

MAATALOUDEN TALOUDELLISEN  
TUTKIMUSLAITOKSEN  
**TIEDONANTOJA N:o 133**

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*THE AGRICULTURAL ECONOMICS  
RESEARCH INSTITUTE, FINLAND  
RESEARCH REPORTS, No. 133*

## AJANKOHTAISTA MAATALOUSEKONOMIAA

CURRENT TOPICS IN AGRICULTURAL ECONOMICS

HELSINKI 1987

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## HOW MUCH LAND IS NEEDED? 1)

Lauri Kettunen

**Abstract.** Overproduction is the most difficult problem in Finnish agriculture. It is generally agreed that production should be reduced. Various methods have been applied to curtail production, but the results are not encouraging.

A decrease in acreage would seem to be the best way of cutting production. This measure is, however, opposed by the political parties which are closely linked to farmers, since it would worsen the employment situation in rural areas, and since any decline in the rural population can easily lead to a deterioration of living conditions in the countryside.

Estimates of the need for arable land by the year 2000 and the implications of a decrease in production are discussed. Political aspects of supply management are also considered in this context, since they determine the content of agricultural policy in Finland.

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Index words: land requirement, planning, future  
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### 1. Introduction

Today, land is still one of the basic factors in agricultural production. However, man has learned various means of utilizing it so effectively, that agricultural production is

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1) A paper presented at the fifth Congress of the European Association of Agricultural Economists in Balatonszeplak, Hungary, August 31 - September 4, 1987.

increasing despite a decrease in arable area. As supply exceeds demand, arable land areas have even been actively reduced in order to cut down production. This is true of Finland, too. The future need for arable land has been a permanent point of contention during the formulation of long-term agricultural policy.

Decreasing the area of arable land has its side effects. People have strong emotional ties with the land. Fields were originally cleared by hand, with sweat and pain. Leaving it uncultivated seems to some people like sacrilege. Arable land is the basis for rural culture, and its beauty. Fields overgrown with bushes and weeds spoil the image many people have of rural areas.

Another argument for maintaining arable land can be found in national security policy. If borders are closed in a crisis situation, the supply of fertilizers and energy may be seriously disturbed. Then the value of land will increase. Even though yields may drop, a sufficient amount of arable land would secure the food supply during times of hardship or crisis.

These facts have always been crucial to the agricultural debate in Finland. These discussions have also a political connotation since one of the leading political parties in the country is the Centre Party (formerly the Agrarian Union) which is the farmers' party (about 18% of the seats), and is mostly supported by farmers or country people. The voice of the farmers has had an effect on decision making.

The role of defender of consumer interests has usually been taken by the Social Democratic Party, which is currently the largest party in parliament (27% of the seats). The Centre Party and the Social Democratic Party have usually made up the core of the coalition government of the country. There has been constant confrontation within the government over agricultural matters. The collapse of a government due to a

disagreement over agricultural issues has not been unusual even though agriculture has not caused as much debate recently as in earlier times. The amount of land needed has always been one of the central topics of discussions about agricultural policy.

## **2. Significance of Arable Land in Production**

How significant is acreage for total agricultural production? Is it at all important? Is it not possible to obtain good crops with intensive cultivation, in spite of rather small field areas? Furthermore, animal husbandry does not necessarily require land at all, if feed is imported.

It is true that the total area cultivated is a decisive factor in supply control in conditions of regulated feed imports and constant levels of production. The level can be expected to remain constant if yields and feeding techniques are unchanged. This is a normal situation in Finland.

Regulation of feed imports as a primary method of control has been quite successful in Finland. The small amounts of feed imported, approximately 5% of the total feed used, consists of protein feeds that cannot be produced domestically (for example soya). Fish meal, however, is imported freely in line with the EFTA-agreement, but the composition of the feed is regulated also in this case.

The second alternative, i.e. keeping levels of cultivation unchanged, is more difficult to realize. Usually the least productive land is taken out of production, which means that the effect on production is smaller than the reduction in acreage. This can easily result in higher levels of production.

Despite the vagueness of the two assumptions changes in arable area usually have an effect on production. The clearest

effect is achieved by taking a whole farm out of production. Then crop production ceases along with animal husbandry.

### 3. Goals

Although there are no totally unambiguously determined production targets for Finnish agriculture, certain production targets have been presented in various contexts as general goals for agricultural policy. For example, production ceilings set in the Farm Incomes Act are, in practice, production targets.

The aim has been to achieve a balance between the production and consumption of agricultural products. Consumption has thus become a driving force determining production targets. Usually production targets are calculated by assuming an aim of self-sufficiency. By multiplying consumption by the self-sufficiency target we can derive the production target. After the target for animal production has been determined, the feed requirement and finally the land requirement can be calculated. Yield and consumption forecasts are essential elements in this method of long-term planning.

### 4. Trends in Arable Land Area

At its peak, in 1968, the arable area in Finland was 2.75 mill.ha. At the same time a drastic change in agriculture was begun. Overproduction problems became insuperable as markets closed. The period of tight restrictions on production, e.g. the soil bank, began. Migration from the countryside to urban areas simultaneously accelerated. Agriculture still accounted for about 20% of the total labour force in 1970, so that the change was also dictated by time. The reduction in the agricultural population was forced by industrialization and general rationalization. Consequently, the total arable area began to fall, and in 1986 it was 2.39 mill.ha, which is 13% lower than the peak value. The area under cultivation decreased even more, by 19% from 2.67 mill.ha to 2.16 mill.ha.



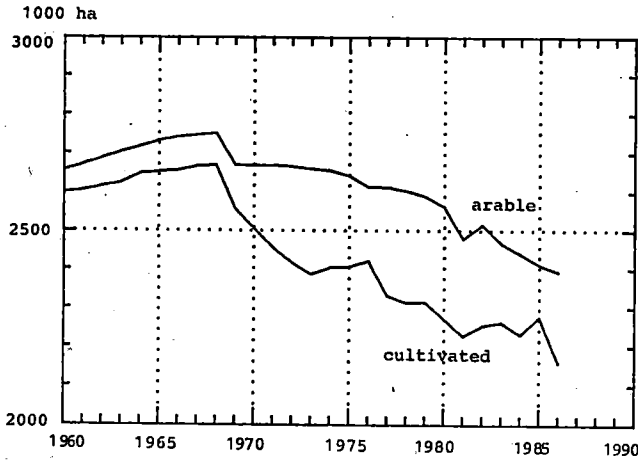


Figure 1. Trends in arable and cultivated area in 1960-86.

Part of the arable area is fallow and some fields are uncultivated for other reasons, which clearly indicates that they will remain out of production as marginal low-yield land.

There are no definite predictions on how acreage will change in the future. It depends on production policy: if we want to cut production, the arable area most probably will have to be reduced. Another alternative is, of course, to reduce levels of crop production, but the implications of this are not known. In other words, there is no evidence to either prove or disprove its economic profitability.

## 5. Planning

Many studies have been made of the developments in land requirement. The results given in Appendices 1-3 have been generated by a submodel of the Finnish food and agriculture model which is designed for long-term scenarios in agricultural development.

To begin with, we need forecasts for consumption developments in order to calculate land requirement. Consumption tends to

be independent of the agricultural policy pursued. Although consumption can also be guided to some extent by pricing policy, consumption forecasts can be regarded as quite reliable.

Another relatively independent factor to be predicted is yield level. It will increase annually by about 0.9%, according to forecasts. This progress can be halted by ecological factors. If the level of fertilizer and pesticides used has to be reduced, the forecasts of yield levels will not come true.

Feed use efficiency ratio is the third factor to be predicted in our planning method. This feature obviously improves with time, but research results are quite controversial and, furthermore, inadequate data results in great variations in the results. This being the case, no forecast has been made and the same value as in 1985 is used in the tables.

The estimation method used involves many potential sources of error, so the results should be interpreted with care. However, the trends are obvious. In the future the arable area needed will be much smaller than the area available at the moment. In 1986 the area under cultivation was 2.17 mill.ha, which produced a large surplus of animal husbandry products. Moreover, some feed grain was exported. In line with the present levels of overproduction (self-sufficiency) 1.78 mill.ha of arable land would be required in 2000. If animal production were to be reduced to the level of domestic consumption, the land requirement would be about 1.5 mill.ha.

Finnish farmers are worried about this prospect, and consequently it represents a serious challenge to agricultural policymakers.

## 6. The programme of the political parties

A new government was formed at the end of April, 1987. It is a coalition of the Conservative Party (7 ministers), Social Democratic Party (8 ministers), Swedish Party (2 ministers) and the Finnish Rural Party (1 minister). The Prime Minister as well as the minister of agriculture and forestry come from the Conservative Party.

The government's programme for agriculture is rather brief. It says among other things that "the goals of agriculture are self-sufficiency, securing the farmers' incomes, cutting down overproduction and export subsidies, and fair prices for food". As regards production policy, it only states that the government will reduce production and cut down export subsidies. No exact goals are specified. The matter will be taken up when the agricultural committee which is considering long-term policy has issued its report.

Since the government's programme does not give any definite answer to the question of production and acreage targets we may look at the agricultural programmes of the political parties.

According to the programme of the Conservative Party "a decrease in agricultural production from the present level is necessary". On the other hand, "if overproduction is less than the generally accepted limits the costs of exporting these surpluses is the responsibility of the whole of society". Thus, the Conservative Party accepts some overproduction, although less than the present level.

According to the Social Democratic Party, "food production has to be equal to domestic consumption. Export costs caused by production exceeding the needs of self-sufficiency have to be paid by agriculture itself". The party does not accept any overproduction. The Centre Party, which is now in opposition, favours overproduction. Also the Finnish Rural Party, which

split from the Centre Party considers overproduction necessary in order to keep rural areas alive. The Swedish Party holds the same view. The Central Union of Agricultural Producers understands the problems of overproduction but has not accepted heavy cuts in production.

The labour unions strongly oppose overproduction and most criticism has come from that quarter. It cannot be ignored by the political parties, especially the Social Democratic Party.

## 7. The future

The future of production policy is thus unclear. The differences in the aims of main parties will characterize the agricultural debate. Fairly close general agreement on a decrease in production may be achieved, but it may be difficult to agree on the means. It remains to be seen how far the Conservative Party can go along with the Social Democrats in cutting production. It is likely that an agreement on production targets will be difficult to reach, since this includes various other aspects like income level, regional and general rural policy. The Centre Party will oppose any decrease in agriculture since it would mean a decrease in the number of its supporters. The Conservative Party also gets votes from rural areas, and in general the traditional Finnish way of life, with its rural customs and farmers, is part of the image of the Party.

It is certain that less land will be needed for Finnish farming in the future. It is, however, difficult to say how the necessary cuts in arable land will be realised, or if they will be realised at all. Agricultural economists cannot do much to help in decisionmaking, since it has so much to do with party politics.

## Appendix 1. Situation in 1985.

	Consump- tion kg/cap.	Self- suffic. %	Pro- duction mill.kg	Feed ratio fu/kg	Yield tn/ha	Arable area 1000 ha
Wheat	60	140	422		3.10	137
Rye	20	100	100		2.30	42
Milk	490	127	3069	0.67	2.58	797
Beef	21	121	126	9.10	2.58	446
Pork	32	110	173	4.30	2.87	259
Eggs	11	165	86	3.10	2.87	93
Poultry	4	100	21	4.10	2.87	29
Others						404
Cultivated area total						2 207

## Appendix 2. Basic scenario for 2000.

	Consump- tion kg/cap.	Self- suffic. %	Pro- duction mill.kg	Feed ratio fu/kg	Yield tn/ha	Arable area 1000 ha
Wheat	60	140	422		3.40	124
Rye	20	110	100		2.50	40
Milk	452	127	2881	0.67	2.78	695
Beef	18	121	109	9.10	2.78	358
Pork	37	110	204	4.30	3.50	251
Eggs	12	165	99	3.10	3.50	88
Poultry	7.5	100	38	4.10	3.50	44
Others						180
Need of arable area						1 780

## Appendix 3. Alternative scenario for 2000.

	Consump- tion kg/cap.	Self- suffic. %	Pro- duction mill.kg	Feed ratio fu/kg	Yield tn/ha	Arable area 1000 ha
Wheat	60	140	422		3.40	124
Rye	20	100	100		2.50	40
Milk	452	100	2269	0.67	2.78	548
Beef	18	100	90	9.10	2.78	296
Pork	37	100	186	4.30	3.50	228
Eggs	12	100	60	3.10	3.50	53
Poultry	7.5	100	38	4.10	3.50	44
Others						168
Need of arable land						1 501

POSSIBILITIES OF FINNISH AGRICULTURE ADJUSTING TO  
MORE LIBERAL FOREIGN TRADE <sup>1)</sup>

Lauri Kettunen

**Abstract.** Overproduction is one of the most difficult problems faced by Finnish agriculture. About one-fifth of total production is exported. Since world market prices are very low, there is no economic justification for export production. Unemployment, social and population aspects have, however, prevented decision-makers from taking drastic action to cut production. Exports of excess supplies have been possible with the help of State subsidies. It seems unlikely that this practice can be continued in the future if foreign trade rules are changed as a result of the new General Agreement on Tariffs and Trade (GATT) negotiations.

The possibilities of Finnish agriculture competing on free world markets are very uncertain. Natural conditions for effective agriculture are very poor compared with those of many other countries, and production costs would rise steeply even if agriculture were extensively rationalized. Finland would appear to require some border protection if it is to maintain self-sufficiency in food, one of the central principles of Finnish agricultural policy.

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Index words: foreign trade, supply control, adjustment  
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<sup>1)</sup> A paper presented at the seventh Finnish-Hungarian-Polish seminar in Eger, Hungary, October 5-9, 1987.

## 1. Background information

Finland is one of the world's northernmost countries. The Gulf Stream has a warming effect on the climate, enabling agriculture in most of the country, although milk production based on hay and silage is the only real option in central and northern Finland. Barley and potatoes are grown in Lapland, whereas the cultivation limit for wheat is in southern Finland. Corn is not grown in Finland. Barley and oats are the main feed grains, with yields of about 3 tons per hectare. About 7% of the land is cultivated, which is sufficient to allow serious overproduction.

Finnish farms are small, with average areas of 12 ha for arable land and 35 ha for forest. Income is secured by means of statutory producer prices. Both price levels and production costs are high, and the income parity is about 70% compared to wages and salaries in other industries.

## 2. Overproduction

Finland exports about 20% of her agricultural production. In 1986 self-sufficiency in milk was 131%, in meat about 112% and in eggs 143% (see Table 1). Production of feed grains

Table 1. Production, export, and self-sufficiency of the main agricultural products in 1986.

	Production mill.kg	Export mill.kg	Self-sufficiency (%)
Milk, total	2975.6	..	131
butter	72.2	15.8	..
cheese	83.4	36.6	..
milk powder	76.0	33.9	..
Beef	124.0	22.3	122
Pork	172.9	10.3	108
Eggs	83.9	25.0	143
Barley	1713.8	472.8	..
Oats	1174.5	200.6	..

Source: PSM tiedote Elintarviketalous 1987.

exceeds domestic consumption by 20-25%. Some manufactured food, fruits and vegetables, as well as some protein feed is imported. Even so, the capacity of Finnish agriculture remains greater than domestic needs. Exports are necessary if production is not to be reduced.

Prospects for the future are even worse. Consumption is not increasing greatly, population growth is almost zero, and the income elasticities for most products are small or even negative. A shift to more processed food can be expected, but this will have little effect on total consumption. Nonetheless, production tends to increase. Yields of the main crops are forecast to increase by 1% per year, and productivity (feed efficiency) in animal husbandry is also improving. The gap between production and consumption seems to be widening.

This situation, in which production exceeds consumption and stores are full, is the same in most industrialized countries. World markets are under great pressure, and prices are low. Governments have been rather reluctant to take measures to bring about a better balance between domestic and world markets.

The situation in Finland has been better than in many countries, in the sense that the production of animal products has not increased. Milk production has even fallen slightly. The decline in world market prices has, however, brought about higher export subsidies and caused widespread dissatisfaction in political circles. It is also difficult to find markets for surplus products, and export companies and State officials are becoming desperate.

### **3. Supply control**

Various means are applied to curtail or cut production. There are collective quotas for milk, meat, eggs, wheat, and feed grains. Agriculture receives only the world market price for production in excess of these quotas (production ceilings).



Frequently, voluntary schemes have been applied to cut production. Bonuses have been paid to milk and pork farmers who have cut production for a certain period, while fallowing of arable land has been applied to curtail feed grain production. The establishment of new animal production units must be approved by the relevant authorities if the size of the farm exceeds given (low) limits. Only active farmers are allowed to purchase arable or forest land.

In spite of these supply control measures, production has not fallen sufficiently, if it has fallen at all. Employment opportunities are not good in the rural areas, and agriculture is considered to provide sufficient income for a reasonable standard of living. Criticism of agriculture varies over time, and heavy criticism is currently directed at the industry, although occasionally agriculture is supported by green and soft values.

#### **4. Export prices and State subsidies**

Export prices for the main agricultural products have been falling in recent years. GATT has laid down minimum prices for butter (\$1000 per ton), certain cheeses (also \$1120 per ton), and milk powder (\$825 per ton for skimmed milk powder, \$950 per ton for whole milk powder, and \$825 per ton for buttermilk powder as of September 23, 1987).

The price of butter exceeded the ceiling up until last year (1986) when the EC began to sell surplus butter at less than the minimum price. This move in fact ruined the butter price agreement, and even though it is still in force and most countries try to adhere to it, the world market price for butter remains below the minimum price. Finland has suffered from this situation. It has been difficult to find any market outlet for butter, and recently GATT has conceded Finland the right to sell butter at less than the minimum price.

Table 2. World market prices of selected commodities in summer 1987 (various sources)<sup>1</sup>.

	World market price FIM/kg	Finnish target price FIM/kg
Wheat	0.57	2.33
Barley	0.28	1.70
Butter	4.50 <sup>2</sup>	..
Cheese	5.04 <sup>2</sup>	..
Milk	..	2.42
Pork	3.47	16.30
Beef	4.55	25.10
Eggs	2.22	8.80

<sup>1</sup>US\$=4.5 FIM<sup>2</sup>GATT minimum price

Even if the price of butter were at the minimum price, it would be of little comfort to Finnish farmers. The production costs for butter are about \$7-8 per kg, depending on milk fat to protein ratio. In 1981-82 the butter price was above \$2000 per ton, and in addition, the situation was a little easier because the dollar was much stronger than it is today.

Prices of milk powder and cheese have been above the minimum GATT prices, but are very low compared to Finnish domestic prices. The same applies to other prices: for example, feed grain prices have fallen recently, the price of eggs hardly covers their transport costs, and pork and beef prices are also low. Fortunately, consumers are not so concerned aware of the prices which they might enjoy if all food were imported. State officials, however, are aware of this when they pay the export subsidies.

## 5. Foreign trade policy

Finland's membership of GATT determines and regulates the country's foreign trade policy. On the other hand, it gives Finland, as it does other countries, a fairly free hand to practice foreign trade in agricultural products. Export

subsidies are allowed, and borders can be closed to foreign competition. Some manufactured food can be imported freely under the EFTA and EC agreements. Finland has also granted Generalized Scheme of Preferences (GSP) to developing countries for certain tropical products.

Finland has a long-term trade agreement with the Soviet Union which includes some exports of agricultural products. In addition, we have agreements for cheese exports to EC and the USA. These agreements are important to Finnish agriculture, and without them we might have great difficulties in finding export markets.

Finland's sizeable exports are not past of its economic target, but have become necessary as a result of the difficulties in stabilizing domestic markets. Finland has actually been attempting to cut production for a long time, but without much success. Now Finland has come to the end of the road, and there is no alternative to curtailing production and halting exports.

Trade rules may change in the future. The USA and other big exporting countries are demanding a more liberal trade policy, similar to that which covers industrial products. They claim that subsidies should be made illegal and border protection should be abolished, measures which would force inefficient producers out of the market. Supply would diminish and world market prices would rise. Market forces would regulate prices and production, and the situation would be healthier. Many studies have supported this claim, but politicians have not accepted the idea. Their reasons are well known, and include unemployment, regional aspects, income, and party politics.

## **6. Adjustment**

What are the problems in adjusting to this possible new situation? Is an open market impossible for Finland? Is there any hope for Finnish agriculture?

Firstly, it is quite likely that a completely free market system would ruin Finnish agriculture. I cannot imagine that a fall in supply would increase world market prices to such an extent that Finnish farmers could compete with more efficient or low cost producers in other countries. I believe that developing countries, in particular, would increase their production if markets were opened up. International and other companies would invest in agriculture in developing countries, where labour costs are much lower than in industrialized countries. This type of development has been seen in other industries, typical examples of which are the textiles and electronics industries.

Of all the agricultural products in Finland, grain would suffer most from the increased competitiveness. Natural conditions are poor in Finland. Some reduction in costs might follow from heavy rationalization in the form of increased farm size, but not be sufficient to make grain production profitable or able to compete with producers in other countries.

Since consumers may prefer domestic production for various reasons, some vegetable production might also survive in a perfectly liberal trade situation. Again, transport costs may make local production competitive. The processing industry would, however, quite probably use imported raw material, since its marketing organization can deal more easily with large import companies.

The matter of how much animal production would remain in a free market situation poses an interesting question. There are some lines of production which might survive to some extent. For example, it is difficult to transport liquid milk for human consumption from abroad. Therefore, it is probable that liquid milk consumption would be satisfied by domestic consumption. Production costs would also fall, since feed would be cheaper. Free trade might also force down other costs.

However, butter and more cheese would come from abroad. Some butterfat, taken from milk before it is put on sale, would be available for domestic consumption and/or for export.

It is difficult to evaluate the competitiveness of Finnish agriculture for other animal products. Production costs would fall as a result of the cheaper feed, but the reduction might not be sufficient. Other production costs may also fall because of stronger competition in the input market. Labor costs, however, are high in Finland, and the structure of agriculture is not the best kind for international competition. Some large pork or egg farms may be able to produce at fairly low costs, which might enable them to compete on the domestic market. The same factors apply to broiler production.

On the whole, it can be said that Finnish agricultural production would decrease greatly with the advent of free trade. A degree of animal and vegetable production could be maintained, but the volume of total production would fall to a fraction of total consumption.

### **6.1. Partial free trade**

It is quite unlikely that GATT negotiations would result in completely free trade. Some import restrictions will still be allowed in the future. Export subsidies may no longer be accepted, but farmers may have to export all excess supplies at their own cost. It is even possible that complete self-sufficiency will not be granted to any country, in which some imports will be necessary for most countries. This may also be the background to which Finnish agriculture has to adapt itself.

It means that production has to be cut considerably from the present level, which exceeds domestic consumption by about 20%. This is nothing new. For a long time agricultural policy has aimed at lower production, even though results have not been encouraging.

## 7. How to study the adjustment

The IIASA has developed a large model system to study the effects of reducing trade barriers. Its country models are large and complicated and linked together so that the effects of a policy change in one country can be felt in other countries. This is an approach which we should apply in principle. Model systems have to take into account all direct as well as indirect effects or feedback.

We have also constructed a food and agriculture model for IIASA, and we have tried to apply it to generate a free trade scenario, to which there are no technical or computational obstacles. Producer prices are reduced, production drops, and so on. In the Finnish model the effect of a fall in producer price is simulated with the use of supply functions, i.e. with supply elasticities, so that prices may fall steeply but production continues. This cannot be the true situation, since it is quite likely that at a certain price level production will cease totally. This limit can be derived from economic theory, but the practice may differ from the one calculated. When the model was constructed, the free trade scenario was not foreseen and was consequently not taken into account. Therefore, the Finnish model is not wholly applicable to the study of any significant free trade scenario. The estimates of supply elasticities are simply not appropriate for the big price changes required in a free trade scenario.

For a country like Hungary, the producer prices (production costs) of which are much closer to world market prices, a free trade simulation using an IIASA type of model is possible, but such a model is unsuitable for Finland. We lack a model that could be applied to study the problem of free trade effects.

The OECD has also developed a large model system to study the effects of subsidy reductions. Supply and demand elasticities are again applied, and the countries are linked together

through national responses, i.e. national demand and supply elasticities are applied to achieve the equilibrium. The model system is rather simple and does not include any responses to other sectors of the economy.

The OECD model has not been applied only to studying the effect of a small (e.g. 10%) cut in support and not to a free trade scenario. The output of the model run shows the effects on prices and production. The runs have been interpreted to show the positive effects of reducing support. Production changes are not great, but world market prices rise to the particular benefit of export countries.

In general, this type of approach is significant. However, it does not adapt well to the Finnish case, since Finland has a rather fixed pricing system regulated by the Farm Income Act. Producer prices are set in negotiations between the farmers and the State, an agreement to which neither party may make amendments. Price subsidy is an integral part of the agreement. International agreements cannot override national agreements.

In conclusion, it follows that a new model is required to study the adjustment to a free trade situation in Finland.

# GENERAL FEATURES AND PROBLEMS OF FINNISH AGRICULTURAL TRADE <sup>1)</sup>

Lauri Kettunen and Paavo Mäkinen

**Abstract.** An overview of Finland's general trade policy is presented. This policy has developed within the framework of GATT under which many bilateral agreements have also been made. With respect to imports, a major aspect has been import regulation.

The structure and development of agricultural trade, including the distribution of imports and exports, are also reviewed. This trade has grown gradually, even though growth has not been a specific goal. The regional distribution of trade has changed somewhat as a result of economic integration in Europe.

The biggest problems in agricultural trade are posed by the low prices prevailing in the world market. Finland has therefore actively endeavoured to reduce surplus production, and, through GATT, has worked towards solutions that recognize the special features of agricultural production with respect to the security and independence of this country, and thus secure the self-sufficiency of food production whatever the situation.

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Index words: agricultural trade, trade policies, composition  
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## 1. Introduction

Finland exported about 20% of her agricultural production in 1985, but this was an unsatisfactory figure for most parties concerned. World market prices were and are still much lower

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1) A paper presented at the 13th Seminar of the European Association of Agricultural Economists in Varna, Bulgaria, September 28 - October 3, 1986.



than the domestic production costs, and so the State has had to substantially subsidize exports. Agriculture itself has suffered from exports, since a full target price is paid only for a certain part of exports. Export of agricultural products is today a necessity resulting only from the failure of agricultural policy to stabilize production at the level of domestic consumption.

This State of affairs was different during and immediately after the second world war when there was a shortage of food. At that time an increase in production was favoured to correct the situation. Self-sufficiency became an ideal which still has its supporters today.

There was also another reason for increasing production in the 1950s and 1960s. Agricultural exports were an important source of foreign exchange for Finland, as for any developing country. Up to the 1970s the foreign trade deficit was one of the most difficult problems of economic policy, and it hindered the use of other economic means. Finland adopted the free trade system in the late 1950s, at a time when she was not very competitive on the world market. Import restrictions had to be used to balance the foreign trade. Any earnings of foreign currency were welcome. Agricultural exports were a relief in the context of a persistent situation.

Only in the late 1970s did the permanent structural deficit of foreign exchange disappear and the conduct of economic policy become easier. The balance of foreign trade is still not as secure as it might be, but the exchange reserves have grown rapidly as a result of the interest of foreign investors in the Finnish market. The mark is a strong currency because of the good performance of the Finnish economy. Agricultural exports are no longer necessary and agricultural production policy can be based on domestic considerations.

## 2. Basic lines of trade policy

Finland has been a member of GATT since 1950. Moreover, Finland is an associate member of EFTA and made a special agreement with the EEC in 1973, when the duties on imports from all EEC countries were removed. Finland has also removed all duties on imports from the Soviet Union and made agreements (abbreviated as KEVSOS in Finnish) with some smaller socialist countries. These agreements also include tariff reductions. Agricultural trade is not, however, included in these agreements.

Finnish trade is almost duty free for industrial products. GSP preferences have been granted for tropical products from developing countries, in the form of the removal or reduction of tariffs, but trade with North America and Japan is still burdened by tariffs.

Finnish trade policy does not differ significantly from that of other western industrial countries. Trade with socialist countries is an exception. About a quarter of Finnish trade takes place with the Soviet Union and it is, therefore, quite natural that special agreements have been made with respect to it. This trade is bilateral and has its advantages and disadvantages. The main import item is crude oil, the increase in the price of which raised the volume of exports to the Soviet Union. It was thus an incentive for an increase in exports during the world wide depression of the 1970s and 1980s. It allowed a steady growth in the economy until recent years. The oil price has now fallen and simultaneously Finland's opportunities for exporting to the Soviet Union have decreased.

Finnish trade in agricultural products is conducted under the GATT agreement. Imports are controlled by tariffs, import fees and licences. Special agreements have been made on the cheese trade with the EEC and USA. Under the EFTA agreement butter can be exported to Switzerland and grain to Norway.

About half of agricultural exports go the Soviet Union, in accordance with detailed annual agreements and more general five-year agreements.

With the aid of subsidies allowed by GATT, Finland exports agricultural goods to all parts of the world. Cheese is the best known Finnish agricultural export item. There are great difficulties in gaining access to new markets even though Finland has tried to utilize its image of an unpolluted country to promote agricultural exports.

### 3. The structure and the evolution of agricultural trade

Even though Finland's agricultural exports have been growing steadily over the past 30 years, expenditure on agricultural (and food) imports (CCCN 1-24) has been clearly higher than the earnings from the export of these groups of products (figure 1). However, the difference is partly due to the non-inclusion of export subsidies in the export value. If current exports were measured in domestic prices, their value would exceed the value of imports. Whereas agricultural exports have accounted for 2% to 5% of all exports since 1950, proportion of agricultural imports has decreased steadily from 25% to about 8% of all imports in the same period. Immediately after the second world war this proportion was as high as 43%.

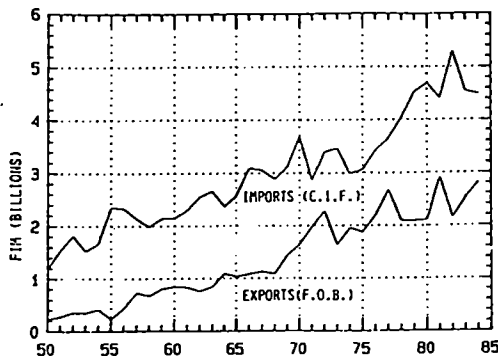


Figure 1. The volume of trade in 1950-84 (1982 prices).

The proportions of different commodity groups of all agricultural imports have remained more or less stable over the last three decades. The major single group has been coffee and tea (CCCN 09) which accounts for 20-25% of agricultural imports. Two other large groups, each accounting for about 15%, have been fruit (CCCN 08) and certain products of animal origin, residuals and waste from the food industry, and oil seed (CCCN 05, 12, 23), most of which is used in the fodder industry. Much of this fodder is used in fox and mink fur production, in which Finland is one of the world leaders. (Earnings from fur export, which have in some years reached FIM 2 billion, are not included in export figures above). Sugar and sugar confectionary (CCCN 17) have accounted for about 10% and tobacco for about 5% of all agricultural imports. Each of the other groups has accounted for less than 5% of agricultural imports over the same period.

As indicated by the composition of agricultural imports, the most important group of countries of origin is that of the developing countries, which supply most of the sugar and tobacco and much of the fruit. Developing countries have accounted for 30-40% of total agricultural imports. Colombia, Brazil, Costa Rica, Guatemala, Cuba and Kenya have been some of the largest suppliers within this group.

As a supplier group, Western European countries have increased their share slightly, standing now at about 35%. The most important countries within this group are the other Scandinavian countries, the Netherlands, the UK and West Germany. Eastern European countries have been small suppliers throughout the post war period and their share has actually decreased, standing currently at less than 5% of agricultural imports. Occasionally, when major grain imports have been necessary, the USA has supplied more than 10% of agricultural imports.

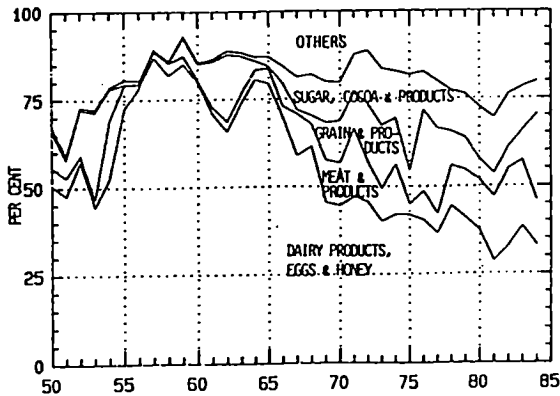


Figure 2. The composition of agricultural exports by value in 1950-48.

As shown in Figure 2, the composition of agricultural exports has varied considerably since 1950. Clearly the most important single product group has been CCCN 05, which includes dairy products, birds' eggs and natural honey. During the past ten years, however, the main component of the group has been dairy products, and eggs have accounted for only about 4% of all agricultural exports.

As Finland's agricultural and food industry has become more diversified, the significance of dairy products in terms of export earnings has declined, even though the value of dairy exports in real terms has increased throughout the post-war period.

The share of butter and whole milk powder has declined slightly over the years now standing at about 45% of dairy exports. On the other hand, cheeses have increased their share. The main export cheese is Emmenthaler.

There were almost no exports of meat and meat products (CCCN 02, 16) before the latter half of the 1960s. After that the value of meat product exports grew strongly until 1982, when

it alone accounted for about 12% of agricultural exports, whereas meat exports have varied greatly over the years. The main export meat has been pork, but during the last three years it has been replaced partly by beef.

As a result of natural causes, exports of cereals and related products (CCCN 10, 11) have varied markedly. The major grain product has been malt.

It may be interesting to note that the confectionery industry has become an important exporter over the last two decades. Cocoa preparations have become the main processed product in this group (i.e. chocolates).

Figure 3 shows three significant developments in the composition of the countries of destination of Finland's agricultural exports. The first is the importance of UK markets to Finnish exporters before it became a member of the EEC. For instance, exports of dairy products to Britain used to account for almost 40% of total dairy exports, but in 1973 the trade came to a total halt. However, adaptation to the new situation was relatively easy because of the rather strong demand and high prices at the time. Further, certain supply control measures (notably the soil bank system, which at its peak left 8% of the cultivated area idle) and increased exports to other

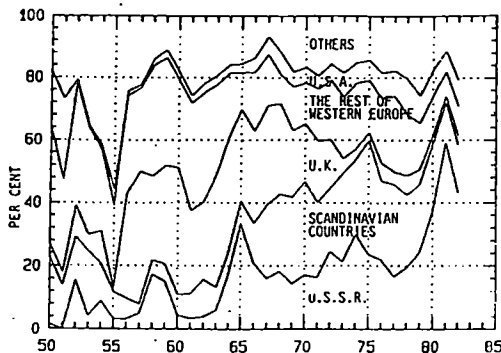


Figure 3. The destination of exports by value in 1950-84.

countries, which were already taking place in the 1960s, played an important role. The USSR became a major purchaser by the mid 1960s and the other Scandinavian countries followed a few years later. Initially, the Soviet Union bought mainly dairy products but later meat and meat products increased their relative significance. Trade with the Soviet Union has been especially important during the recent period of sluggish world trade.

Sugar and cocoa preparations have accounted for almost half of the value of exports to Scandinavian countries, mainly Sweden. The other Western European countries (excluding Spain, Portugal, Greece and Italy) and the USA have bought mainly dairy products, especially cheese, and some fats and cocoa preparations.

Before 1957 Eastern European countries, notably Czechoslovakia and the DDR, were major buyers of dairy products. Since then their share has declined to about one per cent of all agricultural exports. The developing countries have accounted for an average of 8% since 1976, the main products having been Edam and processed cheese and eggs. Japan, Canada and Australia have accounted for a small proportion of agricultural exports.

#### **4. Problems and the future of agricultural trade**

The problems of Finnish agricultural trade are evidently the same as those of other Western European countries. Exports should be cut because of low world market prices, but internal social and political factors hamper the attempts to cut production. Imports are also likely to be protected in the future because of self-sufficiency and employment considerations.

The liberalization of agricultural trade has long been a subject of discussion by GATT. It is difficult for Finland to accept the requirements of big exporting countries to reduce

protection on trade, because it may gain little or nothing from these negotiations and because trade liberalization would be catastrophic for Finnish agriculture. Production costs are high in Finland, so foreign competition would always beat Finnish producers. Production would fall drastically, posing a threat to national security.

For her part Finland tries to stabilize domestic (and world) markets by restricting and reducing her own production. Production ceilings, set officially in the Farm Income Act, will fall gradually until at least 1989/90. It has been difficult for farmers to accept this policy, but the prospect of a stable price level for agriculture has enabled the State to pass the necessary legislation.

Finnish imports of agricultural products are unlikely to fall. Thus, the import surplus will grow, possibly helping to validate some future import restrictions. The requirements of developing countries have usually been taken into consideration and Finland has adjusted her policy accordingly.

Finland is prepared to meet the increasing difficulties in the export markets which, in spite of the shortage of food in the developing world, are getting worse. Excess supplies of animal (particularly dairy) products are accumulating in industrial countries. Stabilization of the situation would appear to be difficult in any event, and may only be possible at all in extreme circumstances.

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## PRODUCTION AND FOREIGN TRADE OF SOME INDUSTRIAL CROPS 1)

Juhani Ikonen

**Abstract.** In Finland production of sugar beets, starch potatoes and oil plants seeds is directed by special statutes, that of malt barley by limitations and decisions included in the State budget. The pertinent legislation now in force is valid until the end of 1987. The Government and Parliament are currently drafting new legislation, to come into force at the beginning of 1988. Drafting of this new legislation indicates that no great changes are to be expected in the extent of the cultivation of these industrial crops. The continuity of production is based on aspects of employment, on implications for regional policy, State finances, industrial policy and price policy, and on factors affecting the balance of payments and supply. In the future, Finland will probably continue to be a net importer of sugar, starch and feed protein and a net exporter of malts.

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Index words: Industrial crops, production policy, foreign trade

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### 1. General

The industrial crops referred to in this paper are sugar beets, starch potatoes, oil plants and malt barley. The oil plants cultivated in Finland are turnip rape and, to a much lesser extent, rape. In Finland, industrial crop production typically accounts for only a small proportion of the total

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area of cultivation. Industrial crops are grown on some 20 000 farms, amounting to approximately 145 000 hectares in 1986; this is about 6% of all hectareage. With the exception of starch potatoes, industrial crops are cultivated in the south of the country. About half of the starch potatoes are grown in Ostrobothnia.

In Finland, industrial crops are grown under contract. This means that each year farmers conclude deals, with the central distributors or directly with factories, specifying production amounts and other pertinent details. The buyer agrees to purchase the amounts of raw materials specified in the contract, at market prices on the day of sale. Prices are set annually in negotiations between the State and producers' organizations.

Without exception, in Finland the cultivation of sugar beets, starch potatoes, oil plants seeds and malt barley requires State subsidies. For this reason, the national direction of the cultivation of sugar beets, starch potatoes and oil plants is based on special statutes that specify the amount of production and the procedures for determining State subsidies. Each year the State budget sets limitations for malt barley and specifies e.g. the maximum amount of malts to be exported.

In recent years sugar beets have been grown on some 30 000 hectares annually, starch potatoes (including seed potato production) on some 10 000 hectares (Table 1). The area under oil plant cultivation has increased by about 20 000 hectares in the 1980s, and was approximately 75 000 hectares in 1986. In the last few years malt barley has been grown on some 30 000-45 000 hectares.

The overall production of sugar beets has ranged from 670 to 1 060 million kg in the 1980s (Table 2). The corresponding starch potato crop has been 200-260 million kg, oil plants seed production some 70-125 million kg. The amount of malt

Table 1. Farming areas (1000 hectares).

	Sugar beets	Starch potatoes	Oil plants	Malt barley <sup>1)</sup>
1980	31.4	10.0	55.3	..
1981	31.5	10.5	55.5	..
1982	32.4	9.9	63.7	..
1983	32.3	9.6	60.9	..
1984	32.3	9.4	62.0	..
1985	30.4	8.9	57.7	35.6
1986	30.6	8.8	74.8	30.8

<sup>1)</sup>No data available for 1980-1984.

Table 2. Total harvests (million kg).

	Sugar beets	Starch potatoes	Oil plants	Malt barley	
				Contracted	Obtained mill.kg %
1980	900	248	87.5	172	140 81
1981	676	207	69.1	199	83 42
1982	790	214	96.3	227	192 85
1983	1060	245	101.2	155	149 96
1984	915	254	85.7	104	85 82
1985	704	209	89.3	118	82 69
1986	843	255	123.9	109	71 65

barley cultivated under contract has been approximately 100-230 million kg, the obtained amount of barley usable for malt being 70-200 million kg. As all cultivation in Finland, the production of industrial crops is characterized by wide variations in harvest, which is clear from Table 2 and from the figures presented later.

Except for malt barley, Finland is not self-sufficient for these industrial crops. In the 1980s the proportion of saccharose produced from sugar beets has varied from 52 to 80% and the self-sufficiency of starch has been 50 to 60%. With respect to oil plants seed meal, domestic production has accounted for 30-50%. The amount of malt barley produced, however, has been about double the amount of domestic consumption.

## 2. Production, importation and exportation

### 2.1. Sugar beets

In Finland, cultivation of sugar beets and domestic sugar production are regulated by legislation. There are laws specifying, e.g. the basic production level of sugar beets, which the Council of State can increase or decrease within certain limits. The basic production level set for 1987 is 770 million kg. There are also laws determining the grounds for granting State subsidies for sugar beet production and refinement. Subsidies are paid directly to the sugar beet factories, which in turn pay farmers the price required by State subsidies upon delivery.

State funds to subsidize sugar are collected by an excise tax, included in the price for sugar paid by the consumer. There is a system to compensate for differences in export and import prices; it raises the cost of the sugar component in imported foodstuffs to the price level of domestic sugar and lowers the price of sugar in foods to be exported to the world market price.

Approximately 200 million kg of sugar was sold in Finland in 1986, of which 113 million kg was produced domestically (Table 3). The sales figures include sugar-based chemical products, the manufacture of which has been increasing in recent years.

Table 3 shows the annual variation in sugar sales, affected by changes in the amount of sugar stored in warehouses, which is included in the above figures. Annual saccharose consumption per inhabitant is some 34.5 kg in Finland, and is dropping slightly as other sweeteners increase their market shares. About 3 kg of starch-based products are consumed per person each year, intensive sweeteners some 2 kg.

Both importation of raw sugar into Finland and exportation of sugar and products containing sugar have fallen clearly in the last few years (Table 4). In 1986, raw sugar imports came to approximately 66 million kg, with sugar exports of some 9.5 million kg. The primary reason for the strong decline in sugar exports is the standstill in sugar exportation to Norway.

In Finland, state subsidies are needed to support sugar production from domestic raw material because production costs are much higher than foreign price levels. The price of sugar is based on the average cost of domestic and imported raw sugar and the cost of refinement. The departure point is the subsidized price of sugar produced from sugar beets and the import price of foreign raw sugar. In December 1986 the subsidized price of domestic raw sugar was FIM 3.97 per kg, the import price of foreign raw sugar being FIM 1.10 per kg, making for a weighted average price of FIM 2.76 per kg.

Table 3. Sale of sugar in Finland in 1980-1986 (1 000 kg).

	Domestic	Imported	Total
1980	97706	107624	205330
1981	79652	94281	173933
1982	112114	97018	209132
1983	125078	79792	204870
1984	94617	64267	158884
1985	119170	66679	185849
1986	112761	86251	199012

Table 4. Sugar imports and exports in 1980-1986 (1 000 kg).

	Imports	Exports
1980	155216	58134
1981	165457	81195
1982	257734	86600
1983	128599	75691
1984	63058	28616
1985	78024	6577
1986	66130	9585

Addition of refinement costs, excise tax, turnover tax and shop commission made for a retail price of FIM 7.65 per kg in December 1986. Support for domestic sugar beet production amounted to FIM 0.161 per kg of sugar beets in 1986. The price paid to farmers was some FIM 0.57 per kg of sugar beets. State expenditure for subsidies of domestic sugar production is covered by excise tax, which has been FIM 0.98 per kg since March 1986. As a consequence, Finnish consumers pay a higher price for sugar than the price would be were sugar production based only on the use of imported raw material.

## **2.2. Starch crops**

In Finland starch is made from potato, barley and wheat. The lion's share of domestically produced starch is consumed by the wood processing industry and other technical uses. Some of the potato starch is used in the foodstuffs industry, e.g. in sausage-making and to make plain potato flour for home use. Sweeteners and syrups, used in the foodstuffs industry, are made by further refining potato starch and, in particular, barley starch. Domestic wheat starch is consumed almost entirely by the wood processing industry. The bulk of the wheat starch is produced from imported raw material. The starch must be refined further, i.e. modified, so that it can be used by the wood processing industry. Most of the starch imported for the wood processing industry has been modified.

The wood processing industry will consume increasing amounts of starch as the industry keeps raising the degree of paper refinement, producing ever better paper grades requiring rather much starch in their production. The use of starch-based sweeteners can also be expected to rise, at the expense of saccharose. In 1986 domestic production of starch came to 80.4 million kg, and 62 million kg was imported, making for a total starch consumption of 142.4 million kg (Table 5). Domestic production has accounted for slightly over 50% of the starch used in recent years.

Table 5. Production and importation of starch in 1980-1986  
(1 000 kg).

	Domestic starch	Imported starch	Total
1980	51080	33503	84583
1981	57246	33477	90723
1982	49193	43983	93176
1983	56339	55534	111873
1984	68818	62288	131106
1985	63304	62674	125978
1986	80400	62000	142400

Table 6. Starch consumption in Finland in 1980-1986  
(1 000 kg).

	Wood processing industry	Syrup industry	Other	Total
1980	62557	11776	10250	84583
1981	67316	14407	9000	90723
1982	67866	15310	10000	93176
1983	84602	16971	10300	111873
1984	100587	18519	12000	131106
1985	97043	16935	12000	125978
1986	112700	17700	12000	142400

In 1986 the wood processing industry consumed 112.7 million kg of starch, or 79% of its total consumption (Table 6). Use of starch in the wood processing industry and the syrup industry has increased continually, whereas the use of starch by the meat industry and households has remained steady, at the level of 10-12 million kg.

Starch production and the State subsidies it receives are regulated by special statutes. According to the legislation now in force, the total amount of starch annually receiving support is a maximum of 18 million kg of potato starch and 4 million kg of barley starch. Subsidies for starch produced from other domestic corn are specified by the Council of State in the framework of the State budget. With respect to potato starch, the statute allows the Council of State, if

need be, to increase the amount of potato starch marketed with State subsidies. These subsidies reduce the price of starch to the world market level. In 1986 the Council of State decided to support the production of potato starch for use in the wood processing industry. Subsidies were also paid for starch used by the starch-based sweetener industry. A high price policy is applied to part of the starch market in Finland, when the price is determined freely on the basis of production costs and supply and demand. Products affected by this policy include starch syrups and starches used by the foodstuffs industry and households. Support for starch production amounted to FIM 145 million in 1986. At the end of that year, starch cost FIM 1.25 per kg on world markets, while potato starch cost FIM 4.40 per kg in Finland.

State subsidies are paid for starch in order to make domestically produced starch competitive with respect to imported starch. The Government is of the opinion that a certain degree of domestic starch production is necessary, especially to ensure the starch needed by the wood processing industry and as a safeguard in crises. Further, sufficient domestic production of starch keeps imported starch at reasonable price levels. The degree of self-sufficiency with respect to starch production will in future be kept at the 50% level.

### **2.3. Oil plants**

The main oil plants cultivated in Finland are spring turnip rape and rape. Oil presses make vegetable oil and meal from the oil plants seeds; the meal is used as the raw material for feed. Imports (soya, sunflower) are used to meet some of the protein needs. Replacing all vegetable oils with domestic products would require the cultivation of oil plants on some 70 000 hectares. Substitution of imported meal by meal from domestically cultivated turnip rape and rape would require the growth of oil plants on approximately 100 000 hectares; some calculations have come up with an area of 120 000 hectares. In recent years efforts have been made to increase the



self-sufficiency of feed by increasing the cultivation of oil plants. During the '80s, domestically produced meal has accounted for 30-50% of the meal used in feed. The supplementary proteins imported for feed have mainly been soya and fish meal. The vegetable oil now produced exceeds domestic consumption. The overall consumption of vegetable oil was about 52 million kg in 1985. Approximately 10% of the vegetable oil made in Finland is exported. Exports have also been in the form of margarines.

Refinement of domestically grown oil plants seeds has been about 100 million kg in recent years (Table 7). It has been estimated that the amount refined will come to some 139 million kg for the 1986/87 harvest. The increase in seed

Table 7. Refinement of oil plants seeds and vegetable oil exports in the harvest years of 1980-1986 (million kg).

	Seeds	Vegetable oil	Meal	Vegetable oil exports <sup>1)</sup>
1980/81	81.7	30.2	49.0	3.7
1981/82	65.2	24.1	39.1	5.7
1982/83	97.4	36.0	58.4	16.8
1983/84	100.9	37.3	60.5	6.9
1984/85	83.9	31.0	50.3	3.4
1985/86	92.2	34.1	55.3	4.9
1986/87	139.0 <sup>2)</sup>	51.0	83.0	-

<sup>1)</sup> Including raw oil and refined vegetable oil

<sup>2)</sup> Oil pressers' estimates

Table 8. Imports of soya beans and some important vegetable oils in 1980-1986 (million kg).

	Soya-beans	Soya oil	Sunflower oil	Palm oil	Coconut oil
1980	111.5	7.8	2.4	2.4	2.6
1981	93.6	1.0	1.3	3.0	5.1
1982	119.0	0.5	2.4	2.5	2.6
1983	122.2	4.6	1.8	3.1	3.7
1984	70.9	0.7	2.7	2.5	2.6
1985	123.4	5.8	1.9	3.7	3.0
1986	143.9	0.2	4.5	2.9	3.9

production over last year's figure is primarily the result of a rise in area under oil plant cultivation.

Soya beans have been the main raw material imported by oil pressers (Table 8). Soya oil has been used by the foodstuffs industry and meal by the feed industry. Beside soya, small amounts of other oil plants seeds, e.g. sunflower seeds, are imported into Finland. These have been used chiefly for refined foodstuffs industry products and as such. Mainly because of quality factors and intended uses, vegetable oils are also imported, as seen in Table 8.

In Finland, direction of oil plants seeds cultivation and its subsidization are based on the so-called oil plant statute. The primary objective of subsidization is to guarantee the competitiveness of domestically produced protein feed and vegetable oil with respect to corresponding products made of imported raw materials. Each year the Council of State, in accordance with the valid legislation, confirms oil plants seed prices and the maximum production, in kg, for which State subsidies will be granted. In recent years the maximum amounts have been as follows:

1983	88	million kg
1984	90	"
1985	105	"
1986	115	"

On the basis of the legislation now in force, the price of domestically cultivated oil plants seeds used by oil pressers and the feed industry is reduced to correspond with imports. Compensation for price reductions is based on the price difference between the domestic and imported seeds.

In order to raise self-sufficiency, efforts have been made to increase the area under oil plant cultivation. It is likely that self-sufficiency in protein will be the key factor determining the extent of oil plant cultivation in the future as

well, for self-sufficiency will enable reduction of raw material imports. Moreover, one objective of the present agricultural policy is to get fields growing crops that are overproduced to change over to crops now imported.

#### **2.4. Malt barley**

In Finland malt barley, like the other crops discussed here, is cultivated under contract. During the '80s, the amounts contracted annually have varied from 100 million kg to 227 million kg (Table 2).

The amount of barley suitable for malt has been 70-192 million kg per year, or 42-96% of the contracted amount. The wide annual variation in the percentage of the contracted amount that is actually obtained is caused chiefly by the variability of climatic conditions during the growing season.

Finland has stringent quality demands for malt barley. It must be of only one species and of even quality, and its protein content must fall within a set range. Malt barley for beer must have a low protein content (a maximum of 12.5%), whereas that of enzyme malt barley must be high.

In Finland malt barley production has been about twice the amount consumed domestically. The barley not consumed on the domestic market has been exported, mainly in the form of refined malt. Primarily because of harvest fluctuations, malt barley has also been imported into Finland in order to maintain the industry's operational capacity. Malt produced from imported raw barley has mainly been exported.

In 1986 malt production came to some 86 million kg; about 49 million kg was consumed domestically and 37 million kg was exported (Table 9).

Table 9. Malt production, domestic deliveries and exports in 1980-1986 (1 000 kg).

	Deliveries		Export	Total	Total malt production
	Domestic	From domestic barley			
1980	48724	24745	19202	43947	92671
1981	47558	32985	10319	44801	92359
1982	45658	25135	12090	39431	85089
1983	43832	32000	19084	51084	94916
1984	45242	42715	2516	46232	91474
1985	47799	35015	4529	39544	87343
1986	48970	31264	5331	36595	85565

Malt is exported under State subsidies, and the amounts are regulated by limitations specified in the State budget. Price differences are compensated only with respect to export malts; no compensation is paid to level out price differences of domestic deliveries. The competitiveness of domestic raw materials for beer is guaranteed by an excise tax on imported beers; this levels out the difference between domestic and world market prices for the malt used to make beer.

The maximum amounts of exported malts compensated for price differences according to the State budget have been as follows:

1984	48000	tonnes of malt
1985	38000	- " -
1986	29500	- " -
1987	29500	- " -

More over, the State has been made responsible for a maximum of 30 000 tonnes of malt barley in 1988. The costs of marketing malt in excess of this amount are included in the exportation costs arising from overproduction, which are financed in part by agriculture itself.

## MAATALOUDEN TALOUDELLISEN TUTKIMUSLAITOKSEN TIEDONANTOJA

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