies, created large amounts of financial liquidity, in the form of so-called petrodollar deposits. To recycle this liquidity, banks began massive lending programs mainly to middle-income oil importing countries. These policies, primarily the low real interest rates, produced an export-led international expansion of the world economy.

The second oil shock of 1979-80 helped set the stage for the world recession of 1981-83. Although the response of the United States and other countries of the Organisation for Economic Co-operation and Development (OECD) to the first oil shock in 1973-74 was to accommodate the increase in energy costs with expansionary policies, the response to the second oil shock was, conversely, to follow contractionary monetary policies. The fear of triggering

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1/ John Dunmore and James Longmire, Sources of Recent Change in U.S. Agricultural Exports, USDA, Jan. 1984.

high inflation in the developed world similar to the inflation that followed the first oil shock precipitated the contractionary monetary policies. 1/ The immediate effects of these policies were worldwide recession, and high, positive real interest rates. As discussed later, lower growth rates in the industrialized countries reduced the volume and prices of exports of debt-ridden developing countries and also led to reductions in imports by such debtor countries.

The decline in GNP and aggregate demand in industrial countries had serious adverse effects on the exporting sectors and on the terms of trade of developing countries. The largest cumulative declines in terms of trade in 1982 occurred in low-income African, Latin American, and other developing countries. 2/ In addition, exchange rates were not allowed to adjust fully in response to internal inflation and this reduced export incentives in the developing countries. 3/ With the exception of East Asia and the Pacific, domestic inflation increased sharply in the developing countries. Inflation was greatest in the oil importing countries, major debt-affected developing countries, and Latin America. As a result of these effects, many of the developing countries found it difficult to generate the foreign-exchange earnings necessary to meet debt-servicing payments.

In summary, it was the slowdown in monetary growth that caused the world recession of 1981-83, sharply curtailed the growth in real income, reduced the terms of trade for developing countries, and caused real interest rates to increase. However, the empirical evidence presented by Dunmore and Longmire suggests that the effect on U.S. farm exports of the decline in the growth rate of real income was relatively small. Since these exports fell sharply during the world recession, this suggests that the dollar appreciation and the debt crisis may have had a larger effect in reducing the level of U.S. farm exports than stagnant world economic growth.

The debt crisis.--The world recession and the debt-servicing problems of the developing countries are interdependent. The percentage of LDC debt concentrated in non-oil developing countries remained virtually unchanged at 88 to 89 percent, between 1981 and 1986 (table 8-5). This concentration of debt in the non-oil developing countries is a relevant factor in determining the competitiveness of U.S. agricultural exports for the following two reasons: (1) these countries are major markets for U.S. agricultural products, and (2) in general, the non-oil developing countries have experienced the greatest

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1/ The basic money supply, called M1, increased in the industrial countries at average annual rates of over 10 percent from 1971 to 1973. This was followed by a slowdown in the growth of money in 1974, producing a temporary rise in real interest rates in 1975. From 1976 though 1979, the annual increase in M1 averaged 10 percent. However, the oil price increases in 1979 were followed by 3 years of declining monetary growth. See Shane and Stallings, op. cit.
2/ Latin American countries showed the largest 1-year change in barter terms of trade, moving from a 15-percent increase in 1977 to a 15-percent decrease in 1978. See Shane and Stallings, op. cit.
3/ Domestic inflation in countries with fixed exchange-rate systems acts as a tax on exports. In addition, it slows the process of development by reducing the incentives for real investment from domestic sources. See Shane and Stallings, op. cit.

problem with debt servicing. A USDA study found that, of the LDC debtor countries, 18 were major U.S. agricultural trading partners. 1/ These 18 countries accounted for more than 60 percent of the debt of the countries facing repayment problems. Overall, the debt problem was highly concentrated in a few country categories. These were middle-income oil importers, major agricultural market countries, the geographical groupings of Latin America and Eastern Europe, and the non-oil-producing countries of North Africa.

The debt-ridden developing economies which have been important yet declining markets for U.S. exports of soybean products are Peru, Venezuela, Poland, and the Philippines. These countries together purchased 6 percent of U.S. soybean oil exports in the 2-year period 1985-86, down from 10 percent in 1980-81, as shown in the following tabulation:

Market	U.S. exports of soybean oil		
	1980-81	1985-86	Change from 1980-81 to 1985-86
	1,000 pounds		
Peru	192,821	27,799	-165,022
Venezuela	160,956	89,275	-71,681
Poland	41,507	18,450	-23,057
Philippines	16,103	13,029	-3,074
Subtotal	411,387	148,553	-262,834
Other	3,808,050	2,336,022	-1,472,028
Total	4,219,437	2,484,575	-1,734,862

U.S. sales of soybean oil to these four developing countries declined by 262.8 million pounds, or 64 percent of the 1980-81 level, a decline that accounted for one-seventh of the overall decline in U.S. soybean oil exports.

In addition to markets for U.S. exports, debt-ridden developing countries are also competing suppliers of soybean products on world markets. The export supply of such developing countries as Brazil and Argentina have been described in earlier chapters. For example, in the case of oilseed meal, Brazil's share of world exports increased from 30 percent in 1979 to 39 percent in 1986; at the same time, Argentina's share of this market grew from 9 to 22 percent (table 2-5). Such exports provide these countries with necessary foreign exchange, assisting in the service of their foreign debt; the debt burden in these countries has, therefore, probably served as a stimulus for further expansion of their soybean farming and processing industries.

Technological development

Two important technology issues pertain to U.S. export performance: R&D of new products and more efficient production and processing methods; and cost differences across countries in oilseed farming, processing, and transportation.

1/ Mathew Shane and David Stallings, Financial Constraints to Trade and Growth: The World Debt Crisis and Its Aftermath, USDA, Dec. 1984.

Research and development.--There have been dramatic and important advances in oilseed farming and processing brought about by R&D activities. An important example is the increase in per acre yields in the United States, South America, and elsewhere, resulting from bean varietal development, pest and disease control, and improved harvesting methods. Another example is the hexane solvent-extraction process for "crushing" soybeans, which isolates oil from meal more effectively than the previously dominant screw-press method.

How R&D affects U.S. exports centers on the relative levels of R&D funding in the United States and its competitors and the related issue of technology transfer. U.S. R&D funding comes largely from Government sources, particularly the USDA and State governments, which provided $2.2 billion in agriculture R&D (all areas, including oilseeds) in 1982. 1/ Much of this R&D focused on farm-level technology and product development. R&D at the processing level seems to be more adequately financed by private sources than at the farm level; U.S. soybean crushers devote many millions of dollars annually to oilseed-related R&D, according to trade sources and industry responses to Commission questionnaires.

The success of Government R&D in supporting and expanding U.S. agricultural production and trade depends in part on the ability and willingness of farmers to adopt new technology. This in turn depends largely on economic factors, such as farm access to financial resources and credit, and the market structure of the farm and processing sectors. As farms in the United States decline in number but increase in size (see the data in ch. 3), other factors remaining the same, farmers' ability to adopt technology may increase because access to capital may also increase. Diversification of farms into multiple crops also increases this ability, because a farm is then not completely dependent upon the success of a single crop, and introducing new technology for that crop is not as risky. Government support of R&D is essential to maintaining technological excellence, because individual farm operations, although growing (on average), are still insignificant and cannot justify significant R&D funding; moreover, the competitive environment faced by farmers ensures that any new successful technology, if economic, will be quickly disseminated throughout the industry. A part of the future success of U.S. agricultural trade, therefore, depends on continued public funding of R&D. 2/

The success of Government R&D in supporting U.S. agriculture depends also on controlling and containing technology transfer, i.e., the spread of technological expertise to other countries, particularly current and potential competitors. At least two features of U.S. agriculture make such control difficult. One is the economic aid and development assistance provided by the United States to friendly countries, particularly developing economies; this assistance typically includes advice by U.S. agriculture experts intent on implementing new technology in these countries. The other is the central role multinational enterprises play in U.S. and world agricultural processing and trade; little can be done to prevent such firms from exporting U.S.-developed technology to their operations in other countries (see the following discussion of multinational enterprises). Technology transfer has been recognized as a

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1/ Office of Technology Assessment (OTA), Technology, Public Policy,..., op. cit., table 12-1, p. 267.
2/ See OTA for a full discussion of agricultural technology and public policy.

competitive problem, 1/ but if little can be done to prevent it, then spillover effects from U.S.-financed R&D (Government or otherwise) will continue to enrich foreign competitors and lessen the relative improvement in U.S. trade performance.

Cost differentials.--An important element in overall competitiveness of a country's industry is its relative cost level, both in oilseed production and processing. Additionally, transportation costs can be important. If, given existing market prices for oilseeds and oilseed products, a country has low production or processing costs--whether by natural advantages or government support--it has a competitive advantage over higher cost rivals and will normally expand output and capture greater market shares for these products. The following discussion examines the relative cost data presented in earlier chapters for the United States and its major competitors.

Farm costs.--At the farm level, production costs vary considerably across countries, even for the same oilseed type. Table 8-6 presents a cost comparison for soybean production in selected countries (the United States, Brazil, and Argentina) in 1986. Total costs per metric ton range from a high of $267.74 in the United States to a low of $185.04 in Argentina, a difference of $82.70, or 31 percent of the U.S. cost. The two most important cost items contributing to this difference are capital replacement and land cost. Capital replacement totaled $33.07 per metric ton of output in the United States and $10.96 in Argentina, a difference of $22.11 per unit. The cost of land totaled $62.95 per metric ton of output in the United States and $22.35 in Argentina, a difference of $40.60. 2/ Although land and capital are expensive in the United States, these are partially offset by a cost advantage for U.S. farmers in marketing, a fact explained perhaps by U.S. advantages in superior transportation (e.g., rail) and other infrastructure.

Comparison of U.S. soybean production costs with costs of other oilseed types in other countries is either not possible or not practicable. The European Community (EC) is a major producer of rapeseed and other competing oilseeds; however, farm-level production costs for such nonsoybean crops are not available.

Assessing the production costs for the other major competing product, oil palm fruit (from which palm oil is produced), is highly complicated by the long time period between planting the oil palm and harvesting the oil palm fruit (which occurs continuously over many years). Some significant costs, most

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1/ Ibid.
2/ The constraint on the creation of new arable land in the United States (which is not as severe in largely undeveloped Argentina and Brazil) tends to make U.S. farmland prices more sensitive to variation in land demand and agricultural output prices. Thus, changing fortunes of U.S. farmers have dramatic effects on U.S. farmland prices. However, the caveat in ch. 3 states that changes in land cost are felt more immediately by those farmers who rent their land (or have borrowed, using it as collateral) than by those who own their land outright. If U.S. farmers are proportionately greater landowners than Argentine farmers (see the discussion in ch. 5 of chacareros and contratistas), then differences in land cost would be less important than the above data suggest.

importantly the cost of land, are incurred at the outset of operations, when undeveloped land is cleared and the trees are planted. Undeveloped land, if abundant, may have a zero value, yet its improvement gives it a positive value. The cost of improvement is expected to be recovered over a multiyear time span. This aspect of land cost may be considered land rent or, more appropriately, as a cost of production. Other costs, such as fertilizer and harvesting labor, are incurred over the useful life of the trees. To measure all such costs incurred to produce a unit of output of palm fruit is not a straightforward calculation. One must take the present value of the initial and future production costs and divide that present value by the total quantity of output produced over the useful lives of the trees. The resulting value is the total cost per unit of output. It is clearly not easily compared with the average cost of a bushel of soybeans, which are planted, grown, and harvested within one year. 1/

Processing costs.--In 1986, U.S. soybean mills had lower crushing costs than mills in the EC, but higher costs than those in South America (table 8-7). Crushing costs of U.S. mills totaled $19.50 per metric ton of soybeans crushed in 1986, about 9 percent below EC crushing costs of $21.42 per metric ton, and 38 percent greater than South American crushing costs of $14.22 per metric ton. The relative cost performance of U.S. crushers in 1986 was an improvement over 1985, caused in part by the depreciation of the U.S. dollar. In 1985, the crushing costs incurred by U.S. crushers totaled $20.60 per metric ton, about 44 percent greater than EC costs of $14.21 per metric ton, and nearly 75 percent greater than South American crushing costs of $11.82 per metric ton.

The relative cost of soybeans to crushers is also higher in the United States than in South America. 2/ In 1986, U.S. crushers paid an average of $210.90 per metric ton for soybeans, about 36 percent more than the cost to South American crushers of $154.59 per metric ton. This difference was greater in 1985, when the U.S. cost of $236.60 per metric ton exceeded the South American cost of $131.68 per metric ton by 80 percent.

Offsetting high crushing and soybean costs for U.S. crushers are low expenses incurred in sales, financing, and overhead. The combined cost of general, selling and administrative expenses plus financial expenses and corporate overhead totaled $4.00 per metric ton of soybeans processed in the United States, compared with $7.56 per metric ton in the EC and $17.57 per metric ton in South America. Such cost differentials reflect a variety of cost advantages for U.S. crushers, including transportation and capital, among others.

1/ Nor is such comparison appropriate, since soybeans are processed into two outputs, meal and oil, in fixed proportions, whereas palm fruit has one important output, palm oil.

2/ The cost of soybeans to EC crushers reported in table 8-7 does not reflect the EC CAP payment designed to offset high farm prices of soybeans, and is therefore not directly comparable with those data for U.S. and South American crushers.

Transportation costs.--The United States has an advantage over its major soybean rivals, Argentina and Brazil, in the cost of shipping soybeans to major markets in Europe and Japan, as shown in the following tabulation (in U.S. dollars per metric ton): 1/

Country	F.o.b. cost	Freight rates to		Landed cost at	
		Rotterdam	Japan	Rotterdam	Japan
Argentina	185.04	18.50	32.39	203.54	217.43
Brazil	241.91	16.50	34.20	258.41	276.11
United States	267.74	12.62	26.00	280.36	293.74

Part of the U.S. advantage in transportation cost can be explained by the shorter ocean distances between these importing areas and U.S. ports and by depressed barge rates on the Mississippi River. 2/ The advantage can also be explained by the higher transportation costs that Argentina and Brazil incur in getting soybeans from the farm gate to the port. These higher gate-to-port costs result mainly from the lack of a low-cost inland transportation system. For example, most soybeans in Brazil move to port by truck because there are few navigable rivers or efficient railroad systems. In contrast, U.S. soybeans can be shipped from any major producing State to port by truck, barge, or train. The transportation cost advantage enjoyed by the United States over its South American competitors is so great that, according to one study, it would be maintained even if barge and ocean rates doubled. 3/

However, although the United States maintains a transportation cost advantage over Argentina, the previous tabulation indicates that the f.o.b. cost of soybeans in the United States is higher. This is because the fixed costs of soybean production are higher in the United States than in Argentina or Brazil. 4/ Thus, the U.S. transportation cost advantage is more than offset by its fixed cost disadvantage.

Government involvement in agriculture

At the root of many of the structural market changes and the rise and decline of the United States in world oilseed product trade are government agricultural policies. Both in the United States and abroad, agriculture programs are pervasive: they have heightened production and exports in some countries and suppressed it in others; they have promoted consumption in some areas and stifled it in others. World production, consumption, and trade have been adjusting to this complex array of props and fetters, which in recent years have dramatically (and probably irreversibly) altered trade flows and eroded U.S. dominance in world trade.

1/ Gerald F. Ortman, Walter J. Stulp, and Norman Rask, "Comparative Costs in Agricultural Commodities Among Major Exporting Countries," Department of Agricultural Economics and Rural Sociology, The Ohio State University, Jan. 1987.
2/ Tenpao Lee, C. Phillip Baumel, and Robert W. Acton, "The Impacts of Transportation Rates on World Soybean Trade Competition," in World Soybean Research Conference III, R. Shibbles (ed.), 1985.
3/ Ibid.
4/ Gerald F. Ortman, Walter J. Stulp, and Norman Rask, op. cit.

In many countries, including the United States, the farm sector suffers from the following three basic problems: price instability, seemingly chronic overproduction, and low labor productivity in small-scale operations. In response, Governments in many countries, for both the economic and additional political reasons, have intervened with price and output controls, income-support systems, and funding for technology R&D. Since it became commercially important in the 1950's and 1960's, the oilseed farm sector has suffered from the usual problems of crop uncertainty and price volatility, among others. Compared with older, more entrenched agriculture sectors such as grain or dairy, the oilseed sector has traditionally been subjected to only moderate Government intervention, such as indirect price support in the United States. But as the sector has grown worldwide, the effects of Government intervention have grown as well.

U.S. Government agriculture policies.--The most important U.S. Government intervention comes from USDA loan programs for soybeans, corn, and related crops, designed to provide farmers with inexpensive, short-term working capital until the sale of their crop. An important additional purpose is to provide a floor under crop prices that can be adjusted by changing the per unit loan rate. By reducing or eliminating the downside risk of price fluctuations, these programs raise the expected returns from soybean farming and encourage higher soybean output than might otherwise occur. Especially during the 1970's, food demand grew fast enough to keep the markets for oilseed meal and oil strong, and price supports were little more than insurance against occasional price declines. Such insurance contributed nevertheless to growth in the U.S. oilseed farm sector. As long as markets for meal and oil were strong--as they were through the 1970's--soybean crushers and exporters were able to sustain soybean prices above support levels.

In recent years, however, markets have softened and high prices have been difficult to maintain. A major reason is the price support effects of the USDA loan program, which have raised the dollar price of U.S. soybean exports and increased the cost of raw material for U.S. soybean crushers and oil and meal exporters. When the United States assumed the role of international oilseed price leader through its dominance of world trade, it was allowed (or forced) to influence foreign oilseed prices in order to stabilize and support domestic prices; as a result, high prices in U.S. oilseed markets have generally meant high prices abroad. Strong markets kept oilseed prices high and stimulated increased U.S. output; however, an equally important result of high prices was increased foreign oilseed production in South America, the EC, Malaysia, and elsewhere. As the world supply increased in the early and mid-1980's, export markets began to weaken and prices fell, eventually to the point where the U.S. soybean price backed down against the USDA support level. The U.S. Government has in recent years absorbed soybean supplies from the market to prevent further price erosion, but with such prices artificially propped up, foreign output has continued to rise and displace U.S. exports. 1/ Increased foreign supply has put further downward pressure on prices, forcing additional U.S. withdrawal from the market to support prices. The effects of USDA price supports--diminished U.S. oilseed exports and market share and increased foreign production and market share--are what elementary economic theory would predict. 2/

The support of farm-level soybean prices also affects U.S. output and exports of meal and oil. Crushers that must pay those artificially high prices sell their meal and oil on unsupported markets at prices that can fall freely. The crushers' margins--small (10 percent or less) to begin with--are doubly squeezed when faced with both artificially high input costs and declining output prices. Thus, at the same time that soybean price supports encourage farmers to supply more than a free market price warrants, diminished margins caused by declining prices for meal and oil reduce crushers' demand for soybeans (which further increases USDA acquisitions).

Another set of U.S. Government actions directed at oilseed and grain trade is the series of temporary embargoes on U.S. exports that the United States imposed during various periods between 1973 and 1981. The Commission earlier investigated the effects of these actions, particularly the 1980-81 embargo on

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1/ An indication of the effort required in recent years to prop up prices by withdrawing supplies is the rapid growth in stocks of soybeans held in the United States. The following series of USDA data on U.S. Government and privately held stocks shows this rapid growth (data in million metric tons):

Crop year	Ending stocks
1977/78	4.4
1978/79	4.8
1979/80	9.8
1980/81	8.5
1981/82	6.9
1982/83	9.4
1983/84	4.8
1984/85	8.6
1985/86	14.6
1986/87	17.3

2/ On a less elementary level, oligopoly analysts would label the United States the residual supplier of oilseeds to world markets. The United States, through the USDA, sets the minimum soybean price, and other countries take this price into account when adjusting production and exports of soybeans and competing oilseeds. At this price, world demand, minus the aggregate output of non-U.S. suppliers, determines the demand faced by U.S. suppliers. If the USDA (and world) price is set above average production costs incurred by foreign producers, foreign output increases and residual demand (that faced by U.S. suppliers) decreases. To maintain prices at the desired level, the United States must increase or decrease export supply as appropriate. The greater the level of foreign output compared with world demand, the greater the adjustment in U.S. supply required to stabilize prices.

U.S. sales to the Soviet Union, on U.S. agricultural trade through the 1982/83 crop year. 1/ Regarding the oilseed sector, the Commission arrived at the following conclusions:

- After rising rapidly in the years preceding the 1980 embargo, U.S. exports of soybeans and soybean meal and oil dropped sharply in the 1980/81 crop year and then recovered almost all of the decline in 1981/82 and 1982/83. (table 15 of the 1983 report)

- As a share of world exports, U.S. exports increased to 55 percent before the embargo, but then dropped to 45 percent in 1980/81. In the following two years, this share rose to 50-51 percent. (ibid.)

- In the years during and following the 1980 embargo, major competing producers (Brazil, Argentina, and the EC) increased their soybean and soybean product output and their shares of world production and exports. (page 28 and table 19) At the same time, major consuming nations have diversified their sources of supply, reducing further the U.S. share of world trade. (pp. 28-29)

- In the opinion of U.S. industry members, the 1980 embargo and previous trade restrictions have given the United States a reputation as an unreliable world supplier of oilseeds and other agricultural products, inducing both the above diversification by consumers and the increase in foreign output. (pp. 33-34)

Although no major trade restrictions have been imposed since 1981, it seems likely that the effects of the 1980/81 embargo have lingered on because the stimulus to foreign production and exports given by the embargo, in combination with the price floor effects of the USDA loan program, helped in some degree to set the stage for the continued expansion of production and trade observed in recent years in South America and elsewhere.

Foreign government agriculture policies.--Policies of foreign governments influence U.S. trade through their effects on foreign production, consumption, and trade. Two important examples are the EC Common Agricultural Policy (CAP) and the Argentine differential export tax system, both of which have received official or unofficial U.S. Government attention for their possible negative effects on U.S. trade.

Unlike the United States and other major world producers, the EC is a net importer of oilseeds, meal, and oil, as well as a significant producer of all three products. In addition, the EC exports increasing quantities of these products. However, the CAP has boosted domestic farming and processing of oilseeds, which has simultaneously reduced EC demand for imports (including exports from the United States) and, through increased EC exports, also reduced non-EC demand for U.S. exports.

1/ See U.S. International Trade Commission, U.S. Embargoes on Agricultural Exports: Implications for the U.S. Agricultural Industry and U.S. Exports, Investigation No. 332-157 (USITC Pub. 1461, Dec. 1983).

The most serious aspect of the CAP in the context of this investigation is the oilseed price-support provision. Because EC tariffs on oilseed, meal, and oil imports are bound (although except for soybeans themselves, at considerably higher levels than U.S. tariffs) under the General Agreement on Tariffs and Trade (GATT), EC trade restrictions take a nontariff form. In particular, EC oilseed processors are given financial assistance that allows them to purchase domestic oilseeds at high EC target prices and yet sell the resulting meal and oil at market prices. No such assistance is given for the use of imported oilseeds; as a result, processors can pay inflated EC oilseed prices and yet still prefer them over lower-priced imported supplies. Imports of oilseeds enter the EC only when domestic supplies are seasonally short, or if EC processing capacity expands faster than the EC oilseed harvest. Propelled by high profit margins (see ch. 4 as well as Archer Daniels Midland Co. (ADM) Chairman Andreas' reference to making "good money" from EC processing in ch. 3), the processing sector has expanded rapidly in recent years, slowing down or reversing the previous rising demand for imports, particularly from the United States. As a result, U.S. exports to the EC have generally declined in recent years, as shown in the following tabulation (in 1,000 metric tons): 1/

	U.S. exports to:		Ratio of
	EC-12	World	EC to World
1979-80	23,026	44,005	52
1981-82	27,845	48,611	57
1983-84	20,521	42,977	48
1985-86	17,122	38,026	45

The future impact of the oilseeds provision of the CAP depends on its cost to EC members, the ability of the farm sector to expand, and the demand for EC oilseed products, among other factors. The cost to EC members of the oilseeds price support is high and rising, having increased by 150 percent between 1984 and 1986. 2/ This cost has become a controversial issue, and has given rise to a proposed EC tax on fats and oils consumption to help finance oilseed price supports. Such a tax, if passed, will probably reduce U.S. exports even more, because it will raise EC consumer costs of foods containing fats and oils--curtailing consumption at the same time that production is increasing--and thereby provide additional supplies of oilseed products for export.

Even if financing shortages force a cutback, or at least a ceiling on EC assistance to oilseed processors and farmers, the farming and processing facilities and the supporting infrastructure are in place and will most likely continue to produce into the future. Even at reduced levels, such production would exceed historical (i.e., pre-1980's) levels, continuing to depress EC demand for U.S. exports of oilseeds, meal, and oil. Like financial support to other fixed investments, past CAP support of production (and trade) will continue to affect markets in the future, regardless of future levels of CAP support. Thus, the effects of the CAP on U.S. trade will probably also continue into the future.

1/ Compiled from official statistics of the United Nations.
2/ National Soybean Processors Association, written testimony submitted in this investigation, Apr. 28, 1987, p. 18.

The Argentine differential export tax system is another case of foreign government policies affecting U.S. trade. This system places high taxes on exports of soybeans and low taxes on exports of meal and oil, with the effect of increasing domestic supplies for internal processing and export as meal and oil. The purpose of the system is to promote the export of meal and oil and retain processing value added within Argentina. U.S. industry members allege that this tax system constitutes an unfair trade practice by artificially increasing Argentine exports of meal and oil. Their argument, briefly stated, is based on several alleged effects of the tax system on Argentine production and trade. 1/

First, domestic pricing is distorted, since domestic soybean supplies withheld from export are kept high and prices are kept low by the high soybean export tax. This reduces costs for processors, allowing them to undercut world prices of soybean meal and oil. Indeed, the U.S. industry claims that the combined value of the exported meal and oil processed from a unit of soybeans is less than the export value of the unit of soybeans itself. This in turn depresses the prices received by U.S. exporters of meal and oil. Second, the volume of Argentine meal and oil exports is increased by the tax system, because domestic production is increased. As a result, Argentine exports of meal and oil displace competing U.S. exports in major and emerging export markets. Moreover, U.S. industry interests assert that the primary intent of the tax system, to retain value added, as well as the secondary objective of accumulating foreign-exchange earnings, are subverted when meal and oil export prices fall below the export market value of the underlying soybeans. Even though Argentine soybean exports are reduced by the higher tax on oilseed exports, this reduced export supply does not increase world soybean prices; rather, world soybean prices are suppressed by the squeeze on U.S. and other non-Argentine crushers' margins caused by the low meal and oil prices.

Multinationalization

An important and enduring structural factor that influences U.S. export performance is the role played by multinational enterprises (MNE's) in U.S. trade in oilseeds and oilseed products. Most such trade is carried out by (usually U.S.-based) MNE's. They are important to U.S. competitiveness not simply because their trade represents the bulk of U.S. exports; they also carry out oilseed processing and trading operations abroad, including transactions between third-party nations that indirectly affect U.S. trade. MNE's endure as an important element of the U.S. industry's structure; however, it is not a stable element, as the past rise and fall of industry giants such as Cook Industries and A.E. Staley Manufacturing attest. Thus, despite the appearance of oligopoly, U.S. and foreign trade in oilseeds and oilseed products can be highly competitive.

Why are MNE's so prominent in oilseed product trade? The main reasons probably are: (1) economies of size in an array of activities, including purchasing, transportation, R&D, information gathering, and risk handling; and (2) diversification by both product line and geographic market area. For

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1/ See National Soybean Processors Association, Petition Seeking Relief..., op. cit.

example, access to information about prices in important export markets for particular products is essential for efficient marketing, but small or exclusively domestic firms typically have less complete information about export opportunities than large multinational firms. Similarly, the risk of fluctuating prices and costs is more easily borne by large, diversified firms than small, single-line firms. A second question--why many MNE's are headquartered in the United States--is easily answered by the dominance in export trade by the U.S. industry compared with its foreign rivals.

MNE's probably have both positive and negative effects on U.S. trade. On the positive side, MNE's can be more efficient marketers of U.S. exports than purely domestic firms, in access to foreign-market information, management of transportation networks, and the bearing of risk, and thus can more effectively market U.S. exports. With sales offices and, frequently, processing facilities abroad, MNE's have access to market information that may even surpass that of the USDA, one of the most common sources of foreign-market information for domestic firms. 1/

Efficient transportation networks, both internally but particularly in ocean transport and foreign port access, are a vital part of export marketing. The control over such networks by firms like ADM and Cargill in the form of ownership of port facilities, railcars, and vessels, helps these firms market U.S. exports more efficiently. In contrast, domestic firms that must rely on outside transportation networks are not capable of such marketing efficiency. Likewise, the risk of lost profits from adverse price swings or lost sales in a single product or geographic market is more easily borne by diversified and geographically dispersed firms like the major oilseed crushers than small, single-line firms selling in one market or to a few major buyers. In addition, the diversification of MNE's into other agricultural commodities and other products enables them to cross-subsidize individual operations and, perhaps, creates a tendency to take on riskier projects than otherwise, such as entering new market areas or introducing new products.

The presence of MNE's also aids smaller U.S. oilseed producers and crushers in exporting their oilseeds and oilseed products. As described in ch. 3, smaller crushers in the United States tend to market a significant share of their exports indirectly through larger crushers (i.e., through MNE's) rather than exporting directly. The benefits to a small firm of indirectly exporting through a MNE can include a higher price and/or reduced costs, and less risk than that involved in export marketing. In addition, a small firm may export indirectly because it has no foreign sales offices and lacks expertise in foreign markets. A small domestic firm has also not developed a reputation abroad as a reliable supplier. These are important factors in the export marketing of oilseeds and oilseed products, and in these respects MNE's have advantages over purely domestic firms, enabling the MNE's to more efficiently export U.S. oilseed products. Thus, through multinationalization, large U.S. oilseed crushers--and, indirectly, their smaller rivals--can more effectively market U.S. exports.

1/ U.S. industry sources interviewed by Commission staff contend that USDA information of foreign markets is in some cases obtained from foreign offices of U.S.-based firms.

On the negative side, MNE's may (1) accelerate the international transfer of U.S. technology, (2) provide their foreign subsidiaries easier access to capital, and (3) cause increased variability in U.S. exports in response to changing U.S. or foreign market conditions. U.S. technology in oilseed farming and processing is at least as good as, and in some cases superior to, that found in competing countries. However, the U.S. technology developed by the crushers themselves, by their suppliers of equipment or other inputs, and by Government sources such as the USDA, can be easily transferred by MNE's to subsidiaries in other countries, enabling foreign industries to compete better with U.S. oilseed producers, crushers, and exporters. In some cases, technology transfer by MNE's may even allow new technology to be introduced abroad before it is put in place in the United States. 1/

Foreign subsidiaries of MNE's have superior access to capital compared with their independent rivals because of the parent firm's large size (enabling cross-subsidization or the parent's guarantee of loans from private lenders to the subsidiary) and MNE access to international money markets. This is a particular advantage in countries with currency controls, high inflation, or other monetary disturbance, which can make capital extraordinarily expensive, as is the case in South America, according to industry sources interviewed there by Commission staff. There, independent firms are held back from expanding because of the high capital cost. MNE subsidiaries, which are less constrained because of parent-firm support, increase the competitiveness of (the subsidiaries' share of) the local industry.

A third negative aspect of U.S. oilseed multinationalization, the possible effect on the level and variability of U.S. exports, is much less obvious, because it depends on the competitive strategy of MNE's in their marketing of oilseeds and oilseed products. The reliance of U.S. firms on the export market forces them to develop some form of international strategy, whether it is a global, full-product-line strategy, a narrow focus on one product in one export market, or something in between. Most of the MNE's exporting U.S. oilseeds and oilseed products appear to have developed a broad product-line, global strategy insofar as they process and trade in a wide variety of agricultural product and commodities and maintain offices in many countries. This way a MNE can more flexibly meet customers' demands, drawing upon a variety of sources of supply, whether such supply is, for example, Brazilian, Canadian, or U.S.-produced.

The implication for U.S. exports from such MNE flexibility is that there is a corporate strategy-related influence on U.S. export levels, in addition to the usual influences--relative labor costs, land quality and availability, etc. U.S. exports may decline, for example, as part of a strategy of a few MNE's to diversify sources of supply to customers in an important market, for example, to take advantage of swings in seasonal prices, transportation costs, or supply

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1/ OTA, A Review of U.S. Competitiveness in Agricultural Trade, op. cit., p. 5. MNE's are not alone as forces behind technology transfer. Government-sponsored agricultural technology may be transferred abroad by the U.S. Government, perhaps as part of a foreign aid program, with the same implications for U.S. competitiveness as MNE technology transfer.

availability. However, the influence on U.S. exports imparted by MNE's is highly uncertain, because of the paucity of information on the corporate strategies of closely held, private oilseed crushers and traders.

An issue related to MNE's is the role played by foreign government trading agencies, although in the oilseed trade they are less important than in other agricultural trade, such as wheat. At least two instances do exist, however. One is the grain trading agency of the Soviet Union, Exportkhleb. This agency was involved in, for example, the U.S.-Soviet soybean and grain deals of the 1970's. The other is the EC Commission, which, by setting trade restrictions and internal market measures such as target prices, serves to unify the EC members' industries, adding an element of monopsony (single-buyer) to EC trade with the rest of the world. EC tariffs, for example, provide EC members with a unifying price-support mechanism by restricting non-EC supplies. As before, there are both positive and negative implications for U.S. exports from foreign government trading agencies, especially when such agencies deal with MNE's. On the positive side, MNE's can promote U.S. exports, despite EC trade barriers, by countering the monopsony power of the EC with oligopoly power of U.S. exporters. However, MNE's selling to EC customers may also deal with EC trade barriers by setting up processing facilities within the EC, thus replacing their shipments of U.S.-produced oilseed meal and oil with their internal production within the EC. Both effects on U.S. trade are probably present: U.S.-based MNE's are large relative to the EC import market, and may have some influence (e.g., through lobbying) over the implementation of EC trade policies; however, most major MNE's (whether U.S.-based or with subsidiaries in the United States) also operate EC-based oilseed mills and vegetable oil refineries in EC countries, and, as described in earlier chapters, their expansion into EC oilseed crushing seems to be increasing.

U.S. Adjustment Efforts

Strategic responses to foreign competition

The Commission requested that U.S. soybean crushers provide information on their planned strategies in response to foreign competition, by identifying from a set of possible responses the strategies relevant to the firm. The crushers' responses are presented in aggregate form in table 8-8.

Each selected strategy falls into one of four categories, depending on whether or not it relates to price/finance, product type, output level, or other strategy. The most common price-related strategy (chosen by five of the eight respondents) is to concentrate on maintaining price competitiveness and match competitors' price terms. Other selected strategies (each chosen by one respondent) include improving financing and reducing raw material cost.

Several product-related strategies included improvement of product quality (chosen by four firms), concentration on market niches where the firm has a competitive advantage (four firms), the improvement or expansion of product service or support (three firms), and concentration on market niches where competition is less intense than others (three firms).

The most common output-related competitive strategy is the shift of production to higher-valued products (five firms). Other common strategies include reduced output to cut losses and inventories (four firms); diversification of product mix to strengthen market position (four firms); and the elimination of unprofitable divisions or operations (four firms).

The strategy most commonly selected by the firms is the modernization of present plant and equipment (seven firms). In addition, six firms intend to invest in new plant and equipment in order to cut costs and boost productivity. In view of the output-related strategies outlined in the previous paragraph, it appears that many firms plan to discard obsolete plant and equipment and replace them with newer, more efficient assets geared toward the production of higher-valued products. In addition, four firms plan to develop joint ventures or mergers with U.S. firms in their domestic operations (and perhaps in the process discard obsolete assets). Only one firm disclosed an intent to develop a foreign joint venture, one firm plans to invest in foreign production facilities to improve its cost position, and one firm plans to invest in foreign production facilities to improve market access.

Cost reduction and capital expenditures

The Commission requested from U.S. soybean crushers additional general information about their current strategies to reduce costs in response to foreign competition. A total of eight firms provided complete responses; the number of respondents that selected each strategy is presented in the following tabulation:

Area of Cost reduction	Short term	Long term
Labor-related	7	7
Raw/intermediate materials	2	2
Production and transportation	7	8
Capital	3	4
Overhead	5	6

The two most important areas for cost reduction, as indicated by the proportion of firms selecting them, are production (crushing) and transportation and labor-related costs (wages and fringe benefits). Included within production costs are energy costs, which along with the cost of raw material (soybeans) are among the largest expense items incurred by crushers. Somewhat surprising is the low response rate for raw and intermediate costs; in view of the sizeable proportion of total costs (90 percent or more) that are accounted for by raw material costs, this would seem a likely area for attention to cost reduction.

The Commission also requested recent and projected capital expenditures for a broad range of capital items, including soybean preparation and processing equipment, meal/oil handling and storage facilities, steam generation, and oil refining, deodorizing, and hydrogenation equipment. Seven firms provided responses for the full period 1982-89; these data are presented here in aggregated form over all capital items to avoid disclosing proprietary data for selected items. The respondents' actual and projected capital expenditures are presented in the following tabulation (in thousands of dollars):

Item	Value
Actual:	
1982..........	50.0
1983..........	40.2
1984..........	50.4
1985..........	47.0
1986..........	36.5
Average.....	44.8
Projected:	
1987..........	28.0
1988..........	72.7
1989..........	44.6
Average.....	48.4

The average annual capital expenditure level during 1982-86 was $44.8 million, although during this period the level ranged from a high of $50.4 million in 1984 to a low of $36.5 million in 1986. Capital expenditures are projected to increase by 8 percent on average, to $48.4 million during 1987-89, although the range over this 3-year period is even greater than during the preceding 5 years, from a low of $28.0 million during 1987 to a high of $72.7 million during 1988. Two qualifications about this data series should be noted. First, the data are in nominal, current-dollar terms; accounting for inflation during 1982-89 would reduce the real rate of growth. Second, a few firms were unable to make complete projections for certain capital investments through 1989. As a result, the above projections are likely to underestimate actual expenditures that will occur in those years. The effects of these two problems somewhat offset each other--the first overestimates the growth rate of capital expenditures and the second underestimates this growth rate.

Industry Views on U.S. Competitiveness

Questionnaire respondents

The Commission's questionnaire asked nine of the largest U.S. soybean processors their views on U.S. competitiveness. This request covered two areas, an assessment of the U.S. industry relative to its major foreign competitors, and the effects of U.S. and foreign Government policies on the competitiveness of the respondent vis-a-vis other domestic and foreign suppliers. The responses of the firms are presented here in aggregated form.

Competitive assessment of foreign rivals.--Industry members were requested to provide their views on the relative competitive strengths of five competitors (Brazil, Argentina, Malaysia, Spain, and the EC-11 (except Spain)) with respect to 20 competitive factors (raw material cost, labor productivity, R&D, etc.). Since some firms did not comment on Spain, the responses for Spain from the others are excluded. Table 8-9 presents the aggregated rankings by the firms. For raw material cost, for example, the competitive advantage is given by most firms to foreign competitors, particularly Brazil, Argentina, and Malaysia; most firms indicated a competitive disadvantage for the EC in this respect. Similar results were obtained for raw material availability and energy cost. The U.S. industry is considered overwhelmingly disadvantaged in the areas of Government trade protection and subsidization. The competitive edge was generally given to the U.S. industry for infrastructure, capital cost and availability, and labor skills and productivity.

Effects of U.S. and foreign government policies.--Respondents were asked to comment on the effects on U.S. competitiveness of U.S. and foreign government policies. Regarding U.S. policies, all but one respondent cited the USDA loan support program for soybean farmers as a cause of high U.S. prices and/or increased foreign prices and production of oilseeds. One firm placed blame on U.S. fiscal policies for high interest rates and the high U.S. dollar, which raised U.S. costs and U.S. prices in foreign markets. Another respondent listed the failure of the U.S. Government to take action against unfair trade practices as an important cause of declining U.S. competitiveness in major foreign markets.

The industry and trade policies of the EC, Brazil, Argentina, and Malaysia were each cited by all but one respondent as harmful influences on U.S. trade and competitiveness. Particularly, the EC CAP, industry development assistance and differential tax systems in Brazil, Argentina, and Malaysia, and export assistance in Malaysia are viewed as causes of increases in domestic production and exports in those countries and of declines in U.S. production, exports, and prices of all major soybean products. Some firms also view the EC support of the dairy product industry as a competitive problem for the U.S. industry. One firm also cited a Spanish Government quota on consumption of soybean oil as a contributing factor in declining U.S. demand for U.S. exports of soybean products.

Industry testimony

Two U.S. industry organizations, the National Soybean Processors Association (NSPA) and the American Soybean Association (ASA), submitted their views on U.S. industry competitiveness to the Commission or its staff in response to a request for viewpoints of interested parties. 1/ The submissions by these two organizations are summarized below.

National Soybean Processors Association.--In written and oral testimony before the Commission, representatives of the NSPA presented data and opinions concerning U.S. shares of world markets, relative cost levels, government policies, and their policy recommendations. 2/ In regard to market share, the "high water mark" for the U.S. industry was the 1979/80 crop year, when the industry held shares of 66 percent and 85 percent, respectively, of world soybean production and net exports, 43 percent and 53 percent of world soybean meal production and net exports, and 42 and 46 percent of world soybean oil production and net exports. All of these market shares declined between

1/ See the Federal Register notice of the institution of this investigation, contained herein as App. C.
2/ See the hearing transcript and "Written Testimony of the National Soybean Processors Association Before the United States International Trade Commission," investigation No. 332-240, Apr. 28, 1987.

1979/80 and 1985/86. In all cases, this decline was the combined result of decreased absolute quantity of U.S. production and exports and increased absolute quantity of foreign production and exports. The principal competitors in terms of increased market shares include Malaysia, Argentina, the EC, Brazil, China, Indonesia, and India. In these countries, domestic production has increased, which has increased their exports or reduced their imports, both of which take away important markets for U.S. exports.

Important production costs include transportation, storage, processing, financing, and the cost of producing the oilseeds themselves. The U.S. truck, rail, and barge system is among the world's cheapest and most efficient. Similarly, U.S. storage systems are modern and efficient, providing a competitive advantage for the U.S. industry in this area as well. Soybean processing plants, although in many cases quite old, have been maintained and modernized to keep costs at a minimum. Those competitors that enjoy costs lower than those in the United States include Brazil and Argentina, where labor and fuel costs are lower than in the United States. Commercial rates for financing in the United States are higher than in the EC, but lower than in South America. However, multinationals operating in South America are less disadvantaged by high finance costs than domestic firms because of their access to international money markets.

An important cost item is, naturally, oilseed production costs. A USDA study cited by the NSPA found that average soybean production costs in the United States exceed those in the two major foreign soybean producers, Argentina and Brazil, by 14 percent and 7 percent, respectively. 1/ However, in the United States there is great variability in production cost by region. The Northern Plains/Corn Belt/Lakes States region has costs significantly below those in either Argentina or Brazil, and the Mississippi Delta/Southeast region has costs significantly above foreign levels.

Soybean production costs compare favorably with costs of other oilseed types. U.S. soybean costs are well below those of EC rapeseed and sunflowerseed. However, the net cost of those oilseeds to processors falls below their production costs as a result of the CAP "subsidy" paid by the EC to local crushers, enabling those crushers to pay high prices to EC oilseed producers.

In regard to meal and oil, "there is general agreement" that soybean meal costs are below those of other oilseed meals, largely because of the relatively high meal content of soybeans. 2/ However, in NSPA's view, the corresponding relatively low oil content of soybeans makes soybean oil less cost effective than other oils, particularly Malaysian palm oil.

Concerning Government programs, the NSPA characterizes the USDA loan support program as "a major cause of U.S. non-competitiveness." 3/ Four reasons are given by the NSPA: 4/

1/ "The U.S. Competitive Position in World Commodity Trade," Agricultural Food Policy Review: Commodity Program Perspective, Economic Research Service, USDA, Economic Report No. 530, 1985, cited in "Written Testimony," op. cit., p. 8.
2/ "Written Testimony," op. cit., p. 10.
3/ Ibid., p. 13.
4/ Ibid.

1. Soybean prices in Argentina and Brazil are abnormally high relative to grain prices, and provide a strong incentive to increase South American soybean production.

2. Soybean prices are abnormally high relative to feed grains and wheat (except in the EC), thereby inhibiting world demand.

3. Soybean oil prices are too high relative to palm oil and rapeseed oil, thereby inhibiting world demand.

4. The price of U.S. soybean oil is much too high relative to soybean oil from Argentina, Brazil, and the EC, thereby locking the United States out of most soybean oil markets.

Although the U.S. Government has the authority to provide export assistance to the industry, it is the view of the NSPA that such authority has not been adequately exercised in many cases. Public Law 480 (P.L. 480) programs have been useful in promoting oil exports. However, the Commodity Credit Corporation's (CCC) GSM-102 credit guarantees have not been fully utilized, inhibiting the export of oil. Likewise the Export Enhancement Program has been used only once, yet "offers considerable potential to the industry," which has submitted several proposals for assistance.

Many foreign-trade practices viewed as unfair by the NSPA have caused it to file two section 301 petitions with the United States Trade Representative, first in 1983 and again in 1986. These petitions allege that six countries--Brazil, Malaysia, Argentina, Spain, Portugal, and Canada--undertake trade practices that together conferred a subsidy totaling $630 million in 1983 to foreign competitors of the U.S. industry. These trade practices include (but are not limited to) differential or preferential export tax systems, tax exemptions and rebates, inventory financing, and a domestic consumption quota. The NSPA asserts that "(i)n most cases, the magnitude of the injury [to the U.S. industry] is closely correlated with the magnitude of the subsidy." 1/ The 1986 action is pending, and "the U.S. industry still awaits concrete evidence that the Section 301 process can achieve meaningful relief." 2/

An additional concern of the NSPA is the adverse impact of the debt incurred by LDC's on U.S. trade in oilseed products. As stated in its testimony, "(t)he current high levels of LDC debt adversely affect our industry in two ways. The first is to inhibit the purchasing power of LDC's which import soybeans and soybean products. Mexico, Venezuela, Poland, Peru, and the Philippines fall into this category. Their problem can often be solved via the judicious use of P.L. 480 food aid and GSM credit guarantees. The second, more complicated effect is to increase the production and exports of LDC's which export soybeans and soybean products. Argentina and Brazil fall into this category. The solution to this problem is more difficult. [The support provided to these countries by the World Bank, the IMF, the U.S. Treasury and State Departments, and others] encourage policies which will increase [Argentine and Brazilian] production and exports of soybeans and

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1/ Ibid., p. 17.
2/ Ibid.

soybean products ... To the extent that such policies are successful, they injure [U.S. soybean producers and crushers.] The result is a major policy conflict, [yet] from our perspective it is painfully obvious that financial policymakers in the U.S. government, the World Bank, and the IMF have consistently favored money-center banks over U.S. agriculture, thereby creating major problems for our industry." 1/

Finally, as policy recommendations intended to regain industry competitiveness and recapture U.S. shares of world markets, the NSPA offers the following:

1. Allow U.S. prices for soybeans and soybean products to seek market clearing levels by decoupling soybean price support from soybean farm income support through mandatory marketing loans, reduced cash loans combined with CCC certificates, or other nonprice-support assistance.

2. Aggressively pursue foreign unfair trade practices via section 301, bilateral negotiations, the GATT, or the Uruguay Round of the MTN.

3. Fully utilize all available export assistance programs for oilseeds and oilseed products.

American Soybean Association.--A "white paper" was submitted by the ASA to Commission staff as an outline of its views on U.S. competitiveness in world trade in soybeans and soybean products. 2/ The paper focused on the effects of the policies of the U.S. Government on the U.S. industry and foreign producers. Like the NSPA, the ASA views U.S. Government policy toward soybean producers as detrimental to U.S. trade performance. In particular, Government policy, particularly the loan support program, is "perverse," and "spells decline for America's soybean industry." 3/ By maintaining world soybean prices at high levels, the U.S. Government provides foreign competitors "an irresistible incentive" to increase soybean output; this increased world supply puts downward pressure on prices and forces the USDA to increase its stockpiles of soybeans in order to keep market supply from outpacing demand.

The solution, in the view of the ASA, is a change in U.S. Government policy. Most importantly, the price-support effects of USDA farm support must be eliminated "to curb future expansion in South American output. This should be accomplished without weakening the income-support effects of the policy; however, the ASA states, "the U.S. soybean farmer's income protection under the loan program is already eroding ... at an accelerating rate, since opportunities to grow and sell soybeans profitably are being transferred to South American growers." 4/

1/ Ibid., p. 19-20.
2/ "Reforming U.S. Soybean Policy," submitted to Commission staff by the ASA on Apr. 13, 1987; on file with the Commission's oilseed industry analyst.
3/ Ibid., p. 1.
4/ Ibid., p. 4.

Prospects for the Future

The information collected in this investigation indicates that the structure of international markets for oilseeds and oilseed products has changed in the last decade, and, as a result, the historically dominant role played by the U.S. industry in these markets is shrinking. The structural transformation of these markets is manifested primarily in rising production and exports of oilseeds and oilseed products in selected foreign regions, notably South America, Southeast Asia, and Europe. Coupled with slowed growth in global demand for these products, this increased supply has depressed prices in important foreign markets, which in turn has put downward pressure on the prices received by the export-oriented U.S. industry.

Declining prices for U.S. exports of oilseeds and oilseed products are proving incompatible with U.S. Government-supported farm-level prices for oilseeds, particularly soybeans. U.S. oilseed processors and exporters are facing a price-cost squeeze that has been aggravated by continued USDA support of domestic oilseed prices. Thus U.S. producers, as well as U.S. Government policymakers, are faced with the task of simultaneously stemming the continued erosion of U.S. market shares in world markets for oilseeds and oilseed products while still providing adequate returns to U.S. oilseed farmers and processors.

The changes in international market structure are probably irreversible. Foreign producers and processors (particularly in South America and Southeast Asia) enjoy low average costs of production and are developing the infrastructure needed to overcome one of their primary disadvantages, inland transportation costs. Thus, even a decline in export prices, such as would happen if the USDA discontinued its support of U.S. soybean prices, would not likely cause a reduction in foreign supply; rather, it would probably only slow its recent rapid rate of growth.

The U.S. industry is dominated by multinational agricultural conglomerates. One positive aspect of such firms is their flexibility, which the U.S. industry will need to face continually changing world markets. Such firms may be able to respond more readily to changing market conditions than small, single-line firms. While such flexibility may increase the volatility of U.S. exports, it may also make world markets operate more efficiently.

The implication of such multinationalization for the U.S. industry is that U.S. firms in their capacity as U.S. producers and processors are declining in importance. However, such firms are expanding operations beyond domestic boundaries to circumvent such external barriers to competitiveness as USDA and EC price-support programs. Those that are not, if they are to prosper, must rely more on supplying the domestic market than the increasingly competitive export markets.

Table 8-1
U.S. shares of selected world markets, 1978-86

Market share measure	1978	1979	1980	1981	1982	1983	1984	1985	1986
Oilseed exports:									
United States..........1,000 metric tons..	22,463	21,285	22,720	22,647	25,964	22,619	20,358	16,996	21,030
World................................do...	28,919	29,239	30,475	30,173	31,671	28,681	28,572	27,078	28,393
U.S. share of world exports......percent..	78	73	75	75	82	79	71	63	74
Oilseed meal exports:									
United States..........1,000 metric tons..	6,314	6,463	7,447	6,824	6,453	6,748	4,662	4,857	6,085
World................................do...	17,322	18,013	19,726	21,970	20,759	23,755	19,346	20,878	19,472
U.S. share of world exports......percent..	36	36	38	31	31	28	24	23	31
Soybean crush:									
United States..........1,000 metric tons..	26,496	28,539	30,424	27,990	28,464	29,145	26,630	28,414	29,660
World................................do...	62,655	66,399	74,034	72,304	75,544	76,328	73,416	77,220	79,253
U.S. share of world crush.........percent..	42	43	41	39	38	38	36	37	37
Soybean exports:									
United States..........1,000 metric tons..	20,710	20,905	21,787	21,860	25,520	22,728	19,596	16,928	21,065
World................................do...	24,057	25,541	26,985	26,509	29,258	26,520	25,830	25,407	27,782
U.S. share of world exports......percent..	86	82	81	82	87	86	76	67	76
Soybean meal production:									
United States..........1,000 metric tons..	20,930	22,714	24,331	22,362	22,682	23,158	20,965	22,317	23,348
World................................do...	49,165	52,418	58,401	56,920	59,581	60,147	57,614	60,492	62,431
U.S. share of world production..percent..	43	43	42	39	38	39	36	37	37
Soybean meal exports:									
United States..........1,000 metric tons..	5,936	6,087	7,024	6,344	6,221	6,488	4,414	4,715	6,509
World................................do...	14,888	15,242	18,213	20,420	20,823	23,508	21,074	23,062	23,543
U.S. share of world exports......percent..	40	40	39	31	30	28	21	20	28
Soybean oil production:									
United States..........1,000 metric tons..	4,818	5,218	5,487	5,126	5,072	5,286	4,991	5,214	5,362
World................................do...	11,233	12,003	13,318	13,134	13,420	13,658	13,372	13,967	14,150
U.S. share of world production...percent..	43	43	41	39	38	39	37	37	38
Soybean oil exports:									
United States..........1,000 metric tons..	929	1,129	1,096	819	938	786	1,011	587	600
World................................do...	2,632	3,046	3,299	3,572	3,596	3,634	4,021	3,575	3,138
U.S. share of world exports......percent..	35	37	33	23	26	22	25	16	19

Sources: Compiled from Oil World, various issues, and from official statistics of the Food and Agriculture Organization of the United Nations.

Table 8-2
Real and nominal exchange rate indexes for the U.S. dollar against currencies of major exporters of oilseeds and oilseed products, in units of foreign currency per dollar, 1980-86

Country	1980	1981	1982	1983	1984	1985	1986
	Real exchange rate index (1980=100)						
European Community:							
Belgium...........	100	128.0	149.3	160.7	173.2	177.2	138.4
Denmark...........	100	118.9	128.6	136.5	147.3	145.0	115.2
France............	100	126.4	140.4	148.5	153.9	151.5	1/
Germany...........	100	125.8	130.2	136.7	151.6	152.7	112.6
Greece............	100	112.7	119.4	133.1	143.7	145.4	121.3
Ireland...........	100	118.7	123.6	134.5	146.6	145.1	1/
Italy.............	100	124.2	132.4	137.2	147.2	148.4	1/
Luxembourg........	1/	1/	1/	1/	1/	1/	1/
Netherlands.......	100	125.4	128.4	136.5	150.8	153.2	1/
Portugal..........	100	110.6	114.1	138.1	146.6	140.2	1/
Spain.............	100	121.5	131.5	152.1	155.6	151.8	120.2
United Kingdom....	100	115.1	125.5	138.9	152.6	149.3	1/
Other:							
Argentina.........	100	127.2	214.5	191.6	187.1	1/	1/
Brazil............	100	92.0	94.0	114.1	111.3	113.0	1/
Malaysia..........	1/	1/	1/	1/	1/	1/	1/
Philippines.......	100	100.1	99.8	113.3	104.2	97.9	103.7
	Nominal exchange rate index (1980=100)						
European Community:							
Belgium...........	100	127.0	156.3	174.9	197.6	203	153
Denmark...........	100	126.4	147.9	162.3	183.8	188	144
France............	100	128.6	155.6	180.4	206.8	213	164
Germany...........	100	124.3	133.5	140.5	156.6	162	119
Greece............	100	130.0	156.8	206.6	264.5	324	328
Ireland...........	100	127.7	144.8	165.4	189.6	194	153
Italy.............	100	132.7	157.9	177.3	205.1	223	174
Luxembourg........	100	127.0	156.3	174.9	197.6	203	153
Netherlands.......	100	125.5	134.3	143.6	161.4	167	123
Portugal..........	100	123.0	158.8	221.3	292.4	340	299
Spain.............	100	128.8	153.2	200.0	224.2	237	195
United Kingdom....	100	115.7	133.0	153.3	174.7	181	159
Other:							
Argentina.........	100	244.4	1,438.9	5,850.0	37,583.3	334,339	523,906
Brazil............	100	175.5	339.6	1,088.7	3,486.8	11,698	25,760
Malaysia..........	100	105.8	107.3	106.6	107.7	114	119
Philippines.......	100	105.2	113.7	147.9	222.3	248	271

1/ Not available.

Source: International Monetary Fund, International Financial Statistics, various issues.

Table 8-3
Effects 1/ of real appreciation and depreciation of the U.S. dollar, 1980-82, 1984-85, and 1986

Item	1980-82	1984-85	1986
Real price:			
Wheat........dollars per metric ton..	-6.85	-3.68	-2.74
Corn..........................do...	-6.20	-4.66	3.00
Soybeans......................do...	-18.30	-13.17	21.91
Export volume:			
Wheat..........million metric tons..	-4.9	-6.64	-2.69
Corn..........................do...	-9.5	-14.68	32.64
Soybeans......................do...	-1.5	-0.99	2.26
Real export value:			
Wheat..............billion dollars..	-1.1	-1.1	-0.3
Corn..........................do...	-1.5	-2.1	4.3
Soybeans......................do...	-0.7	-0.6	1.1

1/ The calculations show the predicted changes resulting from the apprecation/depreciation of the dollar while holding all other factors constant.

Source: Data for 1980-82 are from Jim Longmire and Art Morey, Stong Dollar Dampens Demand for U.S. Farm Exports, USDA, Dec. 1983. Data for 1984-85 and 1986 are from Barry Krissoff and Art Morey, The Dollar Turnaround and U.S. Agricultural Exports, USDA, Dec. 1986.

Table 8-4
Growth of gross product, import volumes, and export volumes for industrial and developing countries, 1967-76 average and 1977-86

(Percentage change from preceding year)

Item	Average 1967-76	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Industrial countries:											
Real GNP	4.8	4.0	4.1	3.5	1.3	1.6	-0.2	2.6	4.9	3.1	3.0
Import volumes	7.5	4.1	4.7	8.6	-1.7	-2.5	-0.8	4.2	12.2	6.1	5.5
Export volumes	8.0	5.1	5.7	7.1	3.7	3.4	-2.2	2.4	9.9	5.3	5.2
Developing countries:											
Real GDP	6.0	5.8	5.3	4.5	3.4	2.4	1.6	1.5	3.7	4.0	4.5
Import volumes	8.4	9.5	7.0	4.9	8.3	7.3	-3.9	-3.6	2.5	4.7	5.6
Export volumes	6.0	2.5	3.9	5.4	-2.6	-4.0	-7.2	0.9	8.0	5.5	5.8

Source: International Monetary Fund, World Economic Outlook, various issues.

Table 8-5
Outstanding external debt of developing countries, 1981-86

(Billion dollars)

Item	1981	1982	1983	1984	1985	1986
All developing countries	660.5	747.0	790.7	827.7	865.3	896.5
Short term	136.2	154.6	137.3	126.3	104.9	107.3
Long term	524.3	592.4	653.4	701.3	760.3	789.2
Non-oil developing countries	578.3	655.2	693.5	730.5	767.5	798.0
Short term	114.2	131.9	113.3	103.9	91.9	93.9
Long term	464.1	523.3	580.2	626.6	675.6	704.1

Source: International Monetary Fund, World Economic Outlook 1985.

Table 8-6
Soybean production: Comparison of costs in selected countries, 1986

Costs	United States		Brazil		
	Overall	Corn Belt 1/	Double-crop with wheat	Soybeans alone	Argentina
Production costs:					
Variable costs:					
Seed..........dollars per metric ton..	12.87	11.30	14.57	14.57	16.31
Fertilizer and lime..............do...	13.04	8.33	50.90	55.04	2/
Chemicals.......................do...	24.53	20.04	14.82	14.82	9.43
Custom operations................do...	5.08	3.56	2/	2/	27.67
Fuel and lube....................do...	16.26	12.98	20.76	20.85	13.26
Repairs..........................do...	10.22	8.22	6.55	6.58	10.44
Hired labor......................do...	1.93	1.62	2/	2/	2/
Miscellaneous....................do...	0.37	0.29	5.89	6.09	2/
Interest on variable expenses....do...	4.06	3.01	3.86	4.01	2.69
Total variable cost............do...	88.36	69.35	117.35	121.96	79.80
Fixed costs:					
General farm overhead............do...	14.61	14.93	2.59	2.59	2/
Taxes and insurance..............do...	15.96	18.08	3.27	4.67	13.82
Capital replacement..............do...	33.07	30.15	13.43	13.49	10.96
Labor............................do...	16.68	13.79	6.45	6.48	13.87
Interest on nonland capital......do...	11.51	10.59	6.46	6.48	8.10
Land charge......................do...	62.95 3/	67.06 3/	35.25	42.74	22.35
Total fixed costs.............do...	154.78	154.60	67.45	76.45	69.10
Total production costs.......do...	243.14	223.95	184.80	198.41	148.90
Marketing costs......................do...	24.60	24.60	43.50	43.50	36.14
Grand total costs................do...	267.74	248.55	228.30	241.91	185.04
Yield per acre.........number of bushels..	28.95	33.70	26.78	26.78	31.24
Production cost.......dollars per bushel..	6.62	6.10	5.03	5.40	4.05
Marketing cost.......................do...	.67	.67	1.18	1.18	.99
Total cost.........................do...	7.29	6.77	6.21	6.58	5.04

1/ Includes Great Lake States.
2/ Not available.
3/ Data are for 1985.

Source: Norman Rask, Gerald Ortmann, and Walter Stulp, "Comparative Costs Among Major Exporting Countries," Occasional Paper, Department of Agricultural Economics, Ohio State University, Columbus, OH, Jan. 1987, app. 3.

Table 8-7
Soybean mills: Average costs of production of selected soybean mills, in the United States, EC, and South America (Brazil and Argentina), 1985 and 1986

Item	United States 1985	United States 1986	EC 1985	EC 1986	South America 1985	South America 1986
	Per metric ton of soybeans crushed					
Cost of goods sold (soybeans).....	$236.60	$210.90	$251.79	$286.73	$131.68	$154.59
Manufacturing costs:						
Direct labor....................	3.70	3.30	2.12	3.61	1.25	1.54
Fuel, power, and utilities......	7.00	6.20	4.60	4.89	3.55	3.73
Repairs.........................	2.60	2.20	0.97	2.16	.98	1.38
Solvent.........................	.70	.40	.36	.47	.61	.61
Depreciation and amortization...	3.30	3.30	1.68	3.53	3.63	4.19
Other...........................	3.70	3.70	4.48	6.72	1.79	2.66
Subtotal processing costs.....	20.60	19.50	14.21	21.42	11.82	14.12
General, selling, and administrative expenses.........	2.20	2.20	2.18	4.22	9.67	11.31
Financial expenses and corporate overhead..............	1.80	1.80	2.67	3.34	15.15	6.26
Grand total all costs.........	260.90	234.10	270.87	315.30	171.54	187.72

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

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission; see also tables 3-34, 4-11, and 6-8.

Table 8-8
U.S. industry response to foreign competition: Strategies to be initiated or carried out within the next year by 8 U.S. soybean crushers

Strategy	Number of firms responding
Price- and finance-related:	
Concentrate of maintaining price competitiveness; match competitors' price terms	5
Improve financing and other financial terms of purchase	1
Reduce raw material cost	1
Product-related:	
Improve product quality	4
Improve or expand product service or support	3
Concentrate on product for market niches where firm has competitive advantage	4
Concentrate on product for market niches where competition is less intense	2
Output-related:	
Reduce output to cut losses and inventories	4
Increase production to higher value-added products	5
Diversify product mix to strengthen market position	4
Reduce product mix to focus on most profitable line	1
Consolidate production into fewer or newer facilities	1
Relocate production or distribution facilities to cut transport costs	1
Sell or stop production of low-profit or unprofitable products or lines	2
Sell or close low-profit, loss-producing or peripheral divisions or operations	4
Strategy-related:	
Expand production and intensify marketing to regain market share	2
Try to acquire higher valued product lines	2
Modernize present plant and equipment	7
Invest in new plant and equipment to expand output	2
Invest in new plant and equipment to cut costs and improve productivity	6
Intensify R&D efforts to develop new products	1
Intensify R&D efforts to develop new technology	3
Intensify R&D efforts to improve process of production efficiency	5
Develop joint ventures or mergers in the United States with other U.S. firms	4
Develop joint ventures with foreign market leaders in foreign countries	1
Invest in foreign production facilities to improve cost position	1
Invest in foreign production facilities to improve market access	2
Expand export sales	3
Expand domestic sales	2
Seek relief from unfair trade practices	1

Source: Compiled from responses to questionnaires of the U.S. International Trade Commission.

Table 8-9
U.S. industry views on U.S. competitiveness compared with major competitors 1/

Competitive factor	U.S. competitiveness 2/ compared with-- Brazil S	E	L	Argentina S	E	L	Malaysia S	E	L	EC-11 3/ S	E	L
	number of responses											
Raw material cost	7	1	0	7	1	0	8	0	0	2	1	5
Raw material availability	5	1	2	5	1	2	5	3	0	1	3	4
Energy cost	6	0	2	5	1	2	7	1	0	1	3	4
Capital cost	2	1	5	2	1	5	0	6	2	0	7	1
Capital availability	1	2	5	1	2	5	2	5	1	1	7	0
Labor wage rates	7	0	1	7	0	1	7	0	1	1	7	0
Labor productivity	1	2	5	1	2	5	1	3	4	1	5	2
Labor skills	0	3	5	0	3	5	0	4	4	0	7	1
Technology	1	6	1	0	7	1	1	5	2	0	8	0
Scale of operations	0	6	2	0	6	2	1	5	2	0	7	1
Plant layout	0	6	2	0	6	2	0	7	1	0	8	0
Plant location	0	7	1	1	6	1	1	6	1	0	7	1
Capital expenditure	0	7	1	1	6	1	3	5	0	0	7	1
Research and development	0	6	2	0	4	4	2	5	1	0	6	2
Infrastructure	0	1	7	0	1	7	0	5	3	0	7	1
Government:												
Trade protection	8	0	0	8	0	0	8	0	0	7	1	0
Subsidization	7	1	0	8	0	0	8	0	0	8	0	0
Regulation:												
Health and safety	4	0	4	4	0	4	4	1	3	0	5	3
Environmental	4	0	4	4	0	4	4	1	3	0	5	3
Antitrust	5	0	3	5	0	3	5	0	3	2	3	3

1/ Includes the 9 largest U.S. soybean processors.
2/ Competitiveness is categorized by the following abbreviations: "S" means strongly competitive; "E" means equal; and "L" means less competitive.
3/ Excludes Spain.

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

Appendix A

Copy of Letter to Chairwoman Stern from Senator Bob Packwood, U.S. Senate Committee on Finance

United States Senate

COMMITTEE ON FINANCE
WASHINGTON, DC 20510

USITC 1278
86 FEB 13 P5:01

ebruary 12, 1986

The Honorable Paula Stern
Chairwoman
U.S. International Trade Commission
701 E Street, N.W.
Washington, D.C. 20436

Dear Madam Chairwoman:

The Committee on Finance requests that the United States International Trade Commission conduct a series of investigations under section 332 of the Tariff Act of 1930, on the international competitiveness of selected major United States industries.

The 99th Congress faces important decisions regarding a wide range of trade issues, including Administration efforts to launch a new round of multilateral trade negotiations aimed at reducing international barriers to trade in goods, services, and investment flows. To guide Congress in decisions about the future of the international trading system, the Committee needs to understand the competitive strengths and viability of key U.S. industries, the extent and nature of competition facing these industries in foreign and domestic markets, and the extent to which any current trade problems result from special situations such as the strong dollar, debt and interest rate problems, or from more fundamental competitive problems.

Several witnesses appearing before this Committee have stressed that U.S. competitiveness and industrial viability must be gauged in terms of performance in international as well as domestic markets. It is important for these studies to examine the viability of these industries and U.S. trade negotiation objectives from the vantage point of the global nature of competition and the internationalization of production and ownership.

For each of these industry studies the Committee requests coverage of:

1. Measures of the current competitiveness of the U.S. industry in domestic and foreign markets;

2. Comparative strengths of U.S. and major foreign competitors in these markets;

3. Nature of the main competitive problems facing the U.S. industry;

4. Sources of main competitive problems; to what extent from:

   a. special transitory or reversible situations such as exchange and interest rate problems, as opposed to

   b. fundamental or structural problems;

5. Competitive strategies; how important are foreign and U.S. markets to future competitiveness, in terms of economies of scale, growth rates, and pre-empting of market advantages.

The Committee decided not to identify specific industries or numbers of studies, but envisages up to seven studies. The Committee has instructed its staff to work out with ITC staff the specific industry selection and production schedule, depending on availability of appropriate staff to conduct them within the requested time. However, it requests that all studies be completed within 18 months and submitted to the Committee individually as completed.

The industries to be studied should be pivotal to overall U.S. industrial and technological strength, by virtue of being (a) either pathbreaking in the development of leading edge technologies that will shape future competitiveness of other U.S. industries, or (b) supplying critical equipment or materiel used in other important industries. The selection should be diverse enough that the range of their impact should reach broadly across the entire spectrum of U.S. industrial strength, represented by the seven tariff schedules. Examples would be key industrial agricultural commodities, selected synthetic organic chemicals, and textile fabrics, along with the equipment producing industries associated with each.

The Committee recognizes that much of the information and data desired may not be available from secondary sources and that primary data gathering may prove essential to understanding global industry competition. It requests that in meeting the objectives of these studies the Commission develop new sources of information outside the United States through both interviews and questionnaires where possible, to assure effective assessment of the strengths and weaknesses of foreign competitors, and of the terms of competition in key foreign markets.

Sincerely,

Bob Packwood

BOB PACKWOOD

Appendix B

Copy of letter to Chairman Liebeler from Senator Bob Packwood,
U.S. Senate Committee on Finance

United States Senate

COMMITTEE ON FINANCE
WASHINGTON, DC 20510

358

September 22, 1986

Ms. Susan W. Liebeler
Chairman
United States International
Trade Commission
701 E Street, N.W.
Washington, D.C. 20436

Dear Madam Chairman:

Pursuant to my letter of April 2, 1986 to Chairwoman Stern requesting a series of investigations of U.S. international competitiveness under section 332 of the Tariff Act of 1930, this is to advise that the Committee has completed deliberation on what additional study might be included within the series to reflect U.S. agricultural industry competitiveness. We have concluded that a study of the U.S. oilseed and products industry would suit the purpose of the overall investigation effectively because of its status as our second largest agricultural industry and export, and its importance in a wide variety of commercial uses.

The Committee understands that this choice completes the selections to be covered under this series, and requests that this last study also be completed within the 11 months remaining of the original 18 month period.

Sincerely,

Bob Packwood

BOB PACKWOOD

Appendix C

Notice of Institution of Investigation No. 332-240

(19 CFR 207.24) and must be submitted not later than the close of business on March 5, 1987. In addition, any person who has not entered an appearance as a party to the investigation may submit a written statement of information pertinent to the subject of the investigation on or before March 5, 1987.

A signed original and fourteen (14) copies of each submission must be filed with the Secretary to the Commission in accordance with § 201.8 of the Commission's rules (19 CFR 201.8). All written submissions except for confidential business data will be available for public inspection during regular business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary to the Commission.

Any business information for which confidential treatment is desired must be submitted separately. The envelope and all pages of such submissions must be clearly labeled "Confidential Business Information." Confidential submissions and requests for confidential treatment must conform with the requirements of §201.6 of the Commission's rules (19 CFR 201.6).

Authority: This investigation is being conducted under the authority of the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.20 of the Commission's rules (19 CFR 207.20).

By order of the Commission.

Issued: December 17, 1986.

Kenneth R. Mason,

Secretary.

[FR Doc. 86-28953 Filed 12-24-86; 8:45 am]

BILLING CODE 7020-02-M

[332-240]

U.S. Global Competitiveness; Oilseed and Products Industry

AGENCY: United States International Trade Commission.

ACTION: Institution of an investigation and scheduling of public hearing.

EFFECTIVE DATE: December 10, 1986.

FOR FURTHER INFORMATION CONTACT: John Reeder, Agriculture, Fisheries, and Forest Products Division, Office of Industries, U.S. International Trade Commission, Washington, DC 20436, telephone: 202-724-1754.

Background and Scope of Investigation

The Commission, instituted the investigation, No. 332-240, on December 10, 1986, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), following receipt on October 30, 1986, of a letter requesting the investigation from the Committee on Finance of the U.S. Senate.

As requested by the Committee, the Commission will investigate and report on the international competitiveness of the U.S. oilseed and products industry. More specifically, the Commission intends to investigate and report on the U.S. oilseed and products industry and its major foreign competitors in order that it might determine the impact of global competition on the industry and assess how the industry is responding to such forces. The Commission expects to report the results of its investigation to the Committee not later than August 28, 1987.

The investigation is one of a series of six investigations involving the global competitiveness of U.S. industries requested by the Committee. As requested by the Committee and as in the case of those other studies (which involve the textile mill, petrochemicals, steel sheet and strip, automotive parts, and optical fibers industries, investigation Nos. 332-229 through 332-233), the Commission will analyze and address in this report (1) measures of the current competitiveness of the U.S. industry in domestic and foreign markets; (2) competitive strengths of U.S. and major foreign competitors in these markets; (3) the nature of the main competitive problems facing the U.S. industry; (4) sources of the main competitive problems and extent to which they involve special transitory or reversible situations, as opposed to fundamental or structural problems; and (5) the importance of foreign and U.S. markets to future competitiveness in terms of economies of scale, growth rates, and preempting of market advantages.

Public Hearing

The Commission will hold a public hearing on this investigation as well as the five others in this series (investigation Nos. 332-229 through 332-233) at the United States International Trade Commission Building, 701 E Street NW., Washington, DC, beginning at 10:00 a.m. on February 24, 1987. All persons shall have the right to appear in person or be represented by counsel, to present information and to be heard. Persons wishing to appear at the public hearing should file requests to appear and prehearing briefs (original and 14 copies) with the Secretary, U.S. International Trade Commission, 701 E Street NW., Washington, DC 20436, not later than noon, February 2, 1987.

Written Submissions

Interested persons are invited to submit written statements concerning the investigation. Written statements should be received by the close of business on April 27, 1987. Commercial or financial information which a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of § 210.6 of the Commission's *Rules of Practice and Procedure* (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by interested parties. All submissions should be addressed to the Secretary, United States International Trade Commission, 701 E Street NW., Washington, DC 20436.

Hearing-impaired individuals are advised that information on this matter can be obtained by contacting our TDD terminal on (202) 724-0002.

By order of the Commission.

Issued: December 18, 1986.

Kenneth R. Mason,

Secretary.

[FR Doc. 86-28952 Filed 12-24-86; 8:45 am]

BILLING CODE 7020-02-M

[Investigation No. 751-TA-11]

Salmon Gill Fish Netting of Manmade Fibers From Japan

Determination

On the basis of the record [1] developed in the subject investigation, the Commission determines, pursuant to section 751(b) of the Tariff Act of 1930 (19 U.S.C. 1675(b)), that an industry in the United States would not be materially injured or threatened with material injury nor would the establishment of an industry in the United States be materially retarded by reason of imports of salmon gill fish netting of manmade fibers [2] from Japan covered by antidumping order T.D. 72-158 if that portion of the order concerning salmon gill fish netting were to be revoked.

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[1] The record is defined in § 207.2(i) of the Commission's Rules of Practice and Procedure (19 CFR 207.2(i)).

[2] Fish netting of continuous polyamide fibers (including nylon), consisting of monofilament yarns measuring not more than 0.806 millimeter in maximum cross-sectional dimension or multifilament yarns or cordage measuring not more than 210 denier, or a combination of the foregoing yarns or cordage, of double or triple-knot construction, dyed or otherwise colored (except white), having a stretch mesh size of not less than 4½ inches and not more than 8¾ inches. Such netting is provided for in item 355.45 of the Tariff Schedules of the United States.

Appendix D

List of Witnesses Appearing at Public Hearing

National Soybean Processors Association
John G. Reed, Chairman of the Board

Of Counsel:
Steptoe & Johnson
Richard O. Cunningham

Appendix E

Selected Portions of the Tariff Schedules of the United States, Annotated, 1987

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty Special	Rates of Duty 2
		PART 14. - ANIMAL AND VEGETABLE OILS, FATS, AND GREASES				
		Subpart A. - Oil-Bearing Vegetable Materials				
		Subpart A headnote: 1. This subpart covers oil-bearing seeds and other oil-bearing vegetable materials.				
175.03	00	Apricot and peach kernels	Lb	1.5c per lb.	Free (E,I)	3c per lb.
175.06	00	Castor beans	Lb	Free		0.5c per lb.
175.09	00	Copra	Lb	Free		Free
175.15	00	Cottonseed	Lb	1/3c per lb.	Free (E,I)	1/3c per lb.
175.18	00	Flaxseed (Linseed)	Lb	22c per bu. of 56 lbs.	Free (E,I)	65c per bu. of 56 lbs.
175.21	00	Hempseed	Lb	0.46c per lb.	Free (E,I)	1.24c per lb.
175.24	00	Kapok seed	Lb	Free		2c per lb.
175.28	00	Palm-nut kernels and palm nuts	Lb	Free		Free
175.33	00	Perilla seed	Lb	1.38c per lb.	Free (E,I)	1.38c per lb.
175.36	00	Poppy seed	Cwt	6c per 100 lbs.	Free (A,E,I)	32c per 100 lbs.
175.39	00	Rapeseed	Lb	0.4c per lb.	Free (E,I)	2c per lb.
175.42	00	Rubber seed	Lb	Free		Free
175.45	00	Sesame seed	Lb	Free		1.18c per lb.
175.50	00	Soy beans	Lb	Free		2c per lb.
175.51	00	Sunflower seed	Lb	Free		2c per lb.
175.54	00	Tung nuts	Lb	Free		Free
175.57	00	Oil-bearing nuts and seeds, not specially provided for	Lb	Free		Free

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty Special	Rates of Duty 2
		Subpart B. - Vegetable Oils, Crude or Refined				
		Subpart B headnote:				
		1. This subpart covers all expressed or extracted vegetable oils, whether crude or subjected to refining processes, but does not cover any of such products which have been artificially mixed or which have been sulfonated, sulfated, hydrogenated, or processed otherwise than by refining. This subpart also covers vegetable tallow.				
176.00	00	Babassu oil	Lb.	Free		Free
		Castor oil:				
176.01	00	Valued not over 20 cents per pound	Lb.	3% ad val.	Free (A,E,I)	3¢ per lb.
		Valued over 20 cents per pound:				
176.14	00	Having Lovibond color values greater than 6 yellow and 0.6 red	Lb.	1.5¢ per lb.	Free (A,E) 0.5¢ per lb.(I)	3¢ per lb.
176.15	00	Other	Lb.	1.5¢ per lb.	Free (A,E,I)	3¢ per lb.
176.16	00	Corn oil	Lb.	4% ad val.	Free (E,I)	20% ad val.
176.17		Coconut oil		Free		2¢ per lb.
	20	Crude	Lb.			
	40	Refined	Lb.			
176.18	00	Cottonseed oil	Lb.	3¢ per lb.	Free (E,I)	3¢ per lb.
176.20	00	Croton oil	Lb.	Free		Free
176.22	00	Hempseed oil	Lb.	6¢ per lb.	Free (E,I)	6¢ per lb.
176.24	00	Kapok oil	Lb.	0.5¢ per lb. + 2% ad val.	Free (E,I)	4.5¢ per lb. + 20% ad val.
176.26	00	Linseed or flaxseed oil	Lb.	4.5¢ per lb.	Free (E,I)	4.5¢ per lb.
		Olive oil:				
176.28	00	Rendered unfit for use as food	Lb.	Free		Free
		Other:				
176.29	00	Weighing with the immediate container under 40 pounds	Lb.	3.8¢ per lb. on contents and container	Free (A,E,I)	8¢ per lb. on contents and container
176.30	00	Other	Lb.	2.6¢ per lb.	Free (A,E,I)	6.5¢ per lb.
		Palm-kernel oil:				
176.32	00	Rendered unfit for use as food	Lb.	Free		Free
176.33		Other		Free		1¢ per lb.
	20	Crude	Lb.			
	40	Refined	Lb.			

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty Special	Rates of Duty 2
176.34		Palm oil	....	Free		Free
	20	Crude	Lb.			
	40	Refined	Lb.			
176.38	00	Peanut oil	Lb.	4¢ per lb.	Free (E,I)	4¢ per lb.
176.40	00	Perilla oil	Lb.	4.5¢ per lb.	Free (E,I)	4.5¢ per lb.
176.42	00	Poppy seed oil	Lb.	0.75¢ per lb.	Free (E,I)	2¢ per lb.
		Rapeseed oil:				
		Rendered unfit for use as food:				
176.44	00	Imported to be used in the manufacture of rubber substitutes or lubricating oil	Lb.	Free		Free
176.45	00	Other	Lb.	0.7¢ per lb.	Free (E,I)	4.5¢ per lb.
		Other:				
176.46	00	Imported to be used in the manufacture of rubber substitutes or lubricating oil	Lb.	Free		0.8¢ per lb.
176.47	00	Other	Lb.	7.5% ad val.	Free (E,I)	22.5% ad val.
		Sesame oil:				
176.49	00	Rendered unfit for use as food	Lb.	2.2¢ per lb.	Free (A,E,I)	4.5¢ per lb.
176.50	00	Other	Lb.	0.7¢ per lb.	Free (A,E,I)	3¢ per lb.
176.52	00	Soybean oil	Lb.	22.5% ad val.	Free (E) 7.2% ad val.(I)	45% ad val.
		Sunflower oil:				
176.54	00	Rendered unfit for use as food	Lb.	0.9¢ per lb.	Free (E,I)	4.5¢ per lb.
176.55	00	Other	Lb.	0.9¢ per lb. + 4% ad val.	Free (E,I)	4.5¢ per lb. + 20% ad val.
176.58	00	Sweet almond oil	Lb.	Free		Free
176.60	00	Tung oil	Lb.	Free		Free
		Expressed or extracted vegetable oils, not specially provided for:				
176.64	00	Nut oils	Lb.	Free		Free
176.70	00	Other	Lb.	5% ad val.	Free (A,E,I)	20% ad val.
176.90	00	Vegetable tallow	Lb.	Free		Free

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty Special	Rates of Duty 2
		Subpart C. - Animal Oils, Fats, and Greases, Crude or Refined				
		Subpart C headnotes:				
		1. This subpart covers animal oils, fats, and greases, whether crude or subjected to refining processes, but does not cover any of such products which have been artificially mixed or which have been sulfonated, sulfated, hydrogenated, or processed otherwise than by refining. The fish oils described in this subpart are classifiable hereunder even if they are deemed to be vitamins or drugs within the meaning of those terms in part 3 of schedule 4.				
		2. This subpart does not cover products of American fisheries (see part 15A of schedule 1).				
		Marine-animal oils:				
		Fish-liver oils:				
177.02	00	Cod	Lb.	Free		Free
177.04	00	Other	Lb.	2.5% ad val.	Free (E,I)	3c per lb. + 10% ad val.
		Fish oils other than liver oils:				
177.12	00	Anchovy	Lb.	0.75c per lb. + 5% ad val.	Free (A,E,I)	3c per lb. + 20% ad val.
177.14	00	Cod	Lb.	Free		Free
177.16	00	Shark	Lb.	0.4c per lb. + 2% ad val.	Free (A,E,I)	3c per lb. + 20% ad val.
177.20	00	Eulachon	Lb.	0.7c per lb.	Free (E,I)	3c per lb.
177.22	00	Herring	Lb.	0.46c per lb.	Free (A,E,I)	3-2/3c per lb.
177.24	00	Menhaden	Lb.	1.7c per lb.	Free (A,E,I)	3-2/3c per lb.
177.26	00	Other	Lb.	0.7c per lb. + 5% ad val.	Free (A,E,I)	3c per lb. + 20% ad val.
		Other marine-animal oils:				
177.30	00	Seal	Lb.	0.95c per lb.	Free (E,I)	3.8c per lb.
		Sperm:				
177.32	00	Crude	Lb.	0.03c per lb.	Free (E,I)	0.67c per lb.
177.34	00	Other than crude	Lb.	0.2c per lb.	Free (E,I)	1.87c per lb.
177.36	00	Whale (except sperm)	Lb.	0.6c per lb.	Free (E,I)	3.8c per lb.
177.40	00	Other	Lb.	0.75c per lb. + 5% ad val.	Free (A,E,I)	3c per lb. + 20% ad val.
		Other animal oils, fats, and greases:				
177.50	00	Lard	Lb.	3c per lb.	Free (E,I)	3c per lb.
177.52	00	Oleo oil and oleo stearin	Lb.	2c per lb.	Free (E) 0.6c per lb.(I)	4c per lb.
177.56	00	Tallow	Lb.	0.43c per lb.	Free (E,I)	3.5c per lb.
		Wool grease:				
177.58	00	Conforming to the specifications for wool fat (including hydrous wool fat) appearing in the U.S. Pharmacopoeia, 15th revision	Lb.	5c per lb.	Free (A,E,I)	6c per lb.
177.62	00	Other	Lb.	1.3c per lb.	Free (A,E,I)	4.3c per lb.
		Other:				
		Edible:				
177.67	00	Derived from milk 1/	Lb.	10% ad val.	Free (E) 3.2% ad val. (I)	20% ad val.
177.69	00	Other	Lb.	5% ad val.	Free (A,E,I)	20% ad val.
177.72	00	Not edible	Lb.	0.75c per lb. + 5% ad val.	Free (A,E,I)	3c per lb. + 20% ad val.

1/ Imports of butter oil are subject to additional import restrictions. See item 950.06 in part 3, Appendix to the Tariff Schedules.

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
				1	Special	2
		Subpart D. - Hardened Oils, Fats, and Greases; Mixtures				
178.05	00	Sod oil	Lb.	0.95c per lb.	Free (E,I)	3-2/3c per lb.
		Hydrogenated or hardened oils, fats, and greases; and lard substitutes whether or not containing lard:				
178.15	00	Rapeseed oil	Lb.	9% ad val.	Free (E,I)	12.5% ad val.
178.20	00	Other	Lb.	5c per lb.	Free (E,I)	12.5% ad val.
		Artificial mixtures of two or more of the products provided for in subparts B and C of this part:				
178.25	00	In chief value of linseed or flaxseed oil	Lb.	4.5c per lb.	Free (E,I)	4.5c per lb.
178.30	00	Other	Lb.	10% ad val., but not less than the rate applicable to component material subject to the highest rate of duty	Free (A,E) 3.2% ad val., but not less than the rate applicable to component material subject to the highest rate of duty (I)	25% ad val., but not less than the rate applicable to component material subject to the highest rate of duty

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty Special	Rates of Duty 2
		Edible preparations not specially provided for (including prepared meals individually packaged) (con):				
		Other (con):				
		Other (con):				
		Other (con):				
183.05		Other		10% ad val. 1/	Free (A,E) 3.2% ad val. (I)	20% ad val.
	05	Minced seafood preparations	Lb.			
		Other:				
	15	Containing sugar derived from sugar cane/or sugar beets	Lb.			
	30	Other	Lb.			

Subpart C. - Animal Feeds

Subpart C headnotes:

1. For the purposes of this subpart --
(a) the term "animal feeds, and ingredients therefor" embraces products chiefly used as food for animals, or chiefly used as ingredients in such food, respectively, but such term does not include any product provided for in schedule 4 (except part 2E thereof) or schedule 5 (except part 1K thereof); and
(b) the terms "mixed feeds" and "mixed-feed ingredients" in item 184.70 embrace products which are admixtures of grains (or products, including byproducts, obtained in milling grains) with molasses, oil cake, oil-cake meal, or other feedstuffs, and which consist of not less than 6 percent by weight of the said grains or grain products.

2. None of the provisions of this subpart cover fertilizer or fertilizer materials (see part 11 of schedule 4).

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty Special	Rates of Duty 2
184.10	00	Bran, shorts, and middlings obtained in milling grains	S. ton	Free		10% ad val.
184.20	00	Beet pulp, dried	S. ton	Free		$4.45 per short ton
184.25	00	Brewers' and distillers' grains and malt sprouts	S. ton	Free		$4.45 per short ton
184.30	00	Hay	S. ton	Free		$5 per short ton
184.35	00	Straw (except flax straw and rice straw)	S. ton	Free		$1.50 per short ton
184.40	00	Grain hulls, ground or not ground	Cwt	Free		10¢ per 100 lbs.
		Grain or seed screenings, scalpings, chaff, or scourings, ground or not ground:				
184.45	00	Of flaxseed	S. ton	Free		10% ad val.
184.47	00	Other	S. ton	Free		10% ad val.

1/ Certain sugar derived from sugar cane or sugar beets subject to quota. See items 958.15, 958.17 and 958.18 in part 3, Appendix to the Tariff Schedules.

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
				1	Special	2
		Soy bean and other vegetable oil cake and oil-cake meal:				
184.50	00	Linseed oil cake and oil-cake meal	Lb	0.12¢ per lb.	Free (A,E,I)	0.3¢ per lb.
184.51	00	Rapeseed oil cake and oil-cake meal	Lb	0.12¢ per lb.	Free (A,E,I)	0.3¢ per lb.
		Other:				
184.52	00	Soy bean and cottonseed oil cake and oil-cake meal	Lb	0.3¢ per lb.	Free (E,I)	0.3¢ per lb.
184.53	00	Other	Lb	0.3¢ per lb.	Free (A,E,I)	0.3¢ per lb.
		Tankage; dead fish and whales; fish and whale scrap, meal and solubles; homogenized condensed fish and whales; all the foregoing not fit for human consumption:				
184.54	00	Cod-liver solubles	Lb	5% ad val.	Free (E,I)	20% ad val.
184.55		Other		Free		Free
	10	Fish or whale meat in airtight containers	Lb.			
	20	Tankage	S. ton			
	30	Scrap and meal	S. ton			
	60	Other	S. ton			
184.58	00	Wheat gluten to be used as animal feed	Lb	4% ad val.	Free (A,E,I)	20% ad val.
		Animal feeds, and ingredients therefor, not specially provided for:				
		Meat, including meat offal, not fit for human consumption:				
		Raw, whether or not chilled or frozen:				
184.60	00	Horsemeat (except meat packed in immediate containers weighing with their contents less than 10 pounds each)	Lb	Free		Free
184.61	00	Other	Lb	Free		10% ad val.
184.65	00	Prepared or preserved	Lb	2% ad val.	Free (A,E,I)	20% ad val.
184.70		Byproducts obtained from the milling of grains, mixed feeds, and mixed-feed ingredients		Free		10% ad val.
	20	Pet food packaged for retail sale	Lb.			
	70	Other	S. ton			
		Other:				
184.80	00	Animal feeds containing milk or milk derivatives 1/	Cwt	7.5% ad val.	Free (E,I)	20% ad val.
184.85	00	Other	Cwt	3% ad val.	Free (E,I)	20% ad val.

Subpart D. - Feathers, Downs, Bristles, and Hair

Subpart D headnotes:

1. For the purposes of this subpart, the term "treated" means cleaned, disinfected, or treated for preservation.

2. (a) Except as provided in (b) and (c) of this headnote, the importation of the feathers or skin of any bird is hereby prohibited. Such prohibition shall apply to the feathers or skin of any bird --

(i) whether raw or processed;

(ii) whether the whole plumage or skin or any part of either;

(iii) whether or not attached to a whole bird or any part thereof; and

(iv) whether or not forming part of another article.

1/ See item 950.17 in part 3, Appendix to the Tariff Schedules.