THE ORGANIZATION OF THE SWEDISH RAPESEED INDUSTRY

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Mr. President, I would like to thank you for inviting me to present a paper on the organization of the Swedish rapeseed industry. But before beginning with more specifics, I would like to mention some general facts about Sweden. Our population today is a little over 8 million, with only 6 percent of the labour force engaged in agriculture. Thus, Sweden is not a typical agricultural country. About half of the land area is covered with forests and more than a third with mountains and lakes. The cultivated land comprises approximately 7.5 million acres, or less than 10 percent of the total land area, whereas the area seeded to oil crops is only 3 percent of the total cultivated acreage, or 250,000 acres.

Although Sweden is a small country and the growing of oilseed crops is negligible compared with Canada, I hope, just the same, that an account of the co-operation that exists in Sweden between the rapeseed growers, the margarine industry and the government will be of general interest.

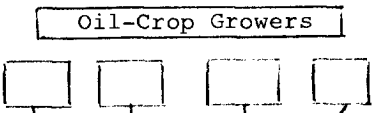
An outline of the organization within the Swedish rapeseed industry is shown in Figure 1. Let me, however, first, as a background, discuss some of the characteristic features of Swedish agricultural policy and governmental regulations in the oil-crop sector.

SOME FEATURES OF SWEDISH AGRICULTURAL POLICY

Swedish agriculture enjoys a tariff barrier that has been gradually raised to ensure to farmers a fair share of the rise in the living standard. Accordingly, the prices of agricultural products in Sweden are considerably higher than the prices on the world market, where countries sell their surplus food commodities irrespective of the production costs. But as a buffer to the competition from the world market, the majority of the industrial countries, like Sweden, protect their own agricultural production with tariff walls or, for instance, as in England, through direct subsidies to farming. Canada, however, is an exception, practising the principle of free trade for her agricultural products. Finally, it should be mentioned that the price level for agricultural products in Sweden is about at par with that of the Common Market (E.E.C.).

FIGURE I

THE ORGANIZATION OF THE SWEDISH RAPESEED INDUSTRY



15,000 growers that are affiliated with . . .

16 local oil-crop and seed-growers' associations.

The Swedish Oilseed Growers' Association (SOC)

Who are members in the head organizations: The Swedish Oilseed Growers' Association (SOC).

SOC's chief duties are:

- to sign contracts with the oil-crop growers,
- to enter into agreement with SOI on cultivation, delivery terms, etc.
- to engage in crop experiments and informational activities.

The Swedish Oilseed Association (SOI)

SOI is an organization in which all the economically interested parties are represented: the government, SOC, the margarine industry.

SOI's chief duties are:

- to purchase the oilseed harvested in the country,
- to administer the handling of the oilseed from growers to the buyer,
- to establish the base price paid to the growers for the oilseed,
- to sell oilseed to SEF according to the Rapeseed Agreement,
- to export the remaining part of the seed harvest.

The Swedish Extraction Association (SEF)

SEF is owned by the country's five margarine factories.

SEF's chief functions are:

- to receive a certain quantity of oil-crop seed according to the Rapeseed Agreement betweed SEF and SOI,
- to produce oil and meal from oilseed,
- to sell the meal for SOI on the Swedish market,
- to deliver the oil to the margarine industry and to export the surplus oil,
- to serve as the margarine industry's contact organization with other organizations in the oil-crop sector.

It was as late as 1967 that the Swedish Parliament established the present official lines for Swedish agricultural policy. The resolution that was passed indicated an agricultural level of activity for Sweden that will ensure self-sufficiency in time of war and blockade. Such an engagement is necessitated by Sweden's traditional policy of neutrality.

Since persons engaged in agricultural pursuits should also be guaranteed a fair share of the rising general standard of living, it is imperative that agriculture adjusts its production in order to be free of the burdensome surpluses that presently exist for many agricultural commodities. Lastly, agriculture must continue with the present rationalization that aims at fewer, larger and more efficient agricultural units.

GOVERNMENTAL REGULATION IN THE OIL-CROP SECTOR

Originally, the most important reason for growing oil crops in Sweden was national self-sufficiency in a national emergency. The Second World War, however, accelerated, to a large extent, the development of oil-crop farming. A governmental commission, with an assignment to plan and regulate the national economy during the wartime blockade, pursued a policy of building the domestic oil-crop industry. Hence, the special governmental regulations in the oil-crop sector must be considered with this historical background in mind.

In Sweden, edible fats are subject to government regulations. The purpose of governmental regulation of edible fats and oils is to ensure that domestic oil crops enjoy equal protection against imports, as other agricultural products. This protection has been achieved by imposing import duties collected by the National Agricultural Marketing Board on raw materials intended for use in margarine manufacture. The import duty is the same on all raw materials: that is, marine oils, soybean oil, rapeseed oil, and so on. In September 1970, the import duty was Sw. Kr. 1:13 (U.S. $0.22) per kilogram of fat. A specified amount of the collected import duties is turned over to the Swedish Oilseed Association each regulatory year for price support of the basic price paid to the oilseed growers. The Swedish Oilseed Association is, in a sense a regulatory association in the oil-crop sector which, among other things, is responsible for setting the basic price of oil-crop seed. I shall take up the functions of this organization in more detail later.

The price of Swedish oil is based on the world-market price of rapeseed oil. To this price, 3 öre (approximately U.S. .5 cents) per kilogram is added, which is the calculated freight costs to Swedish harbours.

To guarantee the growers a market for their oilseeds, the National Agricultural Marketing Board has been authorized by the government to make the use of domestically produced oil mandatory in margarine manufacture. However, it has not been necessary to exercise this authority because, in the so-called Rapeseed Agreement of 1956, the margarine industry pledged to utilize domestic oilseed corresponding to about 40 percent of its annual requirement of fats. With an annual production of margarine at the present time of 130,000 metric tons, the purchase commitment is approximately 112,000 metric tons of domestic oilseed.

The parties of the Rapeseed Agreement are, on the one hand, the Swedish Oilseed Association and, on the other, the Swedish Extraction Association — a company that is owned jointly by all the margarine manufacturers in Sweden. I shall provide a more detailed account later on of the activities of these two organizations in the oil-crop sector.

The oil that is extracted from rapeseed may, according to the Rapeseed Agreement, be used domestically for margarine manufacture or be exported. In this way, the margarine industry has remained free to make decisions in matters involving the composition of the raw materials used in margarine manufacture, which, naturally, should be decided upon on other grounds than agricultural and economic ones — for example, on the basis of taste, consistency and nutritive value.

THE GROWING OF OIL CROPS IN SWEDEN

Oilseeds may be regarded as a relatively new crop for Swedish agriculture. A large scale and more permanent production has existed only since the beginning of the 1940's. After the Second World War, oil crops have taken on greater prominence and importance. To shed light on the extent that oil crops are grown in Sweden, acreages and harvests for the decade between 1960 and 1970 are presented in Table I. The large annual variations in the harvests can probably best be explained on the basis of winter kill of fall-sown crops, but insect damage has played a certain role, too. The peak year in the history of growing oil crops in Sweden was 1968/69, when the area under cultivation was about 260,000 acres (105,000 hectares) and the dried oilseed harvest totalled 231,800 metric tons. The base price paid each year is also shown in this Table. The base price in 1970/71 for seed with a moisture content of 18 percent has been set at Sv. Kr. 90 per 100 kilograms (approximately U.S. $17.30) by SOI. The base price for oilseed in the Common Market (E.E.C.) is about the same.

TABLE I

OIL-CROP AREA, PRODUCTION OF OILSEED AND BASE PRICE PAID TO THE RAPESEED GROWER 1960/61-1969/70

Crop Year	AREA		Total Crop Dried(1)	Base Price Paid to the Grower(2)
	Hectares	Acres	Metric Ton	Kr/100 kg
1960/61	35,100	86,700	58,864	80:-
1961/62	65,200	161,000	122,549	82:-
1962/63	76,800	189,600	145,803	83:-
1963/64	74,300	183,500	112,993	100:-
1964/65	99,900	246,700	192,940	89:-
1965/66	96,000	237,000	198,124	75:-
1966/67	54,900	135,600	89,271	85:-
1967/68	96,000	237,000	218,427	90:-
1968/69	105,100	259,500	231,765	85:-
1969/70	99,900	246,700	183,500	78:-
1970/71 (Estimated)	88,500	218,500	165,000	90:-

(1) The moisture content of the seed = 7.5%.
(2) Oilseed with an 18% moisture content and 47% fat content in the dry substance.

Table II shows that the portion of the total oil-crop acreage seeded to winter rape is over 50 percent. Moreover, both winter turnip rape and summer rape assume an important place, whereas the acreage planted to summer turnip rape and white mustard is insignificant. The yield per acre of winter rape is higher compared with the remaining oil crops, both as regards seed harvest and fat return. Even though the oil plants must be viewed as a special crop with a relatively limited number of growers (about 15,000), oil plants are valuable in plant rotation in Swedish agriculture.

At the Swedish Seed Association in Svalov, a very promising breeding program has been in progress for many years — a program that has as its objectives the release of improved varieties of oilseeds with favourable characteristics for our climate — for example, early maturing, increased winter hardiness and improved straw strength; and, of course, varieties with increased yields.

This breeding program, which has led to new varieties with greater yields, has concentrated mainly on rape — the crop giving the best return of oil. But turnip rape and mustard

TABLE II

PERCENTAGE DISTRIBUTION OF DIFFERENT KINDS OF OIL-CROPS AND AVERAGE YIELDS PER HECTARE 1967/68-1969/70

	Percentage of Total Oil-Crop Area	Average Seed Yield(1)	Average Oil Yield	Oil Content
		kg/ha	kg/ha	%
Winter Rape	55	2,550	1,080	42.0
Winter Turnip Rape	18	2,000	830	41.0
Summer Rape	18	1,730	610	38.5
Summer Turnip Rape	6	1,185	410	37.5
White Mustard	3	1,365	370	30.0

(1) The moisture content of the seed = 10%.

are also receiving attention by the plant breeders in Svalov. Moreover, the Weibullsholm Plant Breeding Institute in Landskrona has an oil-crop breeding program as well.

In Figure II, the increases in average yields of the oilseed crops grown in Sweden between 1941 and 1968 are plotted. The yield increases of this period are the result of the breeding work mentioned above and improved farming practices.

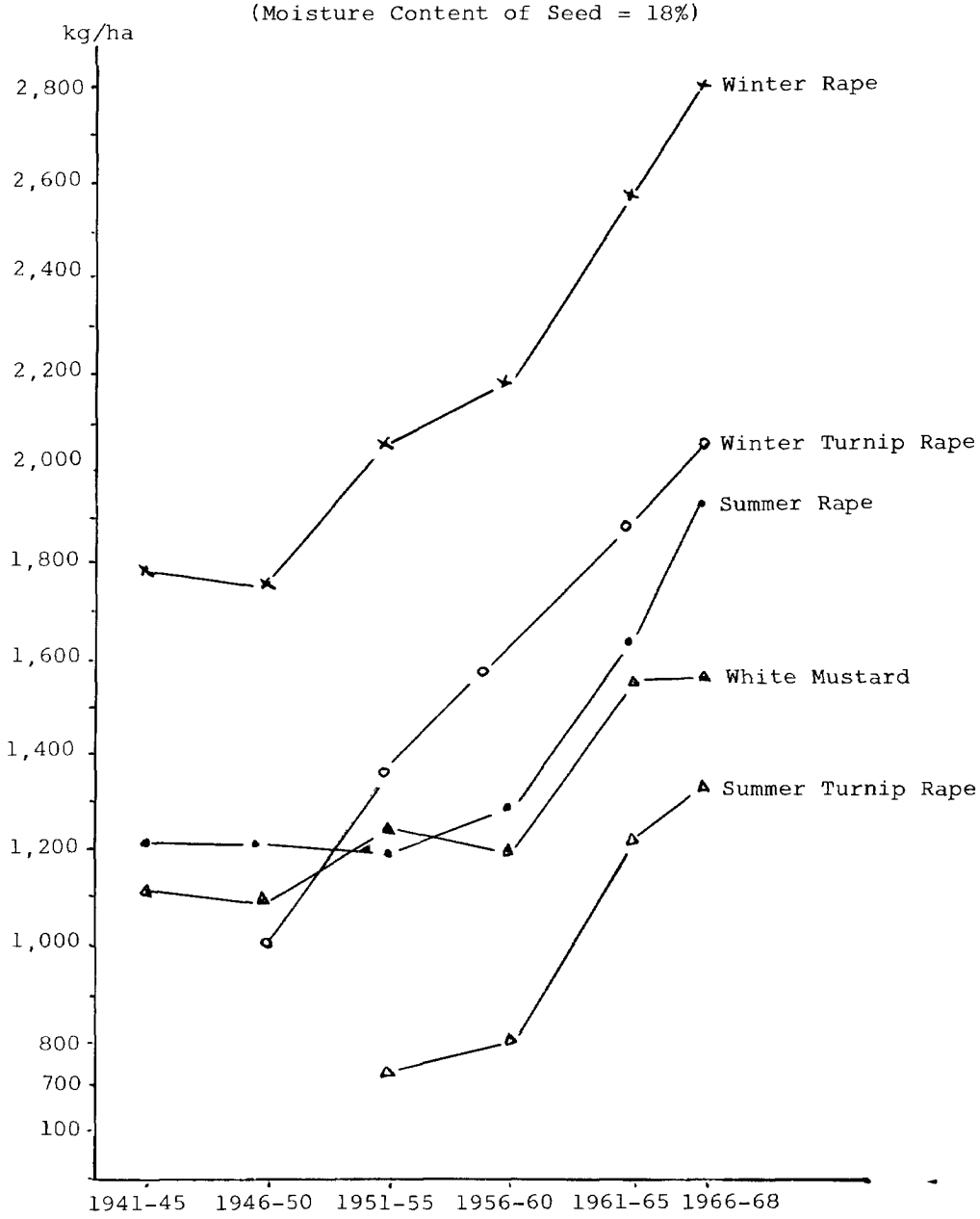
THE SWEDISH OILSEED GROWERS' ASSOCIATION (SOC)

The duties and functions of the following organizations in the oil-crop sector are summarized in Figure I:

- The Swedish Oilseed Growers' Association (SOC), which is the oil growers' own main organization.
- The Swedish Oilseed Association (SOI), in which all the economically interested parties are represented.
- The Swedish Extraction Association (SEF), which is owned jointly by the country's five margarine factories.

The government's involvement in the increase of oilseed acreage was initially an emergency measure. The government's position, as well as that of the oilseed growers, was that a special

(Moisture Content of Seed = 18%)



SOURCE: The Swedish Seed Association, Svalov.

Figure II.

AVERAGE YIELDS PER HECTARE FOR DIFFERENT OILSEED CROPS (1941-68)

association should be formed that would manage the growing of oil crops; and in 1943, the Swedish Oilseed Growers' Association (SOC) was founded. Membership in this organization is made up of 16 local oilseed and seed grower associations. According to its charter provisions, SOC shall promote the economic interests of its members by working to achieve co-operation between the local oilseed and seed grower associations. The voting power of each member in SOC is proportional to the land sown to oil crops.

In Sweden, oil crops are contract grown, which means that the grower, prior to sowing his land, binds himself to SOC to sow a certain acreage with a specified variety of oilseed, and further to process and deliver his harvest in accordance with the contractual terms. The signing of contracts with the oil-crop growers is one of SOC's chief duties.

Another of the main duties of SOC is to enter into an agreement with the buyer of the oilseed, the Swedish Oilseed Association (SOI), as regards terms and conditions of cultivation and delivery of the oil crops. A third chief function of SOC is to carry out research and an active informational program. The resources of the association have, to a large degree, been used to these ends. Research is directed by a research committee, which co-operates closely with the governmental research institutes. The informational campaign is carried out in various ways by articles in the professional and daily presses, brochures and speeches.

SOC also promotes the growing of oil crops by awarding grants for plant breeding and chemical research. The funds that are available to SOC for crop experiments, informational activity and grants to plant breeding are defrayed by a special seed surcharge. This seed surcharge is levied on all oilseed lots delivered by the growers. Presently, the seed surcharge is Sw. Kr.6 per metric ton (approximately U.S. $1.15).

THE SWEDISH OILSEED ASSOCIATION (SOI)

It was realized at an early stage that there was a need in the oil-crop sector for a special organization to represent all economically interested parties. And in 1951, such an organization, the Swedish Oilseed Association, was founded, which is a regulatory association for oil crops. Today, for instance, within the agricultural regulatory system there are regulatory associations — under directive of the National Agricultural Marketing Board — that are responsible for the management of the regulatory funds in their commodity areas.

The Swedish Oilseed Association assumes a rather unique position in that the association, besides its purely regulatory

responsibilities, also takes charge of all the handling of the oilseed from the grower to the extraction plant. The regular grain trade also is engaged in the handling of oilseed, but only as the agent for SOI. Representatives from the government, the Federation of Swedish Farmers' Associations, the Swedish Oilseed Growers' Association and the margarine industry are represented in SOI's board of directors.

The Association's duties include the purchase and selling of oilseed, as well as managing the storing and drying of the seed. Thus, the Association is obliged to purchase all the harvested oilseed in the country that is contract grown. One of SOI's main duties is to set the preliminary and final base prices for the oil-crop harvest each year. In establishing the base price, the following factors are to be taken into consideration according to the National Agricultural Marketing Board's directive:

- The price situation and the price trend on the world market with regard to fats.
- The projected size of the domestic oilseed harvest and the likelihood of disposing of it within the country.
- The estimated amount in fat import duties to be turned over to SOI.

SOI can, through the base price, regulate the acreage (hectarage) to be planted with oil crops. The base price fixed by SOI is intended only for seed that is harvested on contract-grown land. The base price has reference to oilseed with an 18 percent moisture content and a 47 percent fat content on a dry basis (=base price). Price regulation is then to be effected on the basis of these pivotal mositure and fat content percentages.

The economic responsibility for disposing of the purchased oil-crop seed devolves upon SOI, which also determines the price for the seed received from the grower, as well as the settlement or adjusted price for the seed delivered to the Swedish Extraction Association. As mentioned earlier, SOI has, through the Rapeseed Agreement, obtained a guaranteed sale of a little over 100,000 metric tons of the annual oilseed harvest. SOI is responsible also for exporting the surplus oilseed.

THE SWEDISH EXTRACTION ASSOCIATION (SEF)

The Swedish Extraction Association (SEF) in Karlshamn, which operates Sweden's only extraction factory for rapeseed, was formed in 1957 and is owned jointly by all of the country's margarine factories. Their shares in SEF are as follows:

	Shares %
AB Liva Fabriker, Lidingo	38.0
AB Pellerin/Zenith, Halsingborg	31.0
AB Karlshamns Oljefabriker, Karlshamn	25.6
Victoria, Halsingborg	4.6
Alba, Dalby	0.8

The main function of the Swedish Extraction Association is to process on behalf of the margarine industry the oilseed received under the Rapeseed Agreement for the extraction of oil. According to the Agreement, SEF is to sell, for SOI, the rapeseed meal derived from oilseed extraction on the Swedish market.

During recent years, SEF has within the provisions of the Rapeseed Agreement acquired about 110,000 metric tons of oilseed. Thus, from the approximately 45,000 metric tons of oil extracted annually from the above oilseed tonnage, between half and two-thirds of the oil has been used in the Swedish food industry, chiefly by the margarine industry, whereas the remainder has been exported.

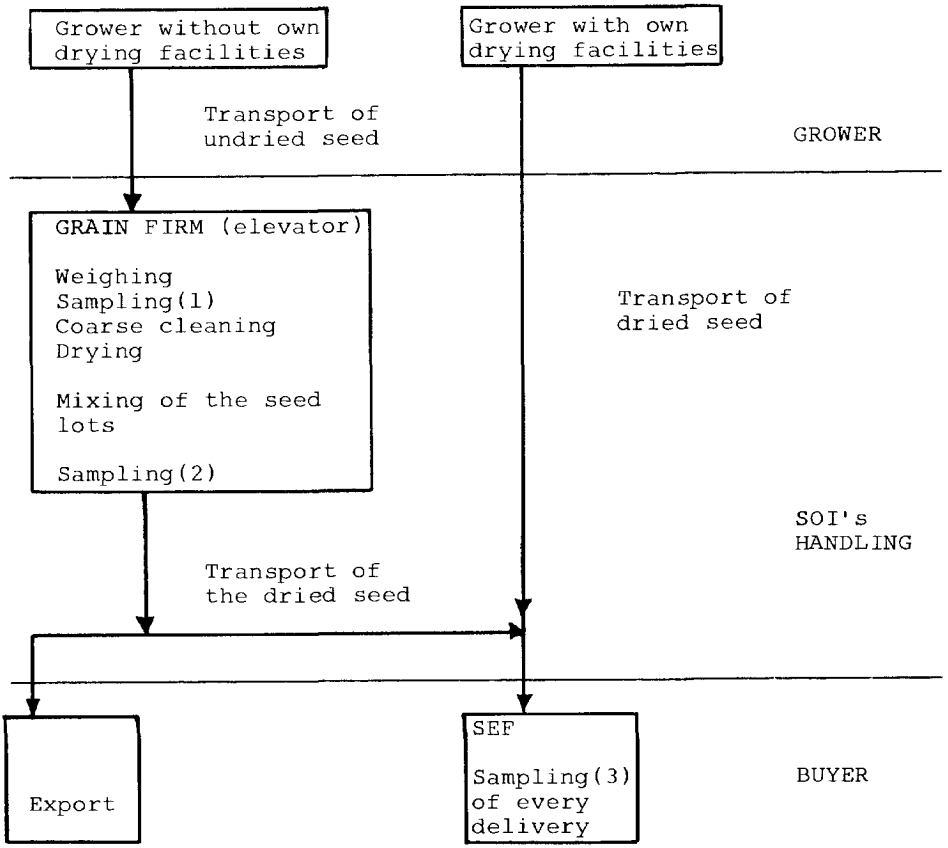
The Swedish Extraction Association receives a certain compensation from SOI for each ton of processed seed. The settlement of accounts between SOI and SEF takes place each calender month for the oil that has been extracted and sold from the oilseed processed by SEF. Payment is made on the basis of the amount of oil and meal, which according to the analysis is expected to be derived from seed having an oil content of 47 percent (dry basis) and a moisture content of 7.5 percent. Price regulation is based on these oil and moisture percentages. Finally, it may be mentioned, too, that SEF has become the margarine industry's contact organization with the other organizations in the oilseed sector. Moreover, SEF promotes the oil-crop farming interests through grants for breeding work and chemical research on oilseed crops.

ROUTE OF THE OILSEED FROM THE GROWER TO THE INDUSTRY

As pointed out previously, it is also the responsibility of SOI to administer the handling of the oilseed from the grower to the extraction plant. This is shown diagrammtically in in Figure III.

FIGURE III

THE ROUTE OF THE SEED FROM THE GROWER TO THE EXTRACTION PLANT



(1) Analysis for calculating price between SOI and the grower: moisture content, oil content and chlorophyll content.
(2) Analysis for calculating the price between SEF and SOI: moisture content and oil content.
(3) Control and sorting analysis: moisture content, oil content, FFA-content and chlorophyll content.

For deliveries from growers with own drying facilities analysis for calculating the price between SOI and the grower and between SEF and SOI.

The major part of the 15,000 oil-crop growers turn over their crops to the country's 200 elevators with drying facilities, which SOI engages as agents in the supervision of drying, cleaning and storage of the oilseed harvest. The elevator where a particular grower delivers his seed, is specified in his contract with SOI. About 400 growers have their own drying facilities, and dry about 10 percent of the annual oilseed harvest.

Seed from growers having their own drying facilities is shipped directly to SEF in Karlshamn, where samples are drawn and tested from every lot received. Let us, however, follow the route of the seed from the grower without private drying facilities. The seed is transported first to an elevator. Here, weighing, sampling, coarse cleaning and drying are carried out. The sample taken when the oilseed is received is analysed for moisture, fat and chlorophyll content. This analysis serves as the basis for establishing the price to be paid to the grower by SOI. During the drying process, seed lots from different growers are co-mingled. Thus, upon the removal of the mixed seed from the driers, a new sample is drawn. This sample is analysed for moisture and oil content and serves as the basis for the price that is paid by SEF to SOI. All sampling is performed by independent control firms. The samples are sent to an official analytical laboratory, where the analyses are performed. From the agents (grain elevators), the dried seed for SEF is transported by truck or boat to SEF in Karlshamn. The remaining part of the crop is stored at the grain firms or in SOI's own elevators until the seed has been sold on the export market. Upon arrival at Karlshamn, SEF samples every lot received and performs a so-called control and sorting analysis. This control includes a visual inspection and a determination of the moisture, chlorophyll-and FFA-contents (free fatty acids). The visual inspection may be complemented by an analysis for purity if this is deemed necessary.

After the seed shipment is checked, a decision is made if it should be accepted or returned. An accepted seed lot is either classified as choice or second-grade. A shipment may be rejected if the moisture content of the seed exceeds 8 percent or if the content of impurities exceeds 10 percent. A lot is classified as second-grade if it is mouldy or malodorous, if the chlorophyll content exceeds 30 ppm in the oil, or if the FFA-content is more than 1 percent.

DEVELOPMENT WORK ON RAPESEED PRODUCTS

The technical development work with rapeseed oil has been done within the margarine industry, whereas the research and

breeding work with rapeseed has been carried out almost entirely at the Swedish Seed Association in Svalov. The Weibullsholm Plant Breeding Institute has, as mentioned previously, oil-crop breeding on its program. Other institutions that are engaged in research in the rapeseed sector in Sweden include the University of Lund (Chemical Center), the University of Uppsala, and the Royal Agricultural College, also in Uppsala.

TECHNICAL DEVELOPMENTAL WORK

The Swedish margarine manufacturers have placed very high demands for quality on margarine raw materials. It is well known that rapeseed oil, owing to its high linolenic acid content, has poor stability when exposed to oxygen. Thus, in the Swedish margarine industry, there has been, for a long time, intensive work been in progress to avoid oxidation in all phases from the harvest of the rapeseed all the way up to the manufacture of the margarine. Oil extraction, storage in tanks and transport of oils take place under the least possible contact with air, and also with minimum delays and at low temperatures. Through developmental work in the margarine industry, it has been possible to significantly reduce the negative effects of the high linolenic acid content in rapeseed oil.

It is quite natural that the establishment of a correlation between the quality of the crude oil and the margarine be extended to include also the relationship between the quality of the crude oil and that of the seed. As is well known, there is a definite relationship between the quality of the seed and the quality of the extracted oil. Moreover, it is indisputable that growers and drying firms are able to influence greatly the seed quality. SEF regards it as its duty to support and speed up all development work aimed at eliminating the quality-reducing factors in oilseed: for example, the content of immature or germinated seed, mouldy, burned non-viable or cracked seed.

A working group, which is comprised of representatives from SOI, SUF and SEF, has been investigating for many years the possibilities of making payments based on oilseed quality. Based on a proposal from this working group, the 1970 growing contract has included a scale for price regulation based on the chlorophyll content of the oilseed. The motivation behind this is that immature seed has a high chlorophyll content and results in discolouration and less stable crude oil.

PLANT BREEDING AT THE SWEDISH SEED ASSOCIATION

The Swedish Seed Association is an official plant breeding institute. Its activities are financed chiefly through governmental appropriation and grants. The Swedish Seed Association also receives considerable economic support from the Swedish Oilseed Growers' Association (SOC) and the Swedish Extraction Association (SEF) for its oilseed breeding program. These same organizations have, in more recent years, lent economic support for research on the chemical composition of rapeseed at the Chemical Center of the University in Lund.

I mentioned earlier that a breeding program is in progress at the Seed Association in Svalov to improve the agronomic characteristics of oil crops for our climatic conditions, and of course, for increased yields of new varieties. However, the research and breeding activities aimed at the improvement of the quality of the oil and meal are of particular interest. Mr. Bengt Loof, a member of the staff of the Swedish Seed Association, discussed this breeding work in his paper entitled "New Developments in Rapeseed Breeding in Sweden". Thus, I shall only mention here that the general goal for the plant breeders, from the oilseed growers' point of view, is to obtain a domestic raw material that can compete with the imported oils both, in price and in quality. With this as the goal, the research in Svalov has been focussed on changing the fatty acid composition of rapeseed by increasing the content of linoleic acid and reducing in turn the content of linolenic and erucic acid. Another breeding objective, which in recent years has attracted increased interest, is the removal of glucosinolates from rapeseed meal.

CO-OPERATION BETWEEN THE GROWER AND THE INDUSTRY

I mentioned, by way of introduction, that originally the sole motive for growing rapeseed and other oilseed crops was self-sufficiency in time of national emergency. However, the development has been such that rapeseed farming today is economically competitive with other crops.

Because of the margarine industry's emphasis on the quality of the rapeseed oil, close co-operation between all of the economically interested parties has been imperative. A working group, or team, is, as pointed out earlier, investigating the possibilities for increased payment for oilseed quality as an incentive to improve the quality of the oil. Another team is investigating the possibilities of increasing the domestic sales of rapeseed meal. Representatives from the grower organizations and industry participate in these co-operative working groups.

Personally, I feel that the organizational set-up in the oil-crop sector, with one seller (SOI) and one buyer (SEF), has been a contributing factor to the favourable development of the industry. But one should not, however, overestimate the importance of the organizational structure. What is actually decisive is the will and ability of people in the various organizations to co-operate with one another. On this point, I am optimistic for the future. For there is reason to expect that the co-operative spirit that has been established in solving the rapeseed problems between agriculture and the Swedish margarine industry will endure.

SESSION V

RAPESEED MEAL UTILIZATION: PRESENT AND FUTURE

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University of Alberta,
Edmonton, Alberta.

CO-CHAIRMAN: Monsieur M. Chanet,
C.E.T.I.O.M.,
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