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THE ECONOMY OF THE SUNFLOWER

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In a paper which I presented at the 4th International Sunflower Conference in Memphis, I tried to outline the trends in the world market. I concluded then that sunflower seed oil holds a strong position vis à vis other edible oils, due to its quality and wide range of application. I will now deal with the practical consequences of this position and, in doing so, concentrate on the following two questions :

1 - At which price does sunflower seed become an alternative commodity for the oilseed processor ?

2 - At which price level does sunflower become an alternative crop for the farmer ?

The answer to these questions is rather obscure because there is no "official" world market price for sunflower seed. There is a lively international trade in oil and meal but nearly all seed is processed domestically by the seed-growing countries themselves. Prices of agricultural produce in these countries are rarely the result of the supply and demand but of government intervention. A world market price for sunflower seed must therefore be derived from the prices of oil and meal. This price, however, will depend on the composition of the seed, which is subject to much larger fluctuation for sunflower seed than for other oilseeds.

In Figure 1 a range of representative compositions is shown, which is based both on the results of analytical work and on the yields recorded in oil mills. It should be pointed out that the data have been averaged and that deviations may occur in practice. The general trend, however, is sufficiently accurate for our purposes.

We see that the husk content declines strongly as the oil content increases. The yield of meal can be assumed to be constant, at least if the aim is to produce meal of constant quality with a maximum of 10 % husk. Actual meal quality will of course depend on the local market situation, where improvements to the quality of the meal are not always reflected in a better price. Moreover, better quality meal requires rather sophisticated processing equipment which is not always available. For the sake of simplicity, I have limited myself to meal with 10 % husk.

Our experience is that the protein content of meal is independent of the oil content of the kernel, which means that high-oil varieties can produce just as good a meal as low-oil varieties. Oil yield of course is strongly influenced by the type of processing equipment.

We can now calculate the value of the seed for various seed compositions, as is demonstrated in Fig. 2. I have taken three levels of oil price, namely $ 250, $ 300 and $ 350 per ton. The average oil price was $ 242, for the period 1960-1969, $ 332 in 1970 and $ 370 in 1971. Meal price has been taken to be $ 90 per ton, which is $ 10 over the average 1960-1969 world market price. The latter, however, was based on a meal containing 37 % protein, whilst I have assumed a minimum protein content of 45 %. We find that the seed value ranges from $ 92 to $ 198 per ton. When oil yield rises 1 % the seed value goes up about $ 3 or up to 3 %. When the oil price rises 1 %, (or about $ 3 per ton) then the seed value also rises by nearly 1 % or about $ 1.20 per ton. In other words, oil price and oil content have a very strong effect on the value of the seed.

To calculate the value of seed I have so far used the market price of its components. Seed value, however, is by no means the same as seed price paid to the farmer. The prices for oil and meal include all the production and distribution costs of industry and traders, as well as their profit margins. To approach the farmers' price we must deduct the seed value by a certain amount, called the "crushing margin". This is demonstrated in Fig. 3. As I have used it, the term "crushing margin" includes all production and distribution costs. We see that the "break-even" point for seed with 40 % oil is $ 150 per ton, or in other words this would be the price of the seed at the assumed levels of oil and meal price if there were no production and distribution costs nor profit margins. In other words, the seed would never command a price of more than $ 150. If we assume the "crushing margin" to be $ 20 per ton the price to the farmer would be $ 130 per ton.

This enables us to answer our first question as to how much the oilseed processor is prepared to pay for sunflower seed. The next question is whether the farmer would be prepared to grow the crop for this price. In Table 1 I have compared the yields of sunflower, maize and wheat required to produce the same gross return, in this case $ 130 per ha.

Table 1 - Yields of sunflower, maize and wheat for fixed gross return.

Crop	Seed price ($/t)	Required yield (t/ha)	Gross return ($/ha)
Sunflower	130	1.0	
Maize	66	1.9	130
Wheat	53	2.5	

Providing the costs of growing and harvesting the crops are about the same, the gross return is the determining factor in the choice of crop. We fing that the yield of sunflower should be at least 50 % that of maize and 40 % that of wheat if the crop is to be competitive.

Under which conditions is this requirement met ? In Table 2 I have compared the average national yields of these crops in 9 countries. The requirement that the yield should be 50 % that of maize is not reached in countries with high maize yields, such as Canada, U.S.A. and France. In countries with low maize yields, however, the requirement is surpassed. This is an agreement with the commonly held view that sunflowers are more drought resistant than maize. Sunflowers will be unable to compete with maize under conditions that are optimal for this crop, but will be in a much better position when maize conditions are suboptimal. The requirement that sunflower yield should be 40 % that of wheat is easily met in all countries, although it would be wrong to conclude that sunflowers do better than wheat under all conditions. It should be noted that all wheat yields shown are rather low, except in France.

It is tempting to conclude from these data that the future for the sunflower is very bright and that it will replace a good deal of the maize and wheat in areas marginally suited to these crops, thereby reducing world supplies of them. This view is too optimistic. One weak point in our reasoning is the assumption that farmers can sell at world market prices and this is not the case. All countries in our Table have a system of pricing which gives the farmer some degree of protection against price fluctuation on the world market. In some countries this protection is such

that farmers are fully isolated from these fluctuations ; they will not react therefore to improvements in the price ratio of oilseeds vis à vis grain crops. In other countries, however, government protection is only slight and in some of these, like Canada and Australia, we find that the shift from grain to oilseed, either rapeseed or sunflower, is in full swing. It is very likely that in these countries the trend towards oilseed will continue for some time to come. In countries with price protection the production of oilseed is fully dependent on governmental price policies. If they want to expand sunflower seed production they should be aware that the lower yield of sunflowers with respect of grain crops should be adequately compensated by higher prices.

Table.2 - Yields of sunflower compared with those of maize and wheat.

	Maize (t/ha)	Wheat (t/ha)	Sunflower (t/ha)	Sunflower as % of	
				Maize	Wheat
Canada	5.0	1.8	1.0*	20	55
U.S.A.	4.5	1.8	1.2*	27	66
France	4.5	3.0	1.7	37	56
Rumania	2.5	1.5	1.5	60	100
U.S.S.R.	2.5	1.0	1.3	52	130
Australia	2.0	1.5	1.0*	50	66
Argentine	2.0	1.5	0.8	40	53
Turkey	1.5	1.0	1.1	73	110
South Africa	1.0	0.7	0.7	70	85

* Estimates

Having dealt with the two questions which I posed at the beginning of this report, I feel sure that many of the world's farmers will be able to produce sunflower seed at competitive prices and that many of the world's seed processors will be prepared to utilize sunflower seed as a competitive commodity.

Figure 1 - Representative compositions and process yields for sunflower seed

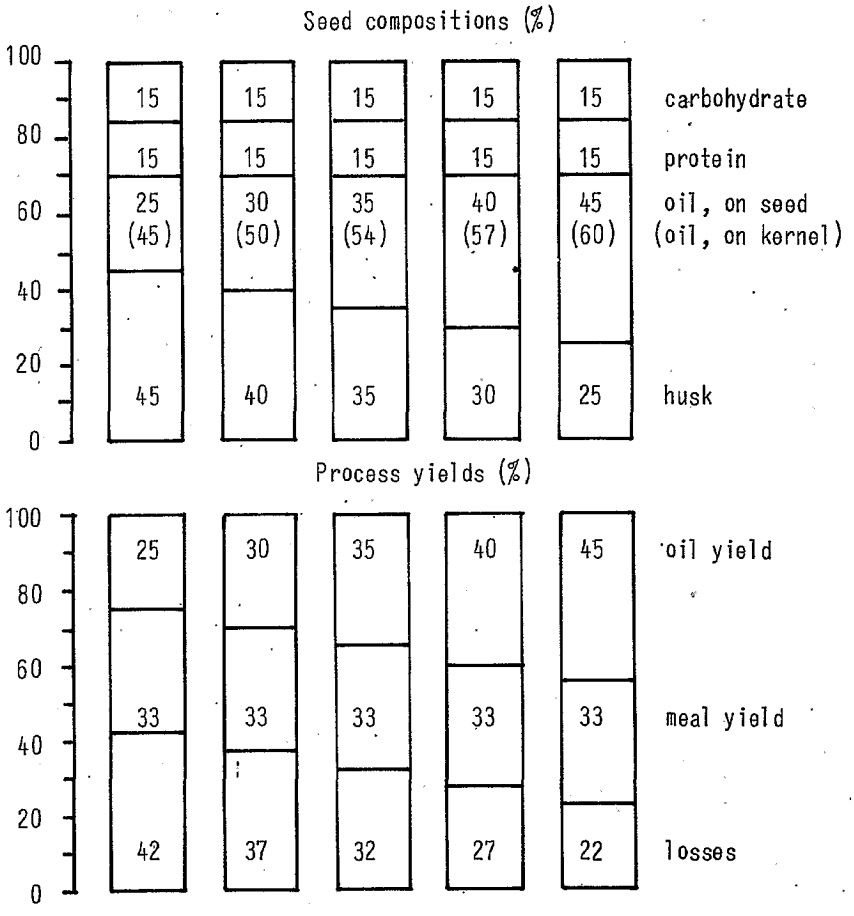

Figure 2 - Relation between oil yield, oil price and gross seed value
(meal price $ 90/t, meal yield 33 %)

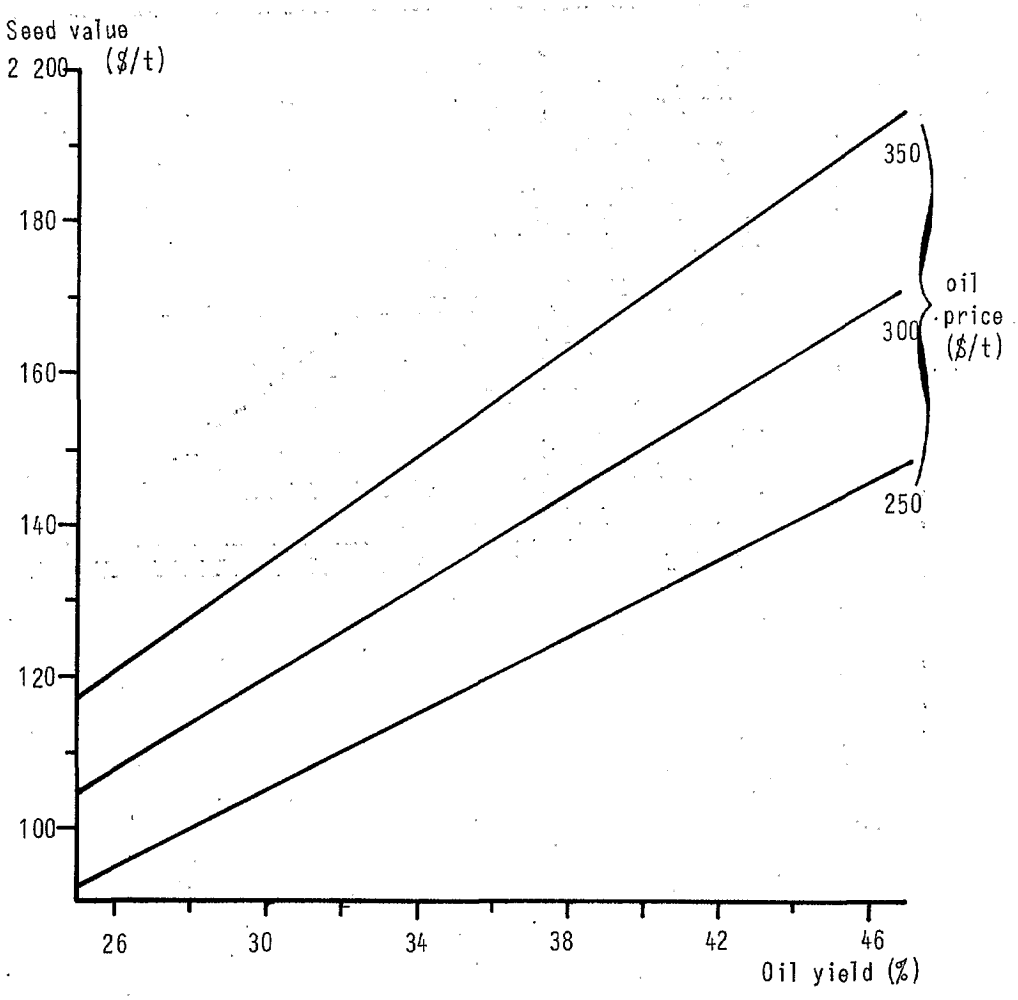

Figure 3 - Price of seed to farmer, for three different oil levels

(oil price $ 300/t, meal price $ 90/t, meal yield 33 %)