MAATALOUDEN TALOUDELLISEN TUTKIMUSLAITOKSEN JULKAISUJA N:o 47
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THE ECONOMY OF CROP PRODUCTION

THE FIFTH FINNISH-HUNGARIAN-POLISH
SEMINAR ON AGRICULTURAL ECONOMICS
FINLAND, JUNE 13-16, 1983

HELSINKI 1983

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PREFACE

The Agricultural Economics Research Institutes of Finland, Hungary and Poland have had cooperation during a period of the last several years. The cooperation has been realized in a form of exchange program of the research staff and younger scientists. Besides this, common seminars have been organized in each country.

The theme of the recent seminar, which was held in Ruissalo, Turku in June, 13-16. 1983,was the economy of crop production. There were 14 papers presented in the seminar which was taken part by 20 participants, mainly research workers but also representatives of administration and organizations concerned with the grain industry.

Agricultural Economics Research Institute of Finland wants to thank the Polish and Hungarian economists as well as the Finnish participants for their efforts making the seminar succesful. This fifth seminar proved once again to be particularly fruitful and worthwhile. The cooperation between the institutes will be carried on. The next seminar is going to take place in Poland in 1985.

This publication includes the papers presented in the seminar. Organizers thank the Ministry of Agriculture and Forestry, The Commission of Agriculture and Forestry of Finland Academy, the Finnish State Granary and Raisio Factories for their support and financial aid for the seminar.

The programme and the list of participants are presented in the appendix.

Helsinki in June 1983

Matias Torvela
Director of the institute

THEME I.

GENERAL ASPECTS OF CROP PRODUCTION

Lauri Kettunen and Paavo Mäkinen
AGRICULTURAL ECONOMICS RESEARCH INSTITUTE

A SURVEY OF PLANT PRODUCTION IN FINLAND, HUNGARY AND POLAND

1. Introduction

Agriculture was still the most important sector of the economy in Finland some 20-30 years ago. The same was probably true in Hungary and Poland. But those times have gone, and economic development has been much swifter in other sectors. Even though agriculture has grown, too, its proportion has declined in all three countries. Industry held first place for many years, but nowadays the services seem to have overtaken industry as the main sector of the economy.

Even though the relative importance of agriculture has decreased, agriculture is still an important and visible part of society. From the Finnish point of view, Hungary and Poland are still agricultural countries, because much of their land is cultivated. Natural conditions seem to be much better in those countries than in Finland, even though there are some good farming areas in Finland, too.

Since the purpose of our seminar is to consider the many angles of plant production, we feel that a short comparision of plant production in the three countries concerned is called for. We shall start by reviewing the natural conditions, then use of input and, finally, the structure and yields of plant production.

2. Soil and climate

2.1. Finland

Finland is a rather flat country. South of the line Oulu - Kajaani - Kuhmo, where most of the cereal production is concentrated, the land seldon rises over 200 m above sea level. Despite the low-lying terrain, fields are poorly situated, being divided into small plots by hills, lakes, swamps and forests. Efficient cultivation is therefore difficult, even on large farms. The situation is a little better in southwestern Finland.

Soil types are unevenly distributed throughout Finland. Heavy clay soils predominate in southwestern Finland and light sandy soils in central Finland. The north of the country is covered largely by organic marsh soils, and the eastern parts by stoney moraine.

Climate, however, has the greatest impact on the regional distribution of crops. The growing season, when the average temperature is above 5°C, is 170–180 days on the south coast. In the northern parts of the country, it is but only 110–120 days. The sum of efficient temperature is correspondingly 1,200°–1,400°C in southern Finland and 1,000°–1,200 °C in central Finland but only 500°–600°C in northern Finland.

The average rainfall in Finland, is 590 mm, but this, too, is unevenly distributed. Especially in southwestern Finland, which is the main cereal cultivation area, rainfall is low at the beginning of the growing season, but heavy rains often lower the crop quality during harvest time.

Some fields are irrigated during dry summers, but no statistics are available. It may account for no more than a few percentage points of the total acreage.

2.2. Hungary

Hungary has a high proportion (57 per cent) of arable land. Gardens, orchards and vineyards comprise 7 per cent of the land. Only one fifth of the agricultural area is forested. The land is mostly flat, but there is some rolling country and a few fairly high mountains. Two thirds of the land area are less than 200 metres above sea level, the lowest point being 78 metres above sea level. The flatness of the land makes organization into large holdings and mechanized farming easy.

There is a great variation in soils. One quarter of the land is steppe soil with a good humus level and a favourable water economy, the pH being 7.0. One quarter is alluvial soil, which has good agricultural value. Forty per cent of the soils were formed under the forest and therefore have many unfavourable characteristics, e.g. leaching, acidity and poor water economy. Six per cent of the soils are very bad saline soils.

The climate is temperate. The location of the country at the boundaries of continental, Atlantic and Mediterranean climate zones causes a high degree of instability with great interseasonal and annual variation. The long, warm continental summer and autumn, with maximum precipitation in the summer months, and the mild winters are ideal for agriculture (but all these could turn out just the opposite as well.)

The average temperature is 11.3° C and from April to September inclusive it is 17.7° C. The annual rainfall on the great plains is 450 mm, in Transdanubia and on the northern hill slopes 600-700 mm, and in the west of the country near the Alps 700-800 mm. The sun shines for 2,050-2,100 hours annually except in the western frontier zone, where it shines for only 1,800 hours.

2.3. Poland

The climate in Poland is typical of temperate zones. There are considerable differences in the length of the growing season between the northern part of the country (some 180 days) and the southern part (about 200 days). Likewise, the mean temperatures of the vegetation period are higher (7,9 - 8,3 °C) in the southern and western regions of the country (Kraków, Opole, Wroclaw) and lower (6 - 7.4 °C) in the northern and eastern regions (Suwalki, Olsztyn, Bialystok, Lublin). The temperatures and precipitation (average rainfall 600 mm: lowland regions 450-600 mm, mountain areas 900-1200 mm) permit the cultivation of most temperate zone crops throughout the country (except maize for grain and soy beans).

The soils are not too fertile and require concentrated fertilization and careful treatment. Some 60 % of the arable land consists of light sandy soils which tend to be unsuitable for the more demanding crops such as wheat, barley and sugar beet. This explains the large proportion of rye, potatoes and oats in the total agricultural area of the country.

3. Use of inputs

The level of the yield, which is determined chiefly by natural conditions can be enhanced with the aid of various inputs, especially fertilizers. Finland and Hungary seem to use about the same amount of fertilizer, Poland slightly less (Table 1). Because of the climate one would expect the fertilizer level in Hungary to be higher than shown by the figures in Table 1. The fertilizer level in Finland could also be slightly higher, at least according to field experiments. But the farmers have probably learned from experience that the present level is optimal.

Table 1. The use of fertilizers in Finland, Hungary and Poland in 1981, kg/ha.

	Finland	Hungary	Poland
NPK fertilizers	205	225	186
of which N	82	85	71
P	64	61	47
K	59	79	68

The use of fertilizers hardly explains the differences in yield. Herbicides are used more or less equally by the three countries, but comparisions are difficult because of the lack of suitable statistics.

Farming is highly mechanized in Finland and in Hungary, but in Poland horses are still commonly used. The yields in Poland (per hectare) are therefore lower than in Finland or in Hungary. The numbers of machines given in Table 2 do not reveal directly the amount or efficiency of the technology, they merely illustrate the degree of mechanization in general.

Table 2. The number of agricultural tractors and combine harvesters in Finland, Hungary and Poland in 1971 and 1979.

	Year	Finland	Hungary	Poland
Tractors	1971	155,600	67,000	248,000
	1979	204,000	55,000	573,000
Combine harvesters	1971	30,000	12,000	15,700
	1979	44,000	14,000	36,000

4. Structure of production

4.1. Ownership

Finnish agriculture is based on family farms. There are about 220,000 farms of over 1 ha, the average size being 12 ha of arable land and 35 hectares of forest.

In Hungary, agriculture is based on the socialist system. In 1980 there were 132 state farms (average size 7,694 ha), 1,320 collective farms of agricultural producers' co-operatives (average size 4,023 ha), about 100 specialized agricultural co-operatives and some 826,000 "auxiliary plots" i.e. gardens, vineyards, allotments, etc. of non-cooperative members, total 1.5 million small and very small plots.

In Poland there were 2,388 co-operative farms and 2,504 state farms in 1981, of which 1,047 were state farms under the Ministry of Food and Agriculture. These state farms account for 95 % of the total agricultural area under state control. However, of the 14,5 million hectares of arable land, 11 million ha (80 %) were cultivated by the private sector, which includes 2.86 million farms of over 0.5 ha and the household plots. The socialized sector accounted for 3.5 million hectares.

4.2. The distribution of land

The share of cereals in the total area is largest in Poland and smallest in Hungary (Table 3). However, the pasture land included in the Hungarian statistics makes it difficult to draw comparisions.

Fruit growing is widespread in Hungary, which has an effect on distribution. A typical feature of Polish agriculture is the large proportion of potatoes of the total area under cultivation.

Table 3. Areal distribution of crops in Finland, Hungary and Poland in 1981 or 1982.

	FINLAND 1982		HUNGARY 1981		POLAND 1981	
	1000 ha	%	1000 ha	%	1000 ha	%
Cereals	1169	46.5	2761	41.7	7906	41.8
Potatoes	39	1.5	61	0.9	2258	11.9
Industrial crops[1]	104	4.2	645	9.7	891	4.7
Fodder crops[2]	721	28.7	971	14.7	2755	14.6
Meadows and pastures	205	8.1	1284	19.4	4052	21.4
Orchards etc.[3]	278	11.0	306	4.6	276	1.5
Others[4]			598	9.0	772	4.1
Total agric. land	2516	100.0	6626	100.0	18910	100.0

1) Include sugar beet, oil plants and, in Hungary, pulses, tobacco, fibre crops and, in Finland, also peas.
2) In Finland only grass for hay and silage plus grass seeds. In Hungary, luzerne, fodder maize and fodder beet, etc.
3) In Hungary, orchards and vineyards.
4) In Finland, soilbank area, gardens and vegetables. In Poland, vegetables and, in Hungary, gardens.

4.3. Distribution of cereals

Because of the difference in natural conditions, the distribution of cereals varies considerably from country to country (Table 4). In Hungary the main crops are wheat and maize, in Finland barley and oats, and in Poland rye. In Finland, wheat cultivation is possible only in the southern parts of the country. In Poland, the sandy soils are best suited for rye cultivation. In Hungary, both soil and climate favour wheat and maize, which give much better yields than rye or fodder crops.

5. Yields

5.1. Yields per hectare

The yields per hectare show the superiority of Hungarian agriculture over that of Finland and Poland. The yield of wheat (4500 kg/ha) is about 50 % higher than in Poland or Finland (less than 3,000 kg/hectare) as can be seen in Table 5. The yield of maize is nearly 6000 kg/hectare in Hungary whereas in Finland (and also in Poland) the yield of feed crops is only 2,500-3,000 kg/ha. Maize gives rather good yields in Poland, too, but the area in which it is grown is smaller than that for other crops. Potatoes give about 19,000 kg/ha in Poland, which corresponds to about 3,000 f.u./ha.

Table 4. The proportion of cereals of the total arable land area and the proportion of different cereal crops of the total area in Finland, Poland and Hungary. Years 1980-1982.

	Year	HUNGARY 1000 ha	%	POLAND 1000 ha	%	FINLAND 1000 ha	%
Wheat	80	1276	44.4	1609	20.5	124	10.6
	81	1151	41.8	1418	17.9	108	8.9
	82	1310	46.9	1456	18.0	143	12.2
Rye	80	73	2.5	3039	38.7	53	4.5
	81	74	2.6	3002	38.0	41	3.3
	82	74	2.6	3273	40.4	16	1.4
Barley	80	246	8.5	1322	16.9	533	45.5
	81	286	10.4	1294	16.4	570	46.7
	82	362	9.3	1236	15.3	540	46.2
Oats	80	35	1.2	997	12.7	448	36.7
	81	55	2.0	1156	14.6	434	35.6
	82	50	1.8	1086	13.4	459	39.3
Maize	80	1229	42.7	16	0.2		
	81	1163	42.3	16	0.2		
	82	1130	40.0	15	0.2		

Table 5. The yields per hectare in Hungary, Poland and Finland. Years 1980-1982.

	Year	Hungary kg/ha	Poland kg/ha	Finland kg/ha
Wheat	80	4,760	2,598	2,903
	81	4,000	2,962	2,222
	82	4,390	3,010	3,076
Rye	80	1,900	2,162	2,264
	81	1,560	2,242	1,463
	82	1,580	2,380	2,500
Barley	80	3,784	2,587	2,870
	81	3,157	2,736	1,895
	82	3,300	2,950	2,962
Oats	80	3,030	2,247	2,812
	81	2,880	2,362	2,327
	82	2,460	2,400	2,876
Maize	80	5,320	3,540	
	81	5,860	4,200	
	82	6,850	5,333	

Yields vary in all countries but the risk of poor crops is much higher in Finland than in Poland or Hungary. A good example of a poor year was 1981, when the average yield was 20 % below normal. 1980 was more or less normal and 1982 slightly above normal in Finland.

It was not the purpose of this paper to evaluate the profitability of farming. Nevertheless, we see from the yields per hectare that the production costs of crops in Finland are twice as high as in Hungary. Hungary has far better potential than Finland for exporting of agricultural products.

5.2. Total yields

The total yields of the major crops are given in Table 6, but because of the differences in acreage they cannot be compared with each other. Regarding the self-sufficiency of the countries, Finland has imported only little grain or feed grain in 1982-83, Hungary has exported a fair amount of wheat and maize, whereas Poland has imported both wheat and fodder grains.

Table 6. Total yields of certain cereals in 1982, mill. kg.

	Finland	Hungary	Poland
Wheat	440	5747	4416
Rye	40	116	7792
Barley	1600	865	3647
Oats	1320	123	2608
Maize		7730	80

6. Summary

Yields of crops are much higher in Hungary than in Poland or Finland. For example, the yield of wheat in Hungary (4,500 kg/ha) is about 50 % higher than in the other two countries. Maize gives 6,000-7,000 kg/ha in Hungary, whereas the yields of fodder crops (barley and oats) are only 2,500-3,000 kg/ha in Finland and Poland. These figures reveal clearly the superiority of Hungarian agriculture over that of Finland and Poland.

Natural conditions certainly favour Hungary. Most of the soils are suitable for cultivation, and precipitation is satisfactory. Climatic conditions are also rather favourable in Poland, but sandy soils (about 60 % the arable area) are unsuitable for demanding crops like wheat, barley and sugar beet. There are some rather good agricultural areas in southern Finland, but climatic conditions may ruin the yields even there. The middle and northern parts of the country are mainly suited for hay alone.

The use of inputs may partially explain the crop variations between the countries. Hungary uses slightly more fertilizers than the others but, taking into account climatic conditions, Finland already uses the maximum amount possible. The low mechanization of Polish agriculture is likely to be another reason why yields so low in Poland.

There are some notable differences in areal distribution. The proportion of meadows and pastures is twice as large in Hungary (19.4 %) and Poland (21.4 %) as in Finland (8.1 %). This is compensated by the larger share of fodder crops in Finland. A typical feature of Polish agriculture is the large areas of potatoes and rye.

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THE GRAINS AND FEEDSTUFFS PROBLEM IN POLAND: PRINCIPAL QUESTIONS AND SOLUTIONS PROPOSED

The grains and feedstuffs question is without any doubt the number one problem in Polish agriculture and for the whole national economy as well.

Polish agriculture produces 550 to 600 kilograms of grains per inhabitant. While this indeed is four times less than the respective figure for Canada and two and a half times less than in the United States, twice less than in Hungary, it is however approximately the same grain production per capita as in Finland and the GDR and more than in Spain, Japan, the Federal Republic of Germany, Great Britain or Italy / see Table 1 /. Despite this, the grains and feedstuffs problem in Poland is of a considerably more acute nature in comparison with other countries. Its nature is structural and this in a dual sense.

1. Polish agriculture has an agrarian structure which does not favor the development of grains production. Grains are a product characteristic for the bigger farms; they require a large scale of production which permits the use of specialized machinery and a reduction of the labor requirements. A strongly dispersed agrarian structure does not favor the expansion of grain acreage, as well since the income per unit of production in this line is not sufficient to secure for the farmer family the desired level of income. Grains are a product too cheap to bring the family adequate income in a situation when the scale of production is small. This is the structural cause for the slight interest in grains production

intensification in Polish agriculture. Thus the fundamental solution of the grains problem in Poland will depend on the improvement of the agrarian structure.

One should stress however that the improvement of the agrarian structure and a growth of the scale of production is not yet a sufficient condition for the desired intensification of grains production in Poland. One ought to remark that there exist countries with a favorable agrarian structure which however produce little grains per capita. Among these are such countries which have chosen this economic model and are importing relatively large amounts of grains, thus obtaining benefits from the international division of labor, such as the Federal Republic of Germany, Denmark and the Netherlands. There are also countries which having an agrarian structure favoring grains production, nevertheless produce little grains because of the low yields, thus having to import considerable quantities of grains. The difference between imports which are planned from the beginning, this being an implicit choice of a development strategy, and imports which are forced upon the economy by the actual situation is very important. In Poland in the 1970's the first strategy was to be implemented, i.e. grain and protein imports were increased considerably in the hope that this would permit a profitable export of meat products, which in turn could be used for the financing of the feeds imports. As result of the low feed conversion ratios this effort failed, one of the final effects of which was a high and growing dependence of agriculture and what ensued the whole economy on supplies from abroad.

No matter what the point of niew, the achievement of self-sufficiency in the production of grains in Poland is an absolute necessity. This will not however be an easy task in the short time horizon, since as I have tried to show, it is among others, also a problem of the agrarian structures and these change very slowly.

2. The deficit of grains in Poland has also a structural nature because of the developed grains consumption model. In the 1970's decade Poland has rather rapidly moved towards the relatively expensive model of consumption based principally on meat. The goals which have been proposed in this field have quite exceeded not only the possibilities and potential of agriculture but also those of the whole national economy as a whole. The condition of the Polish economy permits a per capita consumption of meat of about 55 to 60 kilograms yearly, this being much lower than the 70 to 72 kilograms figure of the past decade. A meat diet based predominantly on pork is very grains requiring. Each step in this direction aggravates the grains deficit since the domestic production of grains cannot grow at an identical rate as the expansion of animal production[1)]. Numerous factors have contributed to the fact that the grain requirements of animal production increased in Polish agriculture at a very high rate. If in 1971 one kilogram of animal production required the use of 2.09 kilograms of concentrate feeds, then in 1979 this figure was already 3.24 kilograms[2)]. In the next years this ratio decreased somewhat principally as effect of the difficulties with imports and as result of specific reduction of animal breeding in the most expensive farms in terms of feed use. There is however little probability that the demand for concentrate feeds will drop back to the low level characteristic for the beginning of the 1970's.

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1) During the 1970's decade crop production grew by 9 %, while animal production increased by 28 %. In this period 48 % of the growth of animal production was possible due to increased imports of grains and feedstuffs.

2) Z. Grochowski: Wewnętrzne proporcje wzrostu produkcji rolniczej. w: Rolnictwo i polityka rolna lat siedemdziesiątych. / The internal structural relations of agricultural production growth; by Z. Grochowski, in: Agriculture and agricultural policy in the 1970's /, PWRiL publishers, Warszawa, 1982, p. 104.

Farmers have found that feeding swine as well as poultry with concentrate feeds is very productive and at the same time saves considerable labor input. The traditional technologies of animal feeding based in Polish agriculture on potatoes are very labor demanding and troublesome, most of all they are difficult to mechanize. The farmers have begun to value more their own labor and effort and as result they depart from the traditional technologies. This is an important factor increasing the demand for grains and aggravating their deficit in the national balance. In the coming years one may expect a slight drop in the grains demand in animal production, principally as effect of rationalization of animal feeding and the introduction of more effective technologies, but one should not expect a return to the starting point. If in the coming years the use of concentrate feeds per one kilogram of animal production will remain at the 2.6 to 2.7 kilograms level, this may be considered a very good result. The present crisis situation and the difficulties with concentrate feeds imports are a strong force towards a drop of grain use in animal production. This is an important element on the active side of the grains balance in Polish agriculture.

The deficit of grains in Poland as it appears from the previous discussion is of a structural nature. Depending on the domestic crops it may vary from 4.5 to 5.5 million tons and presently is twice the size of what it was ten years ago. As it can be seen in the national grains balance / as shown in Table 2 / the share of the domestic crop in the total grain supply has been decreasing, while the share of imports has been increasing, by approximately one per cent point per annum. The share of human consumption is dropping, while the share of grains used for animal breeding is growing. These trends have been slightly arrested after 1981 as effect of the general crisis situation.

When evaluating the size of the grains deficit one should take into consideration the dimensions and composition of imports. This will explain many questions. We are faced in the situation of

Polish agriculture with the so called necessary imports of grains which are estimated to be approximately 2 million tons. This is the part of imports which must be maintained regardless of the size of the domestic production. The traditional Polish feed grains such as rye, barley and oats are characterized by a low protein content of about 13 to 16 %, while for effective feeding of animals required are feeds with an increased content of protein. Thus the domestically produced feed grains must be supplemented with the high protein content components, such as soybean, fish meal, arachis etc. and these must be imported, since their production in Poland is extremely expensive[1)]. When using for animal feeding 12 to 14 million tons of grains, as this is the present figure, we must add to this approximately 2 million tons of high protein content components, which will permit obtaining favorable conversion ratios of feeds in milk and meat production. This group of imports is economically rational and should be maintained.

An important problem is the balance of imports which is the result of a chosen strategy of development. Presently it is a matter of reducing the imports by 2.5 to 3.5 million tons. This is an important problem as it means an expenditure for the national economy of 380 to 530 million US dollars per year, which only in a small degree is compensated by the exports of meat products. The elimination or at least reduction of these grains imports is the guide for the way for Polish agriculture to food self-sufficiency. In fact, the achievement of food self-sufficiency is first of all a problem of solving the grains deficit.

Thus Polish agriculture faces an urgent task of increasing grains production by at least 2.5 to 3.5 million tons. In fact, this growth must be even bigger since the population is growing and as effect of this the demand for grains is also growing.

[1)] While efforts have been undertaken in Poland to grow soybean, they still remain in field experimental stage.

What then is the recommendation on how to achieve this growth of grains production, to make up the lacking 2.5 to 3.5 million tons of grains?

When searching for an answer to this problem one should ask whether the question is that we produce too little grains or whether we use too much grains. Both answers are true. The domestic production is too small considering the factual production potential but also the truth is that the use of grains, especially in animal feeding is not as effective as it should be.

We shall first consider the potential on the side of grains production growth. It is without any doubt that the greatest reserves are in a potential increase of grains yields. The progress in this respect has been recently of little significance. In the second half of the 1970's decade we were faced even with a stagnation of grain yields. There are four basic factors which determine the growth of grain yields:

1. An improvement of the seed material policy, meaning the constitution in mass production of these genetic characteristics of new grain varieties which have been obtained in the experimental breeding stages and the introduction on a large scale of varieties which react well to increased fertilizer application.

2. An improvement of fertilizer management aimed at better coordination of the fertilizer application level with the water resources available in the soil as well as a better selection of fertilizer composition adapted to the requirements of the respective crops.

3. A significant improvement of the agro-technics, especially soil preparation and weed protection.

4. Further expansion of agricultural advising and extension services, especially the popularization of methods of achieving high yields of grains, since the sphere of know-how has today in Polish agriculture a much broader importance than it is usually acknowledged.

While not going into details of these necessary undertakings presently, it should be stressed that they should be implemented simultaneously. One of the reasons for the failure of the efforts in this field so far has been the fact that all of these factors aimed at improving grain yields were considered and employed separately, without giving consideration to their interdependence.

Another way to improve grains production potential could be a growth of the area planted to grains. In the peasant sector the reserves in this respect do not appear to be very great. Approximately 57 % of the area planted is already under grains, this being near the limit of "grain capacity" of the soils. The situation is different in the socialized sector of agriculture. Here only 45 % of the area planted is under grains. There is thus a possibility of increasing the area planted to grains in this sector by 420 to 450 thousand hectares which could in effect yield additionally 1.2 million tons of grains. A condition for this is however a simultaneous increase of the yields of the non-grains feeds, especially those of meadow hay, grass and other fodder crops, which could free land for additional grains production. There is an opinion that it was these low yields of the non-grain fodder crops which have blocked in a way the expansion, in terms of the area planted, of grains and have aggravated the grains deficit in Poland. This latter remark concerns all of Polish agriculture, not only the socialized sector of it.

It is believed that the grains balance could be greatly improved through an increase of the production of high protein content fodder crops, such as beans, broad bean, sweet lupine and other coarse grained podded crops. Poland has attractive soil and

climatic conditions for the development of this production. These high protein content fodders could be an excellent substitute for grains and in addition to this they could permit a reduction of the expensive imports of these components. What is required here is a more intensive economic stimulation, i.e. better price incentives, accompanied by government assistance in the production of the necessary seed material. Specialists believe that it is possible to produce in Poland such a quantity of podded crops which could be a substitute for 1.5 to 2.0 million tons of grains. The development of this production requires however an extensive program of assistance from the agricultural advisory services and from the whole sphere engaged in providing services for agriculture.

The grains balance in Poland could also be improved through decreasing the use of grains and feeds per unit of animal production. Presently 58 % of the total grains used is earmarked for animal feeding. This is a very important position and any improvement, even appearing to be minute, in the conversion rates of grains and feeds to milk and meat will bring great progress and savings. The ways to achieve this have been recognized. A practical realization of these recommendations encounters however numerous difficulties. The real problems are in the sphere of know-how.

The Polish farmers have moved in a relatively short time on a mass scale from the traditional methods of feeding animals to more modern technologies, based first of all on feeding grains.

This process has taken place so rapidly that it was not possible to assist all farmers with professional advising. Many of them regrettably do not posses the needed knowledge and these modern technologies were poorly employed, thus the production effects are not satisfying. In the 1970's the flow of protein concentrates feeds to the countryside was greater than the flow of knowledge. And this is the reason why the results are less than what has been expected.

This view is confirmed by international comparisons. One observes that there are countries which while having the same per capita production of grains as in Poland, have at the same time a more balanced situation in grains and a higher level of food production per inhabitant. The answer to this can be only one. It must be the effectiveness of the feeding of animals. And this depends beside the other factors discussed on the skills and the knowledge of farmers.

There are of course other reasons for the poor feed conversion ratios, such as the low quality of the feeds supplied, due to a lack of some components, changing compensation of the feeds, broken supply schedules, inadequate veterinary care etc. While all of these constraints are indeed true, there is sufficient proof to the fact that good farmers even taking into consideration the described above general difficulties with the supply and quality etc. of feeds, nevertheless achieve high coefficients of effectiveness of grain feeding. This also means that if all farmers were to achieve this effectiveness level, a significant improvement in the national grains balance would appear.

The discussion undertaken in this paper shows that the deficit of grains in Poland today is of a structural nature. It is consequence of the previously selected way of development. But the disequilibrium in the grains balance today is so great that it requires a revision of this choice of strategy made formerly. This process is taking place presently. The ways and means of activization of the grains balance are well recognized; the problem is in how to continue on this way. This brings to our mind and under discussion the matter of economic instruments to be used, in order to improve the situation. Among these in the first place should be named a foreseen increase of the government offered procurement prices for grains. By fall of 1983 the new prices of grains proposed will be higher compared to the present ones by

approximately 40 %. Traditionally grains have been in Poland the cheapest agricultural product. Since we face today a new situation, this arrangement must be changed. The increase in procurement prices of grains alone in itself will not be sufficient. Other measures will be necessary as well, some of which have been discussed in this paper. If these efforts will be complete and coordinated, there then is hope for success.

March 1983, Warszawa

Table 1. Domestic production, foreign trade balance, total use of grains and concentrate feeds / converted into grains / in selected countries calculated per capita, in kilograms in the years 1971 - 1981.

Country	Domestic production			Foreign trade balance**			Total use		
	1971-75	1976-80	1981	1971-75	1976-80	1981	1971-75	1976-80	1981
Bulgaria	858	893	959	-140	-45	-109	998	938	1 068
Czechoslovakia	642	670	618	-161	-171	-139	803	841	757
Finland*	532	629	572	- 26	-15	-123	558	644	695
France	759	784	826	+218	+184	+296	541	610	530
Spain	372	412	306	-160	-223	-206	532	635	512
Japan	150	167	119	-213	-258	-266	363	425	385
Yugoslavia	692	710	651	- 37	- 23	- 29	729	733	680
Canada	1 620	1 557	2 064	+775	+830	+972	845	927	1 092
GDR	511	538	530	-238	-288	-242	749	826	771
Poland	627	560	549	-136	-250	-262	763	810	811
FRG	343	370	366	-192	-196	-172	535	566	538
USA	1 092	1 246	1 434	+400	+560	+654	692	676	780
Hungary	1 093	1 197	1 197	0	0	- 49	1 093	1 190	1 246
Great Britain	272	300	338	-170	-149	- 61	492	449	399
Italy	299	303	322	-172	-188	-147	471	491	469
Soviet Union	698	762	629	- 44	- 84	-165	742	846	794

* Withour wheat

** Calculations basis international statistics by. Dr. M. Kisiel of the Institute of Agricultural and Food Economics.

Table 2. The grains balance in Poland in the 1970/71 - 1980/81 period and its composition

Specification	1970/71	1975/76	1978/79	1979/80	1980/81
	in thousand tons				
INCOME	19 096	23 228	26 485	22 199	24 014
Harvest	16 172	19 449	21 360	17 069	18 179
Imports	2 541	3 128	5 045	4 796	5 538
Reserve reduction	383	651	80	334	297
EXPENDITURES	19 096	23 228	26 485	22 199	24 014
Sowing material	1 554	1 461	1 554	1 625	1 638
Animal feeding	9 596	14 386	16 014	12 739	13 951
Human consumption	6 242	5 993	6 248	6 219	6 352
Industrial use	247	428	789	402	573
Losses	672	827	1 552	1 037	993
Exports	180	133	47	107	116
Increase of reserves	605	-	281	71	391
	Composition, in per cent				
INCOME	100.0	100.0	100.0	100.0	100.0
Harvest	84.7	83.7	80.6	76.9	75.7
Imports	13.3	13.5	19.0	21.6	23.1
Reserve reduction	2.0	2.8	0.4	1.5	1.2
EXPENDITURE	100.0	100.0	100.0	100.0	100.0
Sowing material	8.1	6.3	5.9	7.3	6.8
Animal feeding	50.2	61.9	60.5	57.4	58.1
Human consumption	32.7	25.8	23.6	28.0	26.4
Industrial use	1.3	1.8	3.0	1.8	2.4
Losses	3.5	3.5	5.8	4.7	4.1
Exports	0.9	0.7	0.1	0.5	0.5
Increase of reserves	3.3	-	1.1	0.3	1.7

Source: Rocznik Statystyczny 1982 (Statistical Yearbook 1982), published by the Central Statistical Office GUS, Warszawa, 1982, p. 254.

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CROP PRODUCTION STRUCTURE IN HUNGARY AND THE WORLD MARKET

The total area of the country is 9.3 million hectare of which productive land / agriculture and woodland / is 8.3 million / 89 percent / while built-on area, roads, railways etc. amount to 1 million hectares / 11 percent /.

The fact, that most of the country is flat with two-thirds of the territory not exceeding 200 meters above sea level, and the abundance of good quality soils suitable for a great variety of crops provide favourable conditions for arable farming. The high proportion of arable land / 71 percent of agricultural land and 50 percent of total territory / and a minor role of grassland and forests is an important characteristic of Hungarian farming. As relatively little land remains for grassland and forests, forage has to be produced mostly on arable land and income earning of the rural population in forestry is not frequent.

Land used for crop production slowly declines with progressive of urbanization; loss of land reached 1/4 million hectares, 3.6 percent in the last decade.

Turning grass and woodland to arable farming could be of course, a way of expanding arable land but as Hungary has very little such land, 26 hectares of grassland and 32 hectares forests per 100 hectares arable land ranking second lowest in Europe after Denmark / 29 hectares /, there is practically no possibility for the expansion of arable land.

Physical conditions are medium level; the amount of sunshine, rainfall and the quality of the soils qualify for plentiful and diverse agricultural production, but a high degree of uncertainty of the weather; especially drought, late and early frosts in spring and autumn and cold winters without snow greatly hamper realization of the benefits of nature. The supply of water is also a critical factor as it is a limiting factor of agricultural production on more than half of the area.

Structure of crop production is traditionally diverse; because of the great variety of soil types, macro- and micro- climatic conditions, practically all crops of the temperate zone are traditionally produced in some volume.

The first big change of the crop production pattern was in the 1940's and 1950's when draught-animals were replaced by tractors and excess forage and feed producing land led to a transformation of the crop production structure.

The period 1960 to 1980 was characterized by the stability of the crop production structure; the unchanging factors, e.g. natural conditions and long established agrotechnical practices combined with the enhancement of all-out self sufficiency as a primal goal all contributed in maintaining traditional crop production pattern. Changes were made only as a result of developments of yields, which made some substitution possible; rye and barley were extensively replaced by wheat, clower and other leguminous forage crops by lucerne and silo maize, fodder beet and potatoe by sugar-beet.

Adaptation of modern production methods and equipment brought about a revolutionary transformation mainly of maize, wheat and sunflower-seed production with sharply rising yields and great reduction of labour. But it must be emphasized that this

transformation was not due to world-market developments but was the result of the intruduction of high yielding wheat and maize varieties and most up-to-date growing techniques. This development brought about a modification of the cereal production structure with a suppression of cereals with lower yield potential / rye, oats / by wheat and maize. A big volume of wheat began to be used for feed as a consequence.

Cereals had always overwhelming importance in crop production in Hungary; currently these crops have a two-thirds share in the total crop area. This share remained for a long time relatively stable, with a slowly declining trend:

	Land under cereals million hectares	Share of arable land percent	Share of wheat in land under cereals percent	Share of maize in land under cereals percent
1961-1965 average	3.20	64	41	40
1966-1970 "	3.13	65	45	39
1971-1975 "	3.18	66	44	44
1976-1980 "	2.97	63	46	44
1981-1982 "	2.81	61	46	41

The two main cereals / wheat and maize / make up 85-90 percent of total cereal production, with the share of wheat permanently slightly higher than maize, with the importance of wheat slowly growing since the dramatic growth of world market input prices which had a particularly heavy impact on maize production.

As a result of the adaptation, improvement and widescale application of imported production techniques yields rose spectacularly. In the first decades after the Second World War wheat yields in Hungary exceeded those in the United States by 10-25 percent and this rose to 70-80 percent in the last years; maize yields that were only 60 percent of the USA in the middle of the 60's, progressed in the last years to 80 percent. It must be stated however that much higher wheat yields than in the USA are partly the result of switching to varieties with lower quality leading to a big volume of feed quality wheat.

Wheat and maize yield in Hungary and the United States

tons/hectare

	Wheat			Maize		
	Hungary	USA	Index USA = = 100	Hungary	USA	Index USA = = 100
1934-1938 average	1.4	0.9	150	2.0	1.50	133
1948-1952 "	1.4	1.1	127	1.8	2.5	72
1961-1965 "	1.9	1.7	112	2.6	4.2	62
1969-1971 "	2.6	2.1	124	3.6	5.2	69
1972-1975 "	3.4	2.1	162	4.3	5.4	80
1976-1980 "	4.1	2.2	186	4.8	6.0	80
1981-1982 "	4.1	2.4	171	5.7	7.0	81

Wheat yield progressed between the average of the years 1961-1965 and 1971-1975 80 percent, rose in 1977 over 4 tons/hectare and reached in 1980 a record of 4.76 tons. 1982 it dropped to 4.4. Maize yield rose between the averages of 1961-1965 and 1971-1975 60 percent, passed 5 tons in 1978 and reached a record of 6.85 tons in 1982. There was a very considerable improvement of sunflowerseed yields, too / 1975 1.19, 1982 1.9 tons/hectares /.

Improvement of wheat yields was more rapid than that of maize as the incentive of producer prices was stronger. Reaching bread-grain self-sufficiency was a long standing aim of the production policy, while production of maize was hampered by high hand-labour demand and technical equipment etc., was missing in the earlier years. Not even technically organized production systems succeeded in reaching higher yield growth than wheat.

Total cereal production reached 10 million tons in 1972, 60 percent rice compared with the average 1961-1965; record in 1978 / 13.5 million tons / was more than twice higher than in the first half of the 1960's.

At the same time with the considerable improvement of yields difference between high and low yields diminished. From 1324 wheat producing co-operatives in 1980 847 had yields between 4 and 6 tons and produced three quarters of wheat produced by co-operatives and more than a quarter was produced by 276 co-operatives with 5.0-5.5 ton/hectare yields, there were only 20 co-operatives with yields under 2 tons and 18 over 7.5 tons, supplying 0.3 and 2.1 percent respectively.

The distribution of maize yields is different; from 1253 co-operatives in 1980 167 in the top group of yields exceeding 7 tons produced 28 percent of all co-operatives.

In the first half of the 1970's large farms concentrated their efforts on cereal production, easy to mechanize and causing little other problems, while yielding good profits. Expansion of cereal production relied both on the domestic and export market situation. This situation changed in the second half of the 1970's.

The most important development of the 1970's was the decline of cereal and potato area and expansion of industrial crops and forages as a result of changing price ratios.

The decline of cereal-area was the result of lagging prices. Producer prices of cereals hardly changed, thus producers had no opportunity to keep up with rising production costs and profits from cereal production declined. For a time the high growth of yields made up some of the loss of income but this was not enough. The deterioration of profits from maize production was especially grave as producers could not make up rising costs by improving yields. As a consequence maize-area declined every year in the 1970's. Because of the high costs of production, maize is profitable only on land where yields reach 4.5-5.0 tons/hectare. As a consequence maize production started to shift to land with the higher yields, while on lower quality soils it was replaced

by cereals with lower requirements for soil, climate and agro-technique. This situation is expected to remain in the future, too. The contraction of maize land and rising yields are going to be long term trends.

The incentive of producer prices for the expansion of industrial crops was very strong in the 1970's as economic policy tried to raise production with repeated price-rises, to use favourable export market possibilities. Producers got between 1971 and 1979 82 percent higher prices for sugar-beet and 92 percent higher for sunflowerseed while cereal prices remained unchanged.

World market price explosion and rising production costs as a consequence, led to a critical situation of maize production in the 1980's, though yields were excellent in world comparison. Production of other cereals on the other hand yielded stable profits in good years. Sunflowerseed production acquired an outstanding position, making up losses on large farms in years with bad grain harvest. There is a considerable difference of the rentability of grain production, depending on whether calculation is made with domestic or world market prices respectively; while wheat profits considerably declined because of low producer prices in the last years, production is still very profitable on national level taking into account world market prices.

Human consumption of cereals is stationary while use for feed is strongly expanding; at the end of the 1960's 60 percent, actually only 30 percent of production is used for bread etc. The most important form of cereal consumption / bread / steadily declines and this is only partly made up by rising consumption of fine bakery-ware. Use of cereal products as garnishment of meat became more important in the last years as preparation of potatoes for cooking is very labour consuming and production lagged behind demand. Breakfast cereals have not yet found their way to the

Hungarian consumer. Per capita fat consumption roughly corresponds with developed countries, but only 1/5 of this is of vegetal origin while it is 40-50 percent in most European countries.

There was an import of cereals in most years until 1972, from 1973 however export became permanent; in the years 1973-1979 a total of 9 million tons, yearly average 1.3 million tons was exported.

Maize and wheat export for human consumption strongly varies from year to year and there is a frequent change of markets, too. Most important importers are the CMEA countries, as neighbourhood is a considerable advantage because of low transport costs. Export to the Soviet Union is mainly carried out in the framework of long term contracts, in exhange of fuels and important raw materials.

Wheat and maize export prices to non-socialist countries are since 1973 good, while rouble-prices are somewhat lower, but input / export price relation is still better than the national average of all goods. Wheat export has 16, that of maize 24 percent import content, thus maize export is less favourable because of lower export prices and higher imported material, fuel etc. content. Both wheat and maize are profitable export products but expansion of maize production on the expense of wheat is not justified till there is enough export opportunity for wheat. The volume of foreign currency earning per hectare is however higher for vegetable oil, sugar etc.

The augmentation of sunflower-seed production came to a halt in the first half of the 1970's, but considerable growth started, in the second half of the decade again. Area under oilseeds continued to expand every year as a consequence of favourable export market conditions. Average yearly oilseed area was 45 percent higher in 1976-1980, than in the previous five years and

production volume augmented 80 percent. The expansion of production as a reaction to favourable conditions however was somewhat slow, as export began to rise only in the second half of 1976-1980. Production of the vegetable-oil industry rose in the last years considerably, as a result of growing raw-material supply; production development rose fastest in the 1970's from all industries processing raw materials of vegetable origin. Despite this, 100-140 000 tons of unprocessed oilseeds were annually exported because of a shortage of processing capacity. A high processing capacity was constructed in 1971-1975 and as a result, much more of oilseeds are exported in the form of vegetable oil, with protein-meal remaining for domestic utilization.

Sugar-beet area was 110 000 hectares in the 1960's but as a consequence of declining world market prices, it fell 30 percent till 1971. Production in 1975 still lagged 30 percent behind expectations, as area planted with sugar-beet declined because of low producer prices; obsolete production technique did not allow compensation of the loss of territory with higher yields. Processing results were also bad; because of old machinery and equipment processing capacity was not sufficient and 150-160 day runs with a corresponding high loss of sugar content of the beets resulted.

This was a very unfavourable period, when sugar had to be imported for hard currency from the capitalist market in considerable quantities. In the second half of the 1970's however the situation improved; as a result of considerably higher producer prices and the introduction of prices taking into consideration the sugar content of the beets resulted in higher production. As a result of a higher sugar content of the beets and the expansion of the processing capacity import could be stopped, though production still lagged 16-17 percent behind the plan.

Forage production uses 1/5 / 18-22 percent / of the crop-area; most of this is lucerne and silo-maize; 45 percent of the forage demand of the cattle stock is met by silo-maize and 30 percent by lucerne.

As a result of favourable export outlets for lucerne-meal in the first years of the 1970's and cheap fuel making dehydration a favourable proposition, area under lucerne considerably expanded and yields rose 40 percent in 10 years. In the second half of the decade however, expansion came to a halt because of low export prices and rising fuel prices. Silo-maize is becoming the increasingly important forage-base of the cattle stock, with growing importance in the crop-area.

The considerable grassland area is also an important asset of Hungarian farming, though it is only 1/5 of arable land, much less than in Western-Europe though higher than in most Scandinavian countries and approximately the same as in Poland and Sweden. As grass yield is much lower than in regions having more favourable climate for pasturing, there is an intensive discussion with conflicting views, about the growth potential of grass yields. Practical experience cautions against high expectations, as most of the grassland is on very poor soil / alcalicsoils, barren areas etc. /,areas with difficult access and scattered small plots, where realization of the growth potential would require heavy investments.

Stable, abundant and low-cost protein-feed supply is one of the main problems of Hungarian agriculture; as a consequense of the world market changes the problem gained still in importance. Concentrated feeds are traditionally high in energy and low in protein in Hungary because of the natural conditions, enhanced by the production policy. The supply / demand situation is worsening because of growing protein consumption of intensive animal production. Growth of protein feed production in the 1970's fell behind requirements.

Much of the protein feed necessary has to be imported and foreign currency necessary is met by grain export. Wheat for human consumption and maize export bring more foreign currency per hectare than oilseeds; at the end of the 1970's net income of maize per hectare was despite a considerable input of imported fuel-oil for drying 36 $ higher than that of sunflowerseed and 173 $ than soybean. The cost of a feed-unit of hot-air process lucerne-meal was 3 times higher than natural lucerne hay and 10-30 percent higher than imported protein.

The growing protein gap is currently met with excess feed grain, but this in not an efficient solution. Problems of feeding-economy are shown by the fact, that while output of animal products per animal unit rose 30 percent in the 1970's there was no improvement of feeding efficiency, mainly because nutritive-value of feed - mainly lizin - declined as a consequence of spreading dehydration and technological deficiencies during the drying process etc. The part of animal proteins declined from 9 to 5 percent and replacement with amino-asids did not bring results expected. Expansion of lucerne-meal from 1.8 to 4.7 of the feed-ration led to a loss in feeding efficiency, as it is not good for every animal species. Protein demand is enhanced by the fact, that smallscale pig and poultry farming changes in the direction of feeding concentrates instead of household by-products.

The key issue of the future production structure of Hungarian agricultural production is grain production, as this is the most important part of the whole food economy. Without an expanding grain production, augmentation of animal production would be unwise, while it is possible to expand cereal production without the animal sector also. The importance of grain production is justified by relatively low inputs also. Thus resources should be primarily concentrated on grain production.

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ECOLOGICAL CONSIDERATIONS AND THE REGIONAL DISTRIBUTION OF CROP PRODUCTION IN HUNGARY

The regional distribution of crops is the instrument of the management of the national economy and the farms, to raise economic achievements. The target is an efficient production of good, or excellent quality goods, and the raising the competitiveness of Hungarian food economy.

There is world-wide growing interest in the utilization of natural resources, particularly the renewables and the same is true in Hungary also. In Hungary the most important natural resource is the land and its efficient utilization is decided by the large farms and the small producers integrated by these.

Reasonable utilization of the land is a complex task. Farms have to accomplish simultaneously a more profitable utilization of production sites, a retardation of land-loss, particularly the conservation of the good sites, raising of productivity mainly by land reclamation and a saving of inputs and raising their efficiency.

Distribution of crops is shaped by a great many factors and conditions; differences of natural conditions / soil, climate, hydrologic conditions, surface, etc./, production traditions, existing equipment, distance of processing facilities, size, settlement pattern, infrastructure of consumer agglomerations etc.

Research, state economic management and firms all have their opportunities in the exploration and utilization of these factors and conditions.

1. Role of research in regional distribution

Research has to rely on the profound exploration of the facts, the uncovering of the basic interrelations and ascertaining direction and intensity of the effect of difference factors and conditions. From all these, input - production site - yield relations have basic importance as their utilization can bring permanently additional profits to the firms.

Earlier investigations have already analysed the threefold interrelation of input - production site - yield; we published these in foreign languages in our book[1]. We stated there, that at favourable production sites yields are higher, efficiency of inputs better and rentability higher than on production sites with lower resource level. Additional inputs have - at least on the Hungarian price relations etc. - often declining efficiency. Fig. 1. shows rentability as a function of the resource level of the production sites in our biggest agricultural county.

We would like to present in addition from recent research in Hungary two new results: analysis and forecast of Hungarian agro-ecologic potential to the year 2000 /we have investigated this earlier also/ and county level examinations.

a/ Analysis and forecast of Hungarian agro-ecologic potential to the year 2000

Concerning the interrelations of the regional and enterprise division of labour and specialization in the Hungarian agricultural production and of the natural conditions, along with the other ways of approach, there are two essentials, differing from each

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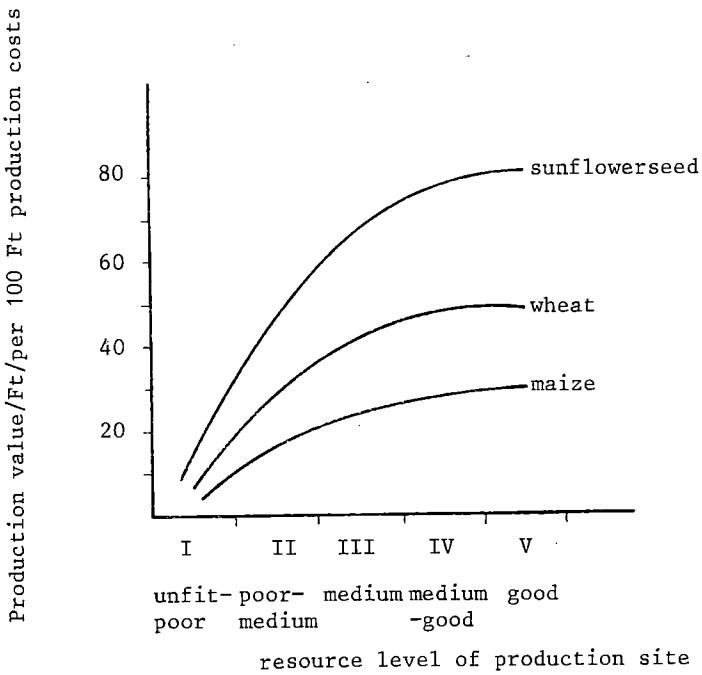
[1] F. Erdei-L.CSETE-J.MÁRTON:
Intensity of farming
/A mezőgazdaság belterjessége/
Közgazdasági és Jogi Könyvkiadó, Budapest, 1963.



source: Basic data used for the calculations: 1980 results of farming cooperatives Bács-Kiskun county

Fig. 1. Realtion of net income /Ft/per 100 Ft production costs at production sites with different resource levels.

other manners /ways of analysis/, in which the question is put in connection with the topic of this study. One of them proceeds from the economic /business/ activity and the needs up to the natural conditions, while the other, on the contrary, searches the utilization possibilities starting from the natural conditions. The first way /and practice/ was mostly represented by Ferenc ERDEI and his collaborators in their first book /1/ and succeeding studies and it was confirmed by their appearances on scientific

forums /2./. Two branches of the second approach can be observed in the domestic practice until now: first, the so-called landscape-research, which has been, in essence, a discovery of site conditions and utilization possibilities on municipal level /3/; second, the investigation of site-input-yield relations /4, 5/ culminating in the analysis of site conditions differentiating the input efficiency, in the preparation of marginal analyses and in the determination of the connected practical lessons.

Nevertheless, the research work, organized in inter-departmental collaboration and to be reviewed below, for the most part belonging to the latter ways of analysis, differs from them in several aspects. These ones are as follow; discovery and forecasting of the agro-ecological potential for 35 regions and 200 soil mosaics; dimensions of research; number of collaborating experts and institutions; rapidity of solution; procedure adopted; joint adoption of different methods; concrete combination of analysis and prognosis; determination of different optimalities.

The findings of investigations could be compared with geological discovery. Namely, geologist discovers the possibilities, utilization of which is the function of the prevailing economic /business/ circumstances and decisions.

The findings of this research enterpreneurship were already reviewed by some scientific sessions. The report /6/ delivered on the occasion of 1980 General Assembly of Hungarian Academy of Sciences presented an entire review on work made until that time. Below, we try to make known the major goals, the findings, the further possibilities of the utilization and some questions of the solution, in a short way. Within the limit of this lecture we pay a relatively greater attention to the latter aspects, because we have not published them so far, and, the readers can utilize in many respects this knowledge in their own practice.

On the major goals

We tried to discover, what total crop production will be possible on the basis of agro-ecological fundamentals to be expected for the millennium turn, assuming the existence of the material, technical and economic conditions needed for utilization.

For this reason, in a detalied way we discovered the actual and the expected methodological, soil, hydrological and melioration data and the expected changes for 35 physical geographical regions, adjusted to administrative boundaries, and, for 31 soils within these regions. After this we calculated the specific yields expected for the millennium turn of the major arable crops, the meadow-pasture, the fruits, vegetables and grape, the forests and the medicinal plants.

Parallelly, different calculations were made for the expected domestic consumption, the agricultural reconsumption and the export surpluses around the millennium turn.

Relying upon the available data basis we optimalized the arable crop production and the total yield according to different targets, finally we formulated recommendations concerning the further utilization lines.

On research findings

The findings of the discovery and the prognosis are manysided, therefore we can mention only some of them.

It became clear from the investigations, the Hungarian agro-ecological fundamentals do not hinder the remarkable increase of the agricultural production. Nevertheless, it is obvious, the agro-ecological characteristics make possible different development by regions, as far as the direction and the extent of this

development is concerned. We can also suspect, the exploitation of possibilities requires material /financial/ inputs of different size and structure.

It can be ascertained, that up to the millennium turn along with a yearly grain production of almost 20-22 million tons, the recent years' production yields of lucern, sunflower, fodder-peas and soybean can be multiplied, while the domestic needs for potatoes and sugar-beet can also be satisfied. Present production yields of the major vegetables can be increased by 50 per cent. Apple production can be increased by almost 50-80 per cent, while production of other fruits can be increased by 100-150 per cent. Present grape average yields can be doubled. About almost 50 per cent of grass land can be transformed into such an intensive area, which will provide a doubled production level. In the case of adequate development of the forestry a further 50 per cent increase of the present timbering can be realized.

We have to stress, all these can be realized through the adequate choose of site, and along with the needed material, technical and economic conditions through the better exploitation of genetic potential, the formation of adequate variety proportions, the development of melioration and irrigation.

It is justified by calculations, the sowing structure adjusting itself to the ecological fundamentals better than until now - in addition to the increase of specific yields - can result a further increase of almost 15-20 per cent in the total production. However, the limiting factors known today - among others the different economic /business/ and enterprisal circumstances - had to be changed in the future for the sake of the cause.

The investigations draw attention to the fact, that at present the flora of the country absorbs from the air elementary carbon of 35 million tons per year. This amount is greater, than the total carbon content of consumed goal, crude oil and natural gas of industrial origin.

Through the better utilization of the domestic agro-ecological potential remarkable reserves might be put in motion, so we can surely declare that along with the satisfaction of domestic needs with adequate quantity and better quality, commodity funds for exports can be multiplied, thus the Hungarian positions in the world trade of foodstuffs of strategic importance can be further improved.

Among the research findings we can also register the procedure and the adopted methods, as well as those additional studies which discovered until now to a less extent known areas, establishing in such a way the more manysided return and better prevailing of natural resources utilized in the agriculture.

Of course, natural endowments do not appear automatically. The growth possibility circumscribed by estimated data and the long-run, optimal utilization of natural resources presuppose the advantageous changes in several social and economic factors - above this investigation; - these are among others; skilled labour force, organization, system of economic /business/ interests, adequate infrastructure in agricultural settlements, development of technical and chemical industrial basis, size of resources needed for the implementation of melioration and irrigation, innovational abilities, etc.

Utilization possibilities of the research findings

Measuring the agro-ecological potential of the agriculture indicated such possibilities, utilization of which corresponds to aggregated interests of the society.

In the course of the measurement not only the possibilities were brought to light, but also those limits, which hinder the prevailing of the agro-ecoligical potential. Both the macro-economic management and the science have to take part in surmounting this obstacle.

The measurement has not been a long-term plan, however, the collected data and results can be fairly well utilized in the social and economic prognosis, in establishing developmental alternatives, in the formation of ways to look at things which determine the production and the research, in the establishment of new research directions and in the promotion of innovation.

In the exploitation of agro-ecological potential a decisive role is played by the working people. The precondition of the scientifically founded production has been the labour force with adequate professional skill and innovational abilities.

Continuous production on a high level cannot be imagined without adequate distribution concerned systems. Therefore, in the course of the elaboration of the production development conceptions, one has to take care with the determination of an adequate system of economic /business/ concerns, and parallelly, with the aim-oriented alteration of production and management organizations.

The possibilities implied in the agriculture can be realized only in that case, in which this is provided by the property /ownership/ and distribution relations, the professional and the cultural skill of labourers, the inter-enterprise ties, the elasticity of macro-economic management and its regulators' system. For this reason, while developing the latter aspects the findings of measuring the agro-ecological potential have also to be taken into consideration.

The prognosis for the millennium turn wants to promote the improvement of the equilibrium position of the national economy, the more "healthy" economic development, the social progress. In such a way, it provides possibility - on a country level and by regions and even within the regions - for the alternative formulation of industrial - in some cases foreign trade - and service sector conditions, which establish and promote the utilization, as well as for the economic efficiency investigations of developmental variants which follow from the combination of these

conditions. The prognosis work can also promote more rational development and organization of the domestic and export transportations, the storage and transport activities.

In the future, the producible biomass can be increased remarkably, and it is not inconceivable, that - above the present forestry cultures - crop production will be carried out definitely for energy obtaining purposes /energy cropping/ in Hungary.

The data basis established in the course of the discovery provides a firm ground for numerous further surveys, new researches, new calculations adjusted to the changing circumstances. The investications are continued in the field of possible utilization lines of biomass, mostly concentrating on the determination of two aspects; how the domestic fodder-protein needs can be satisfied and what role might be played by bioenergy as an alternative energy-resource in the long-term energy supply of Hungary. Along with these basic important questions, several other problems can be defined, such as, for instance, the analysis and the description by function of interrelations between the agro-ecological factors and the production results. Relying upon the research findings we can investigate the utilization issues - on enterprise or plant level - of site endowments, that is we can turn to plant - or field-level analyses from the soil-mosaics investigations.

The model describing the arable crop production- concerning its method - can also be further developed through the enlargement of the circle of factors involved in the investigation and the precision of description of interrelations among the parameters.

The development of modelling for the fruit and grape production, as well as for the animal husbandry sets still a lot of tasks before us. It is especially a great problem to investigate in one system the crop production and the animal husbandry, as well as, to elaborate an optimal harmony of the agriculture, the forestry and the processing activities.

b/ County forecasts for 2000

After the quantification of the basic ecologic characteristics, optimal regional distribution and utilization of crop production /arable crops, vegetables, fruit, grapes, woodland/ is elaborated for all mini-regions with in the county /the mini-regions were outlined by us/ using four target-functions:

1/ maximization of production,
2/ maximization of profits,
3/ maximization of export expressed in dollars,
4/ maximization of export expressed in roubles.

By using different equilibrium and limiting assumptions the result of the reallocation of crop production in mini-regions can be very well evaluated.

2. Tasks for economic management

Improvement of the regional location of crops is guided by the state with economic instruments; prices have in this a prime importance but credits, subsidies and tax-refunding are used also.

When fixing price levels and price relations, the effect of the production site on income differences, volume of production and the form of reproduction /simple, increasing or decreasing scale/ have to be taken into account simultaneously. An outline model meeting all these simultaneously is illustrated in Figure 2.

Thus the improvement of the regional cropping pattern is steadily and gradually shaped by the state, based on the interest of the producers. Previously mentioned research results and the price formation model elaborated in our institute /Fig.2/, can be used for this purpose.

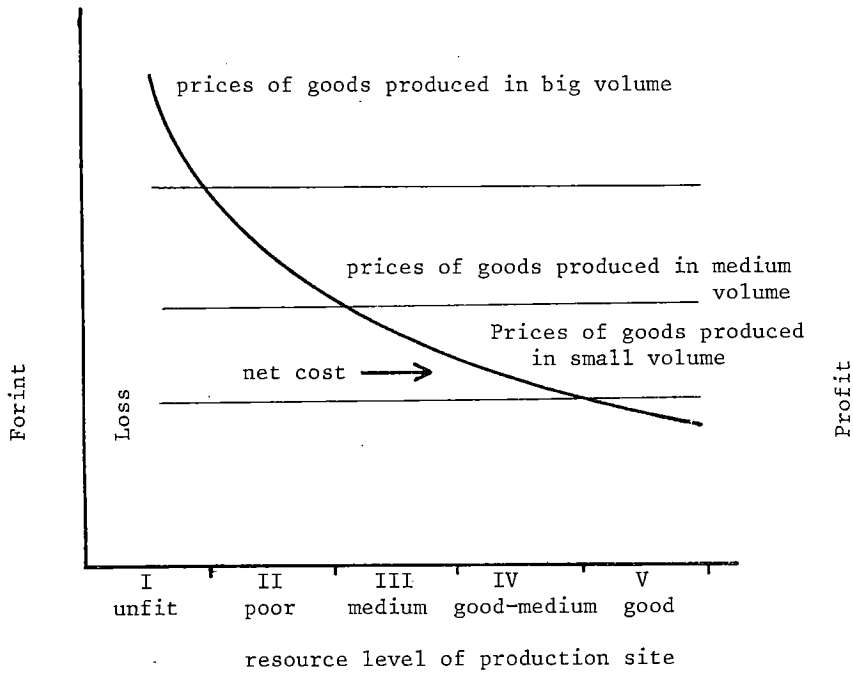


Fig. 2. Interrelation of net cost, production volume and price level at production sites with different resource levels.

3. Firm level decisions for the improvement of crop location

As a result of our research it was established, that in order to move to more profitable production site utilization, following questions have now or in the near-future to be analysed and decided in the context of the complex system of economic management:

/1/ Which are the quantifiable ecologic, economic and management characteristics of the production site /plot, block/.

Practical farmers of course know their land, but as a rule are unable to quantify the factors which determine and express its production potential / soil productivity, water balance, warmth,

precipation, relief /though depth of the ground water-table or frequency of climatic anomalies can have a decisive effect on the security of production and considerably increase risks.

With the help of quantified data it is easy to rank the production sites /plots, blocks/ and those with equal or near-equal resource-levels can be aggregated in to three or five groups.

On farms, where simple or more sophisticated field registries are carefully kept and farm statistical data duly recorded, demarcation of plots is comparatively easy and on such farms here is no difficulty to put down the functional relations in tables and figures and make calculations on these. Horticulture and forestry have long experience with registries. Today it is,of course,not enough anymore to register only ecologic data, but it is very important to know, how these are utilized.

The method employed and the cost and possibility to explore and eliminate factors that limit a greater effect have particular importance. A way to do this is land reclamation.

/2/ What can be produced on a particular production site

It is advisable when finding out how a particular production site can be utilized to consider local practice, explore the production site characteristics and use new scientific and technical achievements.

Exploration and effective utilization of the resource level of the production site has a determining importance in the interrelations shown in the model on Fig. 3.

/3/ What is the yield, input and profit level where it is expedient to produce a particular products; at which point does additional income upset additional costs?

Relation of the provision of labour with equipment, the resource level of the production site and yield

Relation of input, resource level of the production site and yield

	1.	2.	3.	4.	5.	6. →
1.	0	1	2	3	4	5
2.	1	2	3	4	5	6
3.	2	3	4	5	6	7
4.	3	4	5	6	7	8
5.	4	5	6	7	8	9
6. ↓	5	6	7	8	9	10

rent arising

rent arising

Fig. 3. The relation of rent-type income with the resource level of the production site and provision with equipment.

In order to find this out, input-resource level of the production site-yield relations have to be explored and established at what level additional inputs and costs are upset by yields as this is where income is highest. Input-resource level of the production site-yield interrelationship is proved in Figures 4, 5, 6 /Farms, of course, do not make decisions for achieveing highest income alone/.

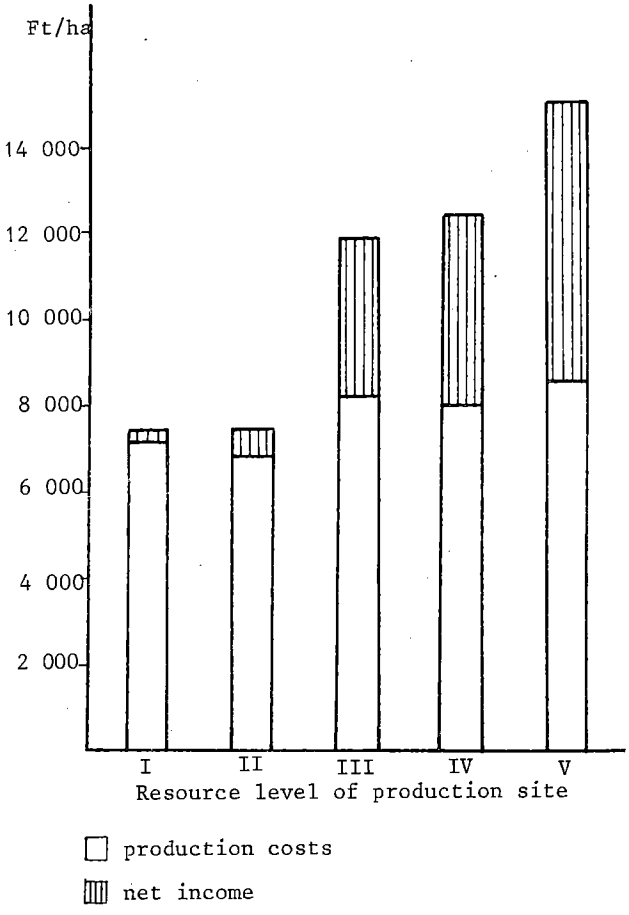


Fig. 4. Profitability of crop production in Bács-Kiskun county cooperative farms /1981/.

It should be examined how efficiency can be raised by the modification of volume and structure of inputs /utilization of biologic and genetic resources, by-products and wastes etc./

Thus crops can be selected with the anticipation to bring profits at a particular production site.

/4/ What size crops should farms have in order to be profitable?

To ascertain this, the next step is roughly to establish the size of production on a particular farm on the basis of the net costs. Net costs are decisive when selecting a reasonable production volume on a farm, but of course other factors have to be considered for practical purposes also. Solution of the problem is illustrated in Fig. 7. The lowest production volume of the farm is situated around the lower limit of rentability, where decline of the net costs slows down.

The greatest farm production volume is situated around the upper limit of profitability, where net cost of the particular product starts to rise abruptly. Optimal production volume of a particular farm is where net cost is lowest.

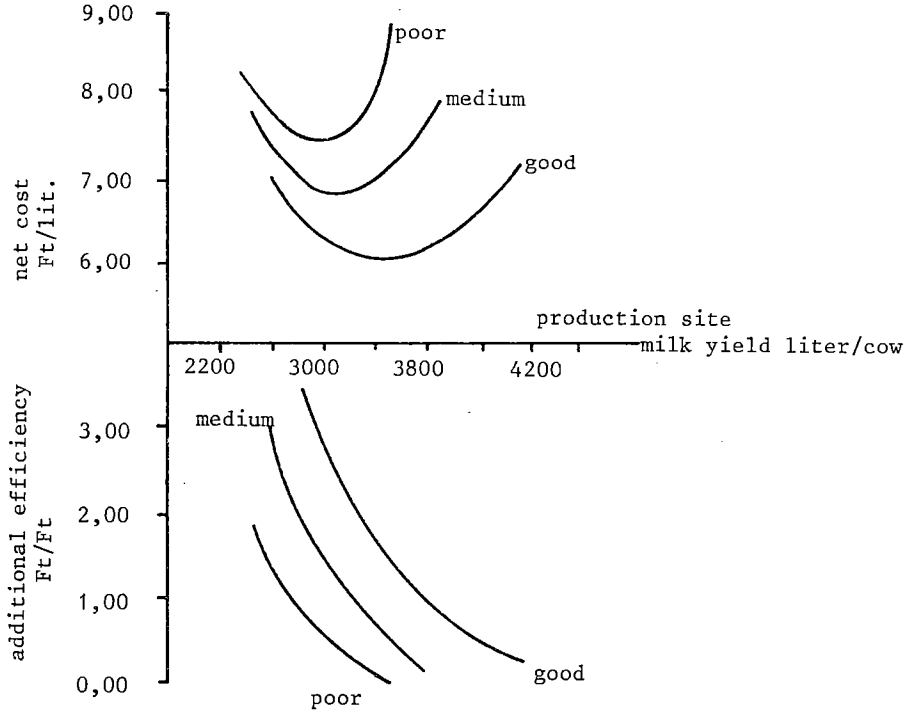


Fig. 5. Relation of net cost, milk yield and resource level of the production site.

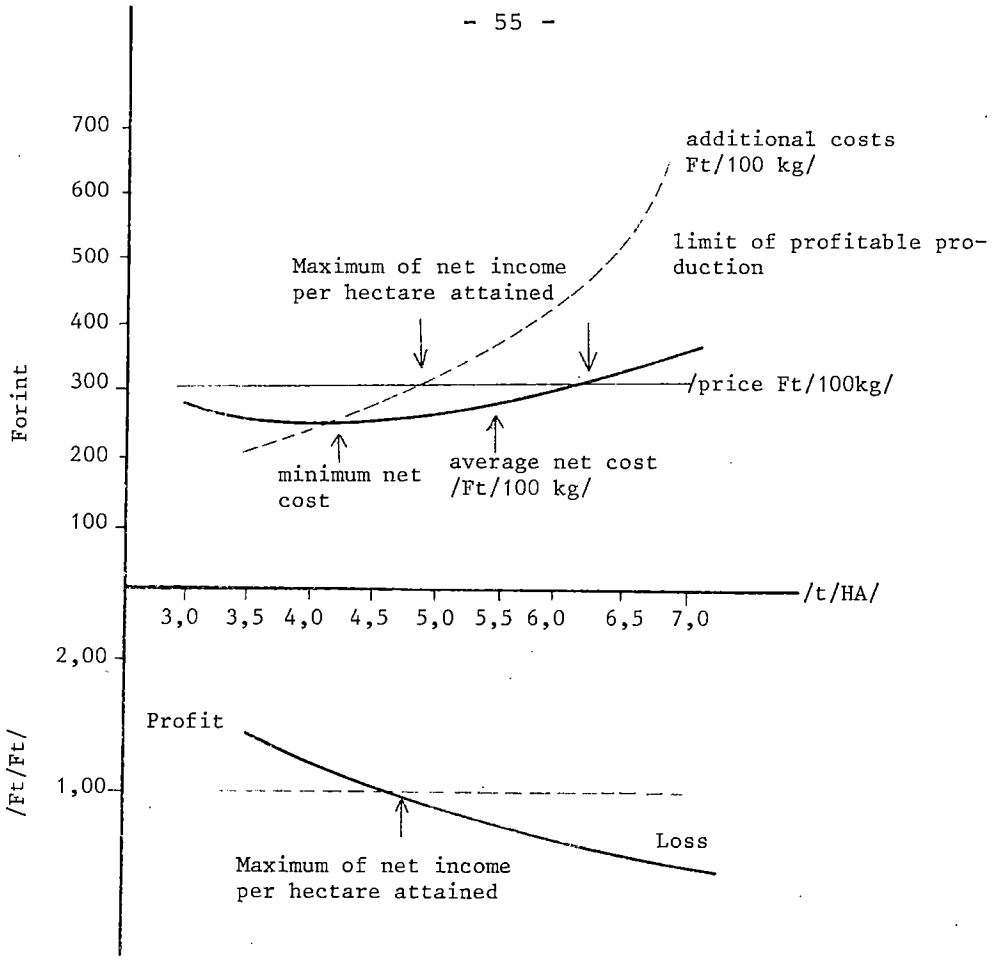


Figure 6. Profitability of maize production on a cooperative farm.

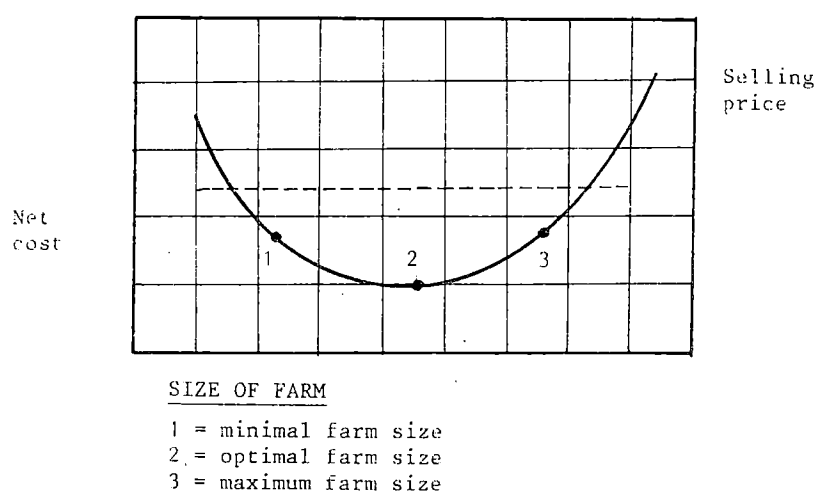


Figure 7. Relation of farm size and net cost

/5/ What is a good combination of the selected products and what is a reasonable production structure to achieve stability of income?

In order to ascertain this, the next step is the combination of the previously selected crops and volumes into production structure alternatives.

/6/ How can the production sites be improved and what is the effect of this on inputs, yields and their structure.

Conservation and improvement of soil productivity gain is importance in future agriculture in the interest of the conservation of environment and to meet food demand. Land reclamation has an important role in this, and it is therefore reasonable for state and cooperative farms to prepare with foresight for the task of country and water planning, land reclamation and conservation. Comparatively little imported goods and equipment are necessary for land reclamation and labour and technical requisites are available also; calculation can show what is the economic advantage of the investments to be made. Land reclamation is a possibility to interfere with the declining efficiency of inputs to modify these in a positive direction.

Direct economic advantages of land reclamation /modification of the size and structure of inputs, raising of yields, changes in the crops grown and the structure of production/ have growing importance, as they improve rentability.

Most important of all the results of land reclamation is probably yield improvement as a result of the elimination of losses and the raising of land productivity but a considerable cost redution and production structure modification is important in some cases also.

Erik Haggrén, Pellervo Economic Research Institute

THE FINNISH GRAIN MARKET AND ITS STABILIZATION POLICIES

I Introduction

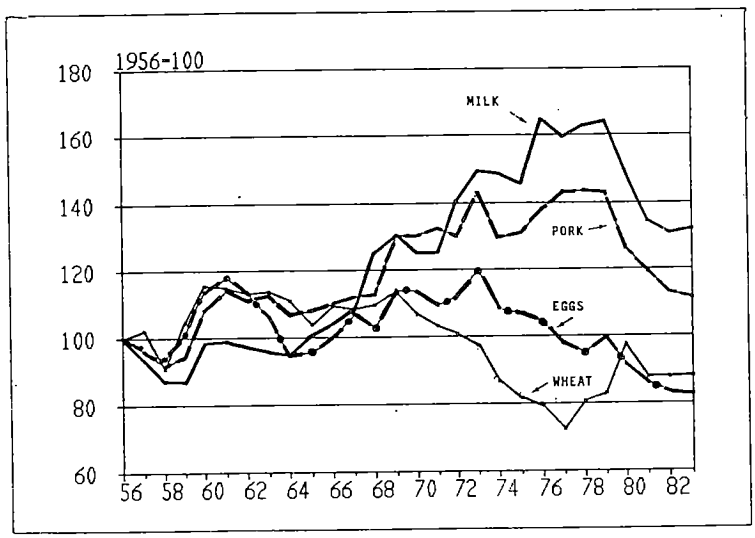
The objectives of this paper are twofold. In the first part the main developments on the Finnish grain market will be described since the beginning of the agricultural target price system in 1956. In the second part alternative stabilization schemes for the Finnish grain market are analyzed more in detail.

Target prices have been the main control instrument in the Finnish agricultural price system which has been officially stated in the subsequent Agricultural Income Acts. This system insulates the domestic market and prices from the world market developments. Under these acts it has been up to the government to secure the achievement of target prices. The means to accomplish this goal include regulation of foreign trade with export and import licenses as well as export subsidies and variable levies.

Within the target price system the relative prices of the main agricultural products become the most important single determinant of the composition of the final output in the agricultural sector. As can be seen in Figure 1, these price ratios have fluctuated slowly but widely in the long run.

Right now Finland is experiencing the results of the price policies followed from the late 1960's until 1977. Relative prices of agricultural products as compared to feed grain prices were increased successively under one decade. Under the same period the relative prices of bread grain declined even more than the feed grain prices. This development resulted in a shift in input use in favor of animal production sector. Although the price ratios have been adjusted since then (Figure 1), corresponding input adjustments take place very slowly. Consequently, this year Finland is experiencing a record level excess production of animal products and at the same time both feed and bread grain acreages fall short of the self-sufficiency level.

Figure 1. The development of target price ratios of main agricultural products as compared to the price of barley in 1956-83

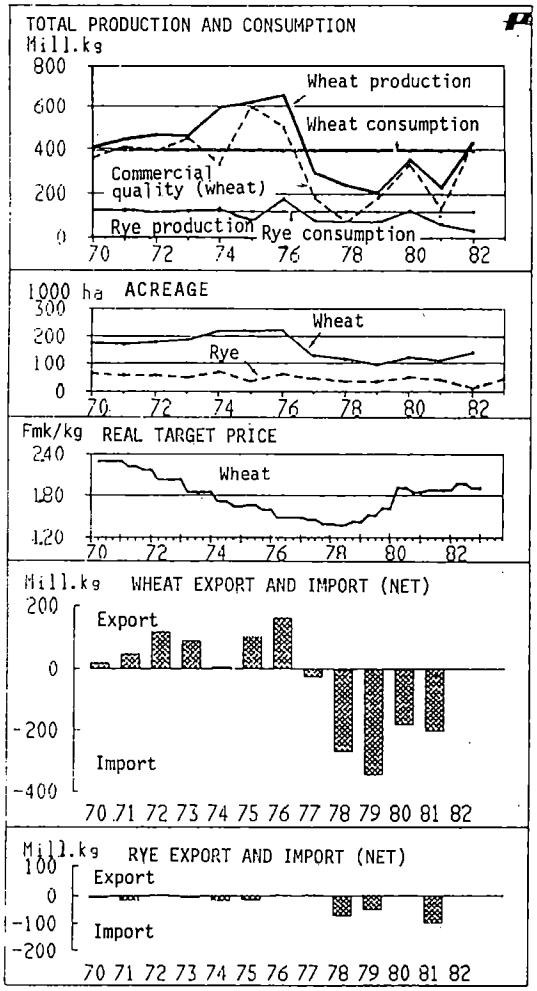


II Main Features of Grain Market Development

1. Bread Grains

As the agricultural target price system was introduced in the 1950's, the bread grains - wheat and rye - were included in the system right from the beginning. At that time, self-sufficiency level was low in bread grain production, whereas there was a considerable excess supply of dairy products. Thus the relative prices of wheat and rye were increased in 1956 and 1959 in order to make Finland self-sufficient in bread grains. The result was a rapid increase especially in wheat acreage, which continued until the mid-1960's despite the decreasing real price of wheat. The production of wheat stayed at this relatively high level even though the nominal price was kept virtually unchanged from 1964 to 1973. Direct price decreases were avoided, except relatively minor marketing fees, which were introduced in some years. Because of decreasing real wheat prices wheat acreage started to decline in the late 1960's. The total production remained at a high level, since average yields rose correspondingly. Consequently, the self-sufficiency level stayed high in the late 1960's and early 1970's, fluctuating between 100 and 120 percent. - The main developments on the Finnish bread grain market since 1970 are described also in Figure 2.

Figure 2. Development of the Finnish bread grain market in 1970-1983.



In 1974 wheat prices were considerably increased in order to compensate for the deterioration of real prices caused by rapid inflation in the previous year. A smaller price increase was made the following year, too. Obviously these price increases resulted in some growth of wheat acreage, and because of the good yield in 1976, one third of the total production or 200 mill. kilogrammes had to be exported. In the next spring an obvious mistake was made in the price setting negotiations. In order to decrease wheat acreage the target price of wheat was reduced by the introduction of a marketing levy of 6,9 percent. At the same time the target price of barley was increased. The new price ratio resulted in a shift from wheat

to barley. In 1977 also the weather conditions were exceptionally unfavorable and yields were accordingly very low. Consequently, a considerable amount of wheat had to be imported. Later on the marketing levy had to be paid back to the producers.

In the following year, wheat production decreased further to an all time low since the introduction of the target price system in the 1950's, resulting in the self-sufficiency level of about 40 percent. In order to encourage wheat production again, a special payment was offered to farmers on per hectare basis for the acreage they allocated for wheat in 1979.

Wheat price was increased in real terms also in 1980, and in 1982 a similar special payment as in 1979 was offered again. Consequently, the profitability of wheat production has become better and a slow increase in wheat acreage has taken place. Anyhow, today's acreage falls short of the self-sufficiency level corresponding average yield and quality.

The exogeneous price setting system has led to relatively large fluctuations in wheat hectarage in the past. Obviously the main reasons behind the fact that no equilibrium has been attained have been the difficulties to evaluate the long run impacts of price changes and the political problems connected with nominal price reductions. Actually wheat prices have been adjusted upwards only at two phases and the downward adjustments have been caused by inflation. Thus it seems to be extremely important that the initial price increases are moderate and, if a rapid adjustment is desired, they can be accompanied by temporary premiums or fees.

Rye production has not experienced as strong fluctuations as wheat production since the target price increases in the late 1950's were made to increase bread grain production. This is obviously mainly due to the special role of rye in the cultivation cycle. In most areas of the country rye is the only grain that can be sown in the fall after fallowing. Only in the southern part of Finland winter wheat is competing with rye. An important factor changing rye acreage is the weather in August. In some years too much rain has made it impossible to sow the planned acreage. - Anyhow, the target price setting for rye has met with the same kinds of problems as discussed above in the case of wheat, even if on a smaller scale.

Consumption patterns of both bread grains have been changing slowly since 1950. Rye consumption has been declining during all that period. In the 1950's the rate of decline was relatively fast because rye was partly substituted by wheat in the Finnish diet. In the last years the consumption per capita seems to have reached a bottom - ceteris paribus - of about 20 kilogrammes, because the annual changes have been minor. Wheat consumption increased somewhat in the 1950's but since then it has been decreasing, too. The rate of the decline has slowed down and in recent years the annual consumption has been about 50 kilogrammes per capita. - At the present income level both bread grains seem to be slightly inferior goods or neutral with respect to income changes, i.e. the income effect is near zero.

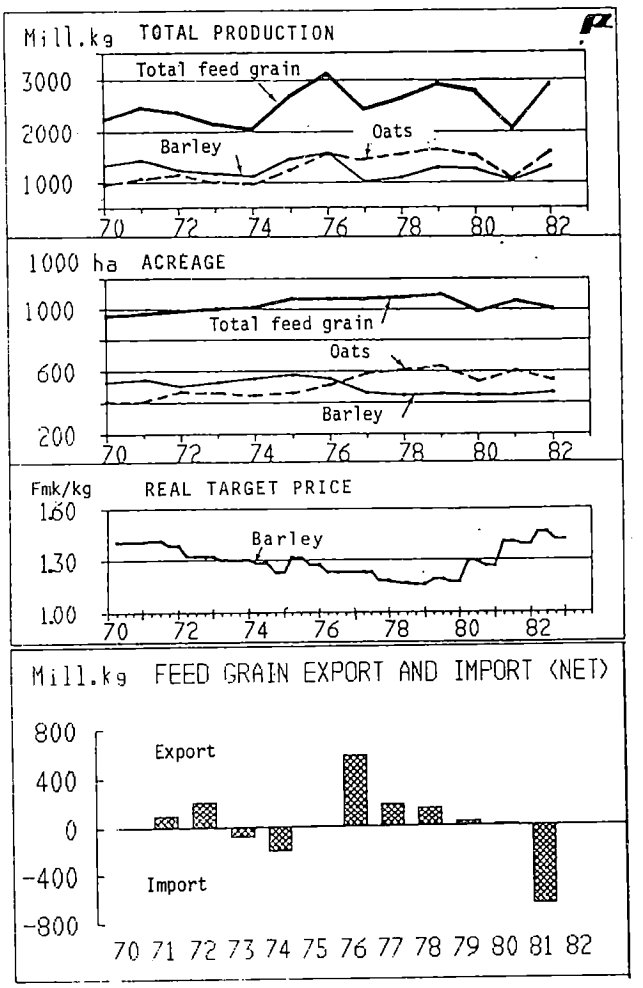
The population growth has been small since the early 1950's and is approaching zero. Thus demand has not shifted significantly by population changes, especially not in the 1970's.

2. Feed Grains

The marketed amounts of feed grains - barley and oats - remained relatively small until the late 1960's. Since then feed grains have been the most important group of cash crops. At the same time feed grains were included in the target price system. Previously the feed grain was produced mainly to be used directly on the farms, and domestic supply and demand were largely balanced at the farm level. On some occasions feed grain had to be imported because of low yields.

When feed grains were included in the target price system, the price uncertainty was eliminated. This may have been one reason for the increased commercial supply, but it should be noted here, too, that better varieties were introduced at the same time and the relative prices of feed grains compared to wheat were slightly increased. - The main developments on the Finnish feed grain market since 1970 are described also in Figure 3.

Figure 3. Development of the Finnish feed grain market in 1970-1983



By 1976 the feed grain production exceeded clearly the self-sufficiency requirements and because of a good yield several hundred million kilogrammes had to be exported in 1976. However, it was relatively cheaper to export feed grains than wheat because of the smaller difference between domestic and the world market prices. Thus the feed grain production targets were set in the 1977 Agricultural Farm Act relatively higher than for wheat and rye and consequently no marketing levies were carried. Thus the total domestic feed grain supplies remained at a relatively high level despite low yields in 1977 and 1978, and met domestic demand requirements.

In the past decades the relative shares of barley and oats have changed in favor of barley, reflecting the changing demand patterns. In the post-war period the production of pork, grain fed beef, eggs, and poultry has increased considerably resulting in a higher demand on barley. Anyhow, the demand patterns have been changing slowly and without sharp short-term fluctuations.

In all, feed grain market was relatively well balanced until the late 1970's. In 1980 it became obvious that domestic feed grain supply would not meet with the requirements of domestic demand if animal production would continue to increase. In 1981 an extremely poor crop was harvested and large amounts of feed grain had to be imported. - In the situation of today, domestic feed grain supply will be enough only if the yields per hectare are above the average level. But if the animal production will decline to meet better with the self-sufficiency target levels, present feed grain acreages would be quite adequate.

In the past decade grain market has become more sensitive to changes in relative prices. This situation is caused by the specializing development in Finnish agriculture. A successively larger share of feed grains is produced on farms specializing in cash crops. Consequently, in the future large shifts in grain acreages can be induced with changes in relative prices.

3. Grain Storage Policies

Traditionally reserve stocks of grain have been kept by the State Granary, which is a state owned monopoly taking care of the foreign trade in grain. Private firms and farmers have usually kept only working stocks. The farm statistics indicate also that farmers have occasionally kept carry over stocks of feed grain if the yield has been especially good, but correspondingly they also seem to have reduced the feed grain acreage to some extent in the next year.

The level of the Finnish bread grain stocks compared with annual disappearance has traditionally been among the highest ones in the world. In a review made by the Food and Agriculture Organization in 1974, the wheat stocks were reported to equal 84 percent of the estimated average

annual use and the rye stocks were on a 74 percent level. The storage targets for bread grain were even higher, 93 percent and 111 percent for wheat and rye, respectively. In the past, these stocks have not been used to stabilize markets because they have been reserved for use in emergency situations, where normal trade is not possible. Anyhow, there have been plans to introduce more flexible rules for managing these stocks. Stabilization of yield fluctuations is becoming a more important target.

Feed grain stocks have been much smaller than those of bread grains compared with the domestic disappearance. The stocks have mainly reflected fluctuations in the yield, although no clear storage rules have been followed. In the last few years there has been a growing interest to increase also the feed grain stocks on a level which would minimize exports and imports caused by annual fluctuations in domestic production. Especially the large variance of yields in the 1970's has motivated these plans. Feed grain stocks are not to be reserved only for emergency situations, but they also are to actively counteract the yield fluctuations.

III Alternative Stabilization Schemes for the Finnish Grain Market

In future, a more balanced grain supply and an optimal self-sufficiency level can best be achieved by combining various means of stabilization. It must be noted, however, that the usable means have a certain hierarchy. First, sizing grain acreage determines the expected average self-sufficiency level. On the other hand, the annual fluctuations of self-sufficiency can be controlled both by carry-over stocks and by fallowing schemes. To balance the supply and demand of grain it will be necessary to use foreign trade at least to some extent, because it is not possible even in theory to stabilize year-to-year crop fluctuations. There can always be so many successive bad years that not even a large storage capacity will do.

Then, what is the optimal self-sufficiency level of grain in the whole of economy, and how can it be achieved by stocking, adjusting production and using other means of agricultural policy?

This paper will seek to examine problems connected with the optimization of stocks. In the same connection, also other balancing means will be studied because stock policies alone can not serve as means for optimal balancing policy. It has to be related to other balancing means, such as exports, imports and fallowing.

1. The Goals of Society as a Basis for Stabilizing Schemes

It is necessary to make certain fundamental choices between alternative goals before the various stabilizing schemes can be developed and estimated purely by economic criteria. Because grain crops vary at random, at least one stage in the food system has to be adjusted. As known, the practice in Finland has been in the past decades that the consumer does not need to change his consumption level as the agricultural production fluctuates. Consequently, the stable domestic price level gives quite considerable relief in the estimation of various balancing programmes, because in this case the preferences of the consumers and the welfare effects resulting from changed consumption need not be estimated at all.

Another choice in the determination of the self-sufficiency level of basic products will be between the economic benefits and the level of risk. In the production of basic food items social risk is traditionally minimized by attempts to achieve a high self-sufficiency level and this is still done although basic food products have most often been available in the world market at prices clearly below our price level. This goal has, on the other hand, resulted in conflicts with regard to some agricultural inputs when purely economical considerations have been given the first place and a greater risk has been taken in the form of imports.

So far, it has not been possible - by means of economic theory - to estimate the real willingness of society to take risks and so straightforward comparisons between economic benefits and the level of social risk cannot be done. Therefore the self-sufficiency level of food production has to be chosen first on some other than economic basis and only after this it is possible to start studying how supply could be controlled to meet the chosen self-sufficiency level.

In the storing of grain the choice between risks and economic benefits has to be made in the determination of the size of the buffer stocks kept for crisis. In respect of economic theory buffer stocks cannot be sized without strong hypotheses about e.g. the probabilities of different kinds of crises.

In practice this will lead to the situation in which the level of buffer stocks and their use in various situations has to be decided separately on basis of the security interests of society. In our country it has been argued publicly that the buffer stocks should correspond to the commercial consumption of one year at least when bread grain is concerned.

When the buffer stocks of grain have been sized on the basis presented above, the balancing of the annual fluctuation of grain production can be examined as a separate problem.

2. Simulation Models an Empirical Approaches on Stabilization Schemes

Although the grain storage problem has remained important through the history, no general rules for an optimal storage program have been stated so far. This situation is caused by some specific features connected with the storage problem. Storage operations are by their very nature actions which are aimed to bring some benefits in the future. Consequently, these benefits are necessarily stochastic. There are always considerable risks involved in the storage operations and there is no guarantee that individual storage operations will bring some economic gains. They may as well result in economic losses. Even if the expected storage benefits are clearly positive, the outcome is very risky and this may discourage private industry from keeping stocks at socially optimal level. Thus in the society, there is clearly a need for a risk neutral public agency who will keep optimal stocks.

Because of the theoretical difficulties encountered in traditional approaches, simulation techniques have been more widely used in recent years while attempting to find practical solutions to storage rules. Because of the development of modern high-capacity computers more complex simulation methods have become usable. Thus the advantages of simulation techniques in deriving storage rules can be more fully exploited e.g. to answer specific questions raised by decision makers and which cannot be answered by purely analytical means.

Simulation techniques make it also possible to compare different decision rules such as storage rules. Because future benefits and costs connected with different storage programs are not known, evaluation of such

programs must be based on the expected values. This method has been used in a number of empirical works on storage problem. Since the yields of future years are not known, the fluctuations in yield levels must be generated by series of random numbers. Different time intervals, e.g. 10-20 years or even more can be used. A great number of such random series - e.g. 100-1000 - are required to estimate the parameters describing alternative storage programs. In Finland/the most interesting parameters would be average self-sufficiency level, total costs of stabilizing schemes, storage costs, import and export costs, how often storage capacity is fully used and how often storages run empty, as well as parameters describing variations in the former variables.

Simulation techniques will not guarantee that an optimal rule can be found. However, different rules can be compared and those which meet the prestated criteria most satisfactorily can be chosen. However, it should be kept in mind that also good storage rules may lead to losses if some factors develop exceptionally.

In some cases there have been attempts to investigate storage rules by using some recent years as basic data. The problem in this method is that it is very unlikely that the past time series will ever be observed again as such.

Sizing of Different Stabilization Schemes

So far no empirical results are obtained which would be needed to evaluate different stabilization schemes. However, economic theory shows that the effectiveness of alternative stabilization schemes varies according to the degree of self-sufficiency.

A small and wealthy country like Finland can normally choose to what extent it wants to rely on the world market when aiming at an equilibrium on grain market. In the past, storage operations have not been used to a large extent to stabilize annual supply fluctuations on Finnish grain market. Consequently, grain has been both imported and exported in a short period of time. In a situation where the degree of self-sufficiency is fluctuating around 100 per cent, storage policies would have been relatively beneficial.

When calculating costs of alternative schemes, freight costs for import and export must be added. According to the State Granary the sum of subsequent import and export costs amounted to 30 pennies per kg in 1980.

In the long run, most countries are clearly either net exporters or net importers. In such a situation the relative importance of storage operations becomes less significant. In Finland the degree of self-sufficiency has decreased considerably in the past years. Consequently, we are gradually becoming permanent grain importers. Thus it will be impossible to stabilize yearly fluctuations on grain market by storage operations, if the degree of self-sufficiency is not kept at the target level.

The relative importance of storage schemes decreases also when the average level of self-sufficiency increases above 100 percent. Because feed grain would be least costly to subsidize when exported to the world market, it would be advantageous to direct the excess capacity of the agricultural sector in Finland to feed grain production. The optimal stabilization scheme of Finnish grain market is obviously obtained when the grain production on the average is somewhat larger than domestic disappearance and storage operations are used to ensure domestic supply when yields are below normal level. When such a scheme is applied, grain will be exported in the long run. Despite the export costs involved this scheme is obviously most economical when the general target is to keep production capacity of agricultural sector at a level which will supply adequate production also if the world market supply falls short of demand.

THEME II.

THE ECONOMICS OF GRAIN PRODUCTION ON DIFFERENT TYPES OF FARMS

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THE ECONOMICS OF GRAINS PRODUCTION IN PRIVATE FARMS

1. The importance of grains in the private sector of agriculture

The private sector in Polish agriculture[1] uses approximately 3/4 of the total agricultural area and indentical is its share in the total arable area. The share of the private sector in the total area planted to grains is slightly higher / i.e. about 80 % / and its share in the total grains crop oscillates around 80 %. In absolute numbers these shares in 1982 represented the following figures / in parenthesis we have shown the respective figure for the whole agriculture /: agricultural area - 14.2 million hectares / 18.9 million hectares /, arable area - 11.1 million hectares / 14.5 million hectares /, area planted to grains - 6.5 million hectares / 8.1 million hectares /, grains crop - 16.4 million tons / 21.2 million tons /. During the period of some dozen or so recent years, to which this paper is restricted, the discussed shares have manifested a slight dropping trend. This phenomena had its reason in the agricultural policy executed in the 1970's, especially in the land policy. During the most recent years these trends have been arrested and even slightly reversed.

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1) The private sector in agriculture includes - beside the private farms / i.e. farms with the total area exceeding 0.5 hectares, run by farmers on their own land and that leased / - as well private agricultural plots with a total area of less than 0.5 hectares, used for agricultural purposes by private persons, the garden plots of employees in the socialized sector of agriculture and in addition the farms of private owners of farm animals who have no land used for agricultural purposes. Thus the private farms' share in 1982 in the respective totals for the private sector in agriculture was 97.6 % of the agricultural area, 98.2 % of the arable area and 99.3 % of the total area planted to grains.

Grains play a very important role in the organization and economics of the private farms. This however does not stem the least from the link of grains production with the maximization of agricultural income, the latter being the principal target and economic motive in management for the dominating population of private farms in Poland. This link in the case of a small commercial scale farms run by peasants is indirect and relatively complicated.

A characteristic of the small commercial scale peasant farms is the subordination of the plant production, in this including grains production, to the requirements of animal breeding, and not to the requirements of the market. This characteristic is proper for the general level of social and economic development reached by Poland presently. The advances made by the non-agricultural sectors of the national economy, especially industry, force - through income generation - a growing demand for products of animal origin. This is the first condition for the appearance of the characteristic discussed. The second condition was the lack of progress in the improvement of the agrarian structure of private agriculture in Poland.

The sector of private agriculture in Poland is characterized by a considerable dispersion of farms. The average agricultural area per farm considered statistically / i.e. over 0.5 hectares / was only little over 4.7 hectares. Out of the total number of 2.9 million units of private farms today as many as 60 % had an area smaller than 5 hectares, using 1/4 of the area at the disposal of private farming. The share of farms with an area of 10 hectares or more in the total number of private farms was 14.7 % and their share in the agricultural area of the private sector was 40 %. This dispersed agrarian structure was the principal reason due to which the majority of private farms cannot achieve the satisfying income when orienting themselves toward commercial grains production. In fact, in Poland there has not evolved a type of a grain - producing farm in which grains production would constitute the

principal source of income. The reason for this is principally the dispersed agrarian structure of private agriculture as well as, though this in a lesser degree, the weakness of the agricultural market and the direct links of cooperation between the farms.

The share of government purchases in private farms' total grains output exceeded 1/5 of their total crop only in the 1973-1975 period. During the recent years this share, despite various incentives for sales to government procurement institutions, has dropped drastically, for instance in 1980 it was 10.3 %, in 1981 only 6.8 %. This share of commercial production in the total output is shaped by a number of factors, first of all by the relation of the grains crop to the animal numbers level and the size of supply for agriculture of concentrated feedstuffs from government resources, these being created principally through the imports of grains and high protein content feedstuffs. One might thus say that the farms' proper feedstuffs resources, in this also included the resources of concentrate feedstuffs/grains/designate the bottom line limit for animal production in these farms. The actual level of animal production, over this limit, is marked by the potential possibilities of purchase of concentrate feedstuffs from government resources. The situation on the concentrated feedstuffs market thus is reflected more on the size of animal production than on the grains production in the farms, if one would take into consideration the total area planted to all grains. This is witnessed by many year trends of grains production, animal production and the volume of sales of concentrate feedstuffs to farmers by the government. In the first half of the 1970's grains production was increasing, so was animal production as well as the purchases of concentrate feedstuffs by farmers. The share of purchased concentrate feedstuffs / from government resources / in the total volume of concentrate feedstuffs calculated per one head of big farm animals / cattle, swine, sheep and horses / increased from 18 per cent in 1970 to 26 per cent in 1975. The relation of prices offered by government procurement organizations for grains to the price paid by farmers for concentrate

feedstuffs favored growing commercialization of grains, that is the share of grains sold in the total grains crop. The share of grains in the total area planted did not change however. In the second half of the 1970's the production of grains in private farms dropped, principally as result of stagnation in fertilizer application and as effect of unfavorable weather conditions. At the same time by the end of the 1970's the supply of concentrate feedstuffs for agriculture from government resources began to lower. The share of concentrate feedstuffs purchased in the total volume of concentrate feedstuffs used per one head of big farm animals lowered from 24 % in 1980 to 21 % in 1981. In this situation the farmers - in their economic interest - aimed at maintaining the animal stock numbers, decreasing the sales of grains to the state. While in the middle of the 1970's the procurement of grains from the private farming sector amounted to approximatelv 3.5 million tons, then in 1979 this figure was 2.2 million tons, in 1980 respectively 1.5 million tons and in 1981 the procurement of grains was only 1.1 million tons, despite the fact that in the period 1979-1981 the production of grains in the discussed sector of agriculture increased by 2.4 million tons.

It is without any doubt that of considerable importance remains, though it is decreasing, the subordination of grains production to the needs of the household / i.e. the farm family's own consumption of its crops / and the requirements of the live draft power force. The number of horses used as draft power is systematically dropping and so is changing the model of consumption in farm families. Nevertheless objective conditions, such as insufficient supply of tractors, imperfections in the agricultural services sphere, problems of inadequate supply on the food products market, as well as subjective factors like traditions, customs etc. have resulted in these elements being still considered in the farmers' production decisions, if one takes into consideration the whole population.

Grains occupy one of the principal positions in the sphere of organization of production processes in private farms. Arable areas represent approximately 77 % of the total agricultural area. In turn, grains occupy about 59 % of the arable area and 45 % of the total agricultural land in private farming. Presently planted to grains is an area of about 6.5 million hectares / in 1982 /, in this the four most important grains in Polish agriculture, i.e. rye, wheat, barley and oats represent an area of 5.6 million hectares.

The area planted to grains - as we have discussed it before - is rather little elastic in respect to economic and technical and production conditions in agriculture. A better elasticity is manifested on the other hand by the changes in the areas planted to the respective grains or in other words in the grains planted area composition. This is witnessed by the statistics in Table 1.

The changes in the composition of the area planted to grains are determined by the situation on the concentrate feedstuffs market and the efforts of the farmers to maximize the production of concentrate feedstuffs per unit of area earmarked for grains. They are also the result of a decreasing number of draft horses and of the dropping tendency in consumption of grains produced by the farmer family itself. The most prominent characteristic of the changes in the grains area composition is the growing share of mixed grains grown for grain. The decisions of farmers in this respect are correct, as these mixed grains give a better yield than other grains. The growth of the yields of the former was anyway clearly visible / see Table 2 /. The crisis in Polish agriculture, started in 1980, caused among others a drop in the share of wheat and anew an increase of the share of rye. This is explained by the fact that despite the lower yields rye still remains the basic feed grain and on the other hand the procurement prices offered by the government for grains have been levelled for all of the four basic grains in Polish agriculture.

Table 1. Composition of area planted to grains in private agriculture in selected years /total area planted to grains in private agriculture[1] = 100 /

	1970	1975	1980	1981	1982
Share of grains in the total area planted	57.2	57.2	56.9	57.5	58.7
Four basic grains total	93.3	91.8	87.8	85.7	85.7
in this					
wheat	21.2	22.9	20.4	18.0	17.9
rye	42.7	37.4	40.6	40.1	42.4
barley	10.0	14.7	13.6	12.8	11.8
oats	19.0	16.8	13.2	14.8	13.6
Mixed grains grown for	5.5	7.6	10.4	12.5	13.0
Buckwheat and millet	1.2	0.6	1.8	1.8	1.3

[1] Without corn grown for grain.

Source: Calculated basis Central Statistical Office GUS data.

The structural and fundamental weakness of grains production in private agriculture, but as well in all of Polish agriculture, is thus not the low share of grains in the total area planted, as this share is not low, taking into consideration the natural conditions. This fundamental weakness is insufficient progress in increasing grains yields. However an analysis of the reasons for this unsatisfactory state of things is beyond the scope of this report.

Table 2. The yields of grains in non-socialized farming, in quintals per 1 hectare

	1960–1965 [1]	1966–1970 [1]	1971–1975 [1]	1976–1980 [1]	1980	1981	1982
Total grains	17.2	19.9	25.0	24.0	23.0	25.0	25.3
Four basic grains	17.3	20.0	25.0	23.9	23.1	25.0	25.2
in this:							
wheat	19.6	23.1	27.7	28.0	25.2	29.0	29.0
- winter	19.7	23.1	27.9	.	25.2	.	29.1
- spring	19.5	23.2	26.8	.	25.1	.	28.5
rye	16.4	18.3	22.8	21.1	21.4	22.4	23.2
barley	19.5	22.9	28.2	26.9	25.6	28.4	28.8
- winter	18.2	21.4	26.6	.	30.2	.	19.8
- spring	19.5	23.0	28.3	.	25.2	.	28.7
oats	17.1	20.5	24.3	22.6	22.5	24.1	23.4
Mixed grains	16.4	18.6	26.8	25.8	24.8	27.0	27.1
Buckwheat and millet	9.4	9.7	9.2	9.6	8.5	10.1	7.4
Corn for grain	23.6	24.2	33.6	40.7	34.5	41.7	38.9

[1] Per annum averages.

Source: Cental Statistical Office GUS data.

2. Costs, profitability and rentability of grains production in private farms

In research of economics of small scale commercial production the analysis of unit costs is of limited importance, expecially as regards the respective branches of production or products. The per unit costs of grains production, i.e. the costs of producing 100 kilogramms of grains, and what follows from this the profitability of grains production / that is the relation of the price to the costs / are shaped by the following factors: yields, inputs of labor and the payment involved, material and

money costs and by the procurement prices. The variations of grains yields are quite large / see Table 2 /, the material and money inputs increase systematically, while the procurement prices increase by leaps. All this has contributed to a considerable changeability of the index of grains production profitability. In the 1971-81 period the profitability index for the four basic grains varied from 79.6 % in 1980 to 131.4 % in 1973[1]. The per unit costs of production of the four grains in this period have grown by 2.9 times. The fundamental cause was the rapid increase of the remuneration for labor, which when calculated per 100 kilograms of the four grains increased 3.6 times, despite the fact that the inputs of labor per 100 kilograms have dropped from 1.07 day in 1971 to 0.84 day in 1981. The material and money inputs in the same period increased 2.4 times. The differentiated dynamics of then labor costs and the material and money outlays have resulted in the fact that the former constitute presently approximately one half of the unit costs of production of the four grains discussed. The growth of production costs was accompanied, though usually with some delay, by a growth of the procurement prices, the latter increasing in the past then years 2.7 times. 56 % of the total growth of the per unit costs in the 1971-1981 period was due to the increase in the wages for a day of labor. If one was to assume that the labor remuneration growth was only an increase in the technical labor productivity, then as effect of the growth of material and money outlays the price of 100 kilograms of grains would increase only 1.9 times, not 2.7 times. From a formal point of view the production of grains - except for three highly bad years / these being 1977, 1979 and 1980 / - was profitable, and the total income calculated per one day of labor more than covered the assumed labor remuneration[2].

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[1] In this part of the paper we draw from calculations of costs and profitability in grains production done for the so called average private farm, which has been determined basis macroeconomic statistics for the private sector, omitting farms with an area of less than 2 hectares. The average farm area so calculated is thus 7.2 hectares.

[2] The labor remuneration per day in private farming was assumed to be equal to the total consumption fund in farmer families per person, per day.

The presented calculation of costs and profitability in grains production is however for the major part of the population of small scale commercial farms of little relevance. The point of the matter is that grains production in the average farm / with an area of over 2 hectares / requires only 57 labor days / 3.24 hectares of grains x 17.8 days /, that is approximately 13 % of the labor inputs total for the farm. Thus for further utilization there remains the balance of labor inputs, i.e. 87 %, to be employed in the more labor intensive branches of crop production and as well in animal breeding. In conditions of favorable for grains production years and for their profitability, such as was 1981, the average farm would obtain from grains production, assuming that the whole crop would be sold at socialized procurement prices, a revenue of about 37 thousand zloty. At the same time the total revenue of the farm was about 256 thousand zloty. Thus the income from the whole farm calculated per one day of labor was a little less than 600 zloty, this being less than in grains production. However if the farmers were to realize directly the revenue from grains production / through their sale /, then they would have not only to limit breeding but would also deteriorate the effectiveness of animal production /a drop in feeding effectiveness /. In the final effect having achieved a relatively high revenue for the 13 % of the labor inputs engaged in the grains production, they would not obtain the assumed labor remuneration for the remaining part of the labor inputs, if they could be realized at all. Thus one concludes that for the small scale commercial farm more important is the revenue from the whole farm calculated per unit of area and not the revenue per one day of labor in this or other branch. The discussed relative profitability of grains neither has a significant importance for the farmers decisions concerning grains sales. For instance in 1977 when the profitability index was below 100, the sales of grains actually increased. In turn, in 1981 despite a factual improvement of grains profitability, principally as effect of an increase of procurement prices as well as a growth of

yields, the sales of grains visibly dropped. This confirms our thesis about the relativity of the calculation of grains production profitability and the slight elasticity of grains production as regards the changes of the economic conditions of their production in the small scale commercial production farms. Decisive here is the economic calculation of the whole technological chain: grains - animal production.

3. Production of grains in various area groups of private farms

Previously we have stated that as result of the dispersed agrarian structure there has not evolved in Poland on a significant scale a type of a grain producing farm, which while specializing in grains production would achieve a satisfying revenue. Nevertheless, in accordance with universal regularities one may observe a certain link between the size of the farm and the grains production in it. This link we will illustrate with statistics of farms performing agricultural bookkeeping and pertaining to the year 1979/80. This year we have chosen deliberately as it was still a rather normal year, before the crisis.

Understandable and obvious is the dependency between the area of the farm and the share of grains in the total crop area /see table 3 /. The most significant characteristic of the crop composition is the forcing out of more labor intensive crops, such as potatoes and as well sugar beets, by the less labor intensive crops, principally grains, as the area of the farm increases. This is explained mainly by the labor resources balance of the farm.

Table 3. Composition of area planted in the population of farms performing agricultural bookkeeping / selected crops /

Crop	Farms with an area, in hectares				
	less than 3	3 to 7	7 to 10	10 to 15	15 and over
Grains	48.3	53.7	54.8	55.8	57.2
Wheat	15.2	13.7	12.0	10.2	8.3
Rye	13.8	18.5	19.5	20.2	19.9
Barley	7.3	7.6	7.9	9.1	11.0
Oats	5.9	6.6	7.7	7.0	6.0
Mixed grains	5.7	7.1	7.3	9.0	10.9
Other grains	0.4	0.2	0.4	0.3	1.1
Potatoes	22.1	18.9	18.4	17.2	14.7
Industrial crops	5.0	6.1	7.6	7.3	6.4
Fodder crops	20.0	18.9	17.4	17.7	20.0

Source: Wyniki rachunkowości rolnej gospodarstw indywidualnych 1979/80 / Results of agricultural bookkeeping in private farms in the year 1979/80 /, published by the Institute of Agricultural Economics Warszawa 1981, p. 32.

Statistics provided by agricultural bookkeeping farms confirm the thesis about the subordination of grains production to the needs of animal breeding. Feeding the animals is the principal position in grains expenditures[1)]. As regards the four basic grains / including mixed grains / the share of animal breeding represents 56.4 %, varying from 76 % in the case of oats to 39 % in the case of wheat. For consumption is earmarked less than 10 % of the grains crop / highest is the share of rye - 18 %, in the case of wheat the share is 13.4 % /, while for sale earmarked is about 11 % of the grains / highest here is the share in wheat - 29 % and in barley - 23 %, lowest is the respective share in oats - 6 % /. These shares are shaped differently in the respective farm area groups / compare Table 4 /.

1) The grains expenditure includes the following positions: sowing material, animal feeding, human consumption, sales, stores at the end of the year and other expenditures.

Table 4. The shares of animal feeding, human consumption and sales in the total expenditured of grains[1)]
/ total expenditure = 100 /

Destination	Farm area in hectares				
	up to 3	3 to 7	7 to 10	10 to 15	15 and over
Animal feeding	55.0	58.1	55.7	58.6	51.0
Human consumption	18.1	11.4	8.2	6.5	5.1
Sales	9.8	12.4	19.6	19.4	18.2
in this private	5.3	3.0	3.3	2.9	3.3

[1)] The 4 grains together with mixed grains.

Source: Wyniki rachunkowości rolnej..., op.cit., p. 68.

In the 1970's in the total 4 grains expenditure the share of animal feeding increased by over 15 per cent points / from 40.1 % in 1969/70 to 56.4 % in 1979/80 /, while the share of human consumption dropped / from 13.2 to 9.7 % / and so did that of sales / from 27.8 to 17.1 % respectively /. One remarks that the share of sales manifested considerable variations from year to year, influenced by the crop situation, stock numbers in breeding and the situation on the concentrate feeds market. These variations pertained less to the sales on the private market, the share of which oscillated around 3.5 %. The share of sales to this market in a significant degree was linked to the development of market prices of grains.

An analysis of statistics of agricultural bookkeeping farms permits to state that only farms - on the average - with an agricultural area of about 20 hectares may orient themselved on commercial grains production, achieving at this both a revenue higher than the average revenue of farm per day of labor and a higher consumption fund per person, with lower costs of production of a unit of final production / see Table 5 /.

Table 5. Farms with the share of the 4 basic crops in the final production exceeding 20 % as compared to the general population of agricultural bookkeeping farms and to farms with the share of grains up to 5 %.

	Total farm population	Farms with share of grains up to 5 %	Farms with the share of grains exceeding 20 %	
			total	with an area of 15 hectares and more
Agricultural land area, in hectares	8.51	7.61	10.91	19.37
Area planted, in hectares	6.57	5.48	8.91	15.21
Soil quality index for arable land	1.75	1.69	1.83	1.71
Share of 4 basic grains in area planted, in per cent	46.6	42.7	57.7	56.9
Labor inputs in days per hectare	57	63	44	32
Value of fixed assets per hectare in thousand zloty	96	103	66	66
Animal stock per 100 hectares in big animal units	104	114	67	63
in this swine stock per 100 hectares, number of swine	137	162	48	32
Yields of 4 basic grains per 1 hectare	2.42	2.03	3.09	3.06
Total production per 1 hectare in thousand zloty	43	46	32	30
in this crop production per 1 hectare, in thousand zloty	20	19	20	18
Final production per 1 hectare in thousand zloty	31	33	24	23
in this crop production per 1 hectare, in thousand zloty	9	7	12	12
Share of crop production in final production, in per cent	24.9	22.4	51.1	51.1
Production added per farm, in thousand zloty	180	168	178	280
Revenue from the farm per day of labor	329	316	309	368
Consumption fund per person in thousand zloty	27.5	26.9	29.1	32.6
Accumulation per 1 hectare, in thousand zloty	6.2	6.7	3.4	3.2
Costs of 1,000 zloty of final production, in zloty	912	924	919	834
in this: material, money inputs	392	388	409	442
labor remuneration	520	536	510	392

Note: Labor remuneration standard at 281 zloty per day of labor.

The farms in the lower area groups in which the share of grains in the final production exceeded 20 %, achieved poorer economic results than the averages for all farms performing agricultural bookkeeping. For instance the revenue per 1 day of labor in a farm in the whole population of farms doing bookkeeping was averagely 329 zloty, in farms with an area of less than 3 hectares and a share of grains in the final production over 20 % - 139 zloty, in the 3 to 7 hectare group and an analogical grains share - 203 zloty, 7 to 10 hectares - 302 zloty and in the 10 to 15 hectares group - 309 zloty. The cost of production of 1 000 zloty worth of final production was on the average 912 zloty. In farms in which the share of grains in the final production exceeded 20 % these costs were respectively: farm area up to 3 hectares - 1 503 zloty, 3 to 7 hectares - 1 218 zloty, 7 to 10 hectares - 939 zloty , 10 to 15 hectares - 930 zloty.

Thus it appears that the potential farms which could orient themselves at commercial grains production should be searched for in the group of farms with an area of at least 15 hectares of arable land and about 20 hectares of total agricultural area. Agricultural policy should thus support the creation of such farms, especially on soil of better quality. An increase of the number of such farms, and what would ensue a development of the grains market and that of concentrate feedstuffs will favor relative lowering of the market prices of grains and feedstuffs - as effect of the relatively low costs of their production. This in turn will exert a stimulating effect on increasing the gross commercial expenditure / i.e. without subtracting purchased concentrated feedstuffs / in grains production crop in farms with a smaller area. This will as well favor processes of simplification, specialization and concentration of agricultural production, in this also of grains and thus result in lowering the per unit costs, and as a consequence - increase farmers' revenues through a growth of labor productivity and lower costs of production, not only through increasing the prices of agricultural products.

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THE ECONOMICS OF GRAINS PRODUCTION IN BIG COMMERCIAL FARMS

The agrarian structure of Polish agriculture in general does not create conditions favoring grains production. Grains are a product characteristic for large area farms: they require a large scale of production, which makes profitable using specialized machinery and means a considerable decrease of the labor inputs.

In this context the socialized sector of Polish agriculture, being organized into large area farms, more highly mechanized compared to the private sector, theoretically has better conditions for going into production of grain crops. Despite this, in the whole period since 1945 the share of the socialized sector in the total grains production was lower than that of private farms / see Table 1 /.

The state of things was the result of numerous factors. The state farms in Poland upon their creation were burdened with three principal tasks:

Firstly, they were to conduct activities linked with the creation of biological progress in agriculture for all of agriculture;
Secondly, since the area of the state sector was quite large / in the beginning it was 1.5 million ha / and the prospects were for further increase in the future, this sector was to conduct production activities, resulting in supply for consumption of the major products, principally those of which the greatest deficit was experienced;

Thirdly, the developing, modern state farming enterprises were to become a model, a standard for the proper organization of work and life style for the countryside composed of dispersed and backward farms in the private sector.

The post war difficulties of the economy's development were the reason for burdening the socialized sector in agriculture with tasks of an intervention nature. This concerned principally the production of such products which were little profitable for private farms, principally animal products.

The performance by the socialized farms of the multiple intervention functions was in the past the fundamental reason for the appearing difference between the potential production possibilities of these enterprises and the effects achieved. This resulted, as a consequence, in phenomenally of low economic productivity.

An analysis of the development of the socialized sector in the post war period permits to state, that - despite the encountered considerable difficulties - the function of extension of technical and biological progress was executed in a satisfactory manner. The animal breeding enterprises and seed material breeding and reproduction enterprises are the principal producers of high quality reproduction material in animal breeding and the seed industry. For instance, the state farms produce about 90 % of the total supply of elite and original seed material in grains. The growth of this production is impressive; in 1955 the state farms produced 55.3 thousand tons of qualified seed grains, in 1965 87.8 thousand tons and in 1975 the respective figure was 527.9 thousand tons.

One should assess positively as well the operations of the socialized farms as an important producer of consumption products. Their role in this field increased all the more when the phenomena of disequilibrium between food demand and the production of

agriculture was magnified. The intervention function of the state farming enterprises then became all the more explicit; concerned first of all with the task of increasing animal production, principally beef and pork. Frequently these tasks quite exceeded the enterprises proper potential, which caused technological disproportions between the respective sectors of production within the enterprise and thus constituted the fundamental cause of the deficits experienced by the economics of a large share of state farms.

Thus the potential capacities of the socialized sector in the field of grains production for various reasons could not be fully employed. Instead of being the principal supplier of grains and fodder to the private sector of agriculture, the socialized sector became a net buyer of these products from the state.

I. Production and use of grains in state farms

The socialized sector in Polish agriculture in 1982 used 24.2 % of the total agricultural area, produced 20.7 % of the final gross product, 23.7 % of the total market production and 10.1 % of the production added total in agriculture.

The dominating position of the state farms in the socialized sector of agriculture / 78.5 % of the agricultural area, 81.6 % of the final product, 82.3 % of the market production and 80.4 % of the production added / as well as the fact that the best and most complete statistics are available for this group of farms permits us to recognize it as the representative of the socialized sector in Polish agriculture[1)]. For this reason in our further considerations on grains production economics we will be speaking of the phenomena and relations in the state farms.

[1)] Beside the state farms, the socialized sector of Polish agriculture includes agricultural production cooperatives / using 3.9 % of the total agricultural area / and farms run by the agricultural circles cooperative organizations / the latter's major work is providing mechanization services to private farmers /.

An analysis of long term changes in the share of grains in the total area planted in Polish farming, permits to state that until 1980 this share was dropping. There were numerous reasons for this; they have been discussed extensively by A. Woś in the paper presented also at this seminar. Statistics presented in Table 1 point to the fact that the general drop in the share of grains in the total area planted was principally the effect of the decreasing share in the state farms. In the private farms since 1965 have been observed no important changes in this respect.

As we have stressed it in the introduction, the principal reason forcing the state farms to limit their grains production was their duty to perform an intervention role in the state's agricultural policy. Other reasons however are not without importance. Among the most important belong certainly the changes in the production composition and production techniques. These problems have been however extensively discussed during our previous sessions[1)]. One should remember here that one of the most important changes in the production technologies was a growth of the grain intensity of animal production. The imposed tasks of increasing animal production - in many cases quite exceeds the state farms' proper feedstuffs resources - which the government administered on the state farms, resulted in a growing demand for feedstuffs. Thus the increasing grain requirement of the animal production technologies resulted in aggravation of the grains and concentrate feedstuffs deficit. At the same time the demand for roughage feedstuffs did increase as well.

The lacking grains and feedstuffs concentrates could however be easily supplemented by the farms through purchases from government supplies. On the other hand, the increasing demand for roughage had to be covered solely through an increase of their production on the farms themselves; this latter production growth

1) See the Polish papers presented at the Finnish-Hungarian-Polish Seminars on Agricultural Economics: Wałbrzych, April 1978, Helsinki, June 1979 and Csopak, September 1980.

could have been achieved only partially through an increase of the yields, while in part it was necessary to increase the area planted to the fodder crops on previously arable land. This took place for the major part at the expense of the grains area. One should also stress at this point that the decisions on such a way of increasing animal production in the state farms were as well encouraged by economic considerations. The availability of concentrate feedstuffs on the market / greater, by the way, for the state farms, than for the private sector / and their low price, made for the state farms the decisions to limit grains production rather easy. In a much smaller degree these factors were decisive in decisions of limiting the share of grains in the total area planted in the private farms.

The negative effects of the rather rapid decrease of the area planted to grains in the state farms were partly neutralized by a growth of the yields. For example, the yields of the four principal grains in Polish agriculture / i.e. rye, wheat, barley and oats / increased in the period 1950-1982 in the state farms at an annual rate of 4.6 %, while the respective figure for the private farms was 3.4 %.

The share of the more intensive grains varieties such as wheat and barley was also greater in the state farms. As effect of increasing fertilizer use the yields of wheat and barley in the state farms increased in the period 1950-1982 at an annual rate of 5.6 %, while the respective figure for the private farms was 4.2 %. A much lower rate of yields improvement was achieved in rye and oats, since in the state farms it was respectively 3.9 % and in the private farms 3.1 %. Important changes took place in the period discussed in the shares of the respective grains in the total area planted; this was the result of higher procurement prices for wheat and barley, compared to rye and oats, and on the other hand the higher yields of the former were encouraging. In the state farms the share of wheat and barley increased from 37 %

Table 1. The share of grains in the total area planted. The composition of the area planted to grains in the state farms and in private farms in the period 1950-1982.

Years	Share of grains in the total area planted, in per cent			Composition of the areas planted to grains / grains total = 100 /			
	total agriculture	state farms	private farms	wheat and barley		rye and oats	
				state farms	private farms	state farms	private farms
1950	63.6	54.4	64.5	36.9	24.4	63.1	75.6
1955	60.8	51.5	62.3	38.7	22.5	61.3	77.5
1960	60.2	47.9	61.9	39.7	21.7	60.3	78.3
1965	55.6	43.9	57.7	50.5	25.9	49.5	74.1
1970	55.8	47.5	57.2	56.6	33.8	43.4	66.2
1975	53.6	36.1	57.3	62.3	40.9	37.7	59.1
1980	54.1	42.7	57.1	57.7	38.7	42.3	61.3
1981	54.5	41.8	57.5	55.2	36.0	44.8	64.0
1982	56.3	45.5	57.8	53.9	34.6	46.1	65.4

Source: Computed by the Author basis the annual statistical yearbooks published by the Polish Central Statistical Office GUS: Rolniczy Rocznik Statystyczny 1945-1965, Rocznik Statystyczny Rolnictwa 1971, Roczniki Statystyczne Rolnictwa i Gospodarki Żywnościowej 1978 i 1982, Roczniki Statystyczne 1981 i 1982 and the Mały Rocznik Statystyczny 1983.

in 1950 to 58 % in 1980, while the respective figures for the private farms were 24 % and 39 %. In 1981 the same price was offered for all grains and this changed significantly the previous trend and presently wheat and barley are sown on 54 % of the total grains area in the state farms and on 35 % of the grains area in private farms.

The differences between the farming sectors in the composition of the grains plantations are as well somewhat influenced by the natural conditions. The socialized farms, which grow more of the intensive grains, have better soils. For instance, the share

Table 2. Yields of the four principal grains in state and in private farms, in the 1950-1982 period, in tons per hectare.

Years	Four grains total		Wheat and barley		Rye and oats	
	state farms	private farms	state farms	private farms	state farms	private farms
1950	1.42	1.26	1.49	1.31	1.40	1.26
1955	1.37	1.43	1.54	1.45	1.26	1.42
1960	1.57	1.61	1.74	1.73	1.50	1.58
1965	1.99	1.89	2.11	2.06	1.88	1.85
1970	2.09	1.93	2.29	2.37	1.84	1.74
1975	3.07	2.42	3.24	2.83	2.75	2.21
1980	2.52	2.30	2.76	2.57	2.33	2.17
1981	2.60	2.50	3.06	2.79	2.32	2.29
1982	3.11	2.52	3.39	2.98	2.80	2.32
	Average per annum rate of growth, in per cent					
1950-1982	4.6	3.4	5.6	4.2	3.9	3.1

Source: As in Table 1.

of soils classified as good in the total arable area was in the state farms 16.4 %, while in the private farms it was 13.5 %, on the other hand the share of soils classified as poor and very poor was in the state farms 22.8 % and in the private farms 34.6 %[1].

[1] Rocznik Statystyczny Rolnictwa i Gospodarki Żywnościowej 1982 / Agriculture and Food Economy Yearbook for 1982 /, published by the Central Statistical Office GUS, Warszawa, 1982.

The grain planting composition presented above, shows the trends of change and yield levels which determine the state farms potential in grain production. The share of state and of private farms in the total grains production in the years 1950-1982 is shown below / in per cent /:

Year	State farms	Private farms
1950	9.1	89.9
1955	11.2	79.4
1960	9.3	89.4
1965	11.0	87.4
1970	13.6	84.7
1975	14.1	83.4
1980	17.1	77.5
1981	16.4	78.9
1982	19.3	75.7

Source; As in Table 1.

When comparing on one hand the share of the state farms in the crops composition, and on the other in the grains production, one observes that despite the fact, that the area planted to grains was being limited, the state farms' share in grains production was on the increase, clearly from 1965. This growth however did not cover the production requirements of the state farms. This is clearly shown by Table 3.

The balance of sales and purchase of grains and concentrate feedstuffs in state and in private farms is shown below, in thousand tons:

	1971-1975	1976-1980	1981	1982
State farms	-349.1	-1 349.0	-1 173.8	-166.5
Private farms	641.1	-1 482.9	-2 520.4	386.7

As it can be seen from the figures above the deficit of grains and concentrate feedstuffs in the state farms was on the increase until 1981. In 1982 this unfavorable situation was changed, despite this the state farms nevertheless, did buy in that year from the government stocks 166.5 thousand tons of grains and feedstuffs concentrates. Thus, one observes that

Table 3. Production and use of grains in state and in private farms in the years 1971-1982, in thousand tons.

	1971-1975[a]	1976-1980[a]	1981	1982
	State farms			
GRAINS INCOME TOTAL	4 817.9	5 856.3	4 913.4	5 154.1
in this: crop	2 764.1	3 183.2	2 991.4	3 772.6
purchase	2 053.8	2 673.1	1 922.0	1 381.5
GRAINS EXPENDITURE TOTAL	4 893.0	5 829.6	4 943.1	5 347.6
in this: plantings	191.0	251.8	316.0	335.1
fodder for production livestock	2 639.0	4 054.4	3 519.0	3 110.7
sales	1 704.7	1 324.1	748.2	1 215.0
DIFFERENCE OF STOCKS	75.1	-26.7	29.7	193.5
	Private farms			
GRAINS INCOME TOTAL	22 326.3	20 526.5	20 477.1	19 042.0
in this: crop	17 742.9	15 434.3	15 848.8	16 389.3
purchase	4 583.4	5 092.2	4 628.3	2 652.7
GRAINS EXPENDITURE TOTAL	22 634.9	20 448.8	21 570.5	18 968.7
in this: plantings	1 421.2	1 309.5	1 282.2	1 307.9
fodder for production livestock	11 783.3	12 685.8	13 226.6	11 997.8
sales[b]	5 224.8	3 609.3	2 107.9	3 039.4
DIFFERENCE OF STOCKS	308.6	-77.7	1 093.4	-73.3

[a] For the respective periods -- the per annum average

[b] Inclusing grains used for consumption purposes.

Source: Calculated by the Author, basis Central Statistical Office GUS statistics.

the use of grains and feedstuffs in this sector was by approximately 10 % higher than the grains production, with relatively high yields of grains of 3.11 tons per hectare. The apparent deficit of grains cannot be fully explained by the size of the animal production conducted. The fundamental reason for this state of things can be observed in Polish farming during the past decade by the growing share of grains in the animal diet, which is not always reasonably high.

The grain intensity of animal production in state and in private farms is shown by the figures below in which we have converted the slaughter animals produced, milk, wool and eggs into conventional meat units[1)].

The use of grains and concentrate feedstuffs, in kilograms to produce one kilogram of meat in the respective periods, in the groups of farms discussed, is as follows:

Years	State farms	Private farms
1971-75	3.30	2.50
1976-80	3.77	2.75
1981	3.71	3.17
1982	3.54	2.93

Calculated by the Author basis Central Statistical Office GUS data.

The appearing big differences in the grain requirements in animal production do not fully represent the feed conversion ratios. This is because, while in the state farms, the dominating fodders are grains and concentrate mixes, and the feeding of animals in the private farms is still based largely on potatoes. In both sectors, however, one observes a similar trend in feeding grains; a growth of the quantity of grains required until 1981 and then a marked drop since 1982. This drop was caused by a significant limitation of the grains and feedstuffs imported. As a consequence,

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1) The following calculation coefficients have been assumed: 1 kilogram of slaughter animals = 0.55 kilogram of meat; 1 liter of milk = 0.15 kilogram of meat; 1 kilogram of wool = 3.6 kilograms of meat; 1 kilogram of eggs = 1 kilogram of meat.

the sales of concentrate feedstuffs from government stocks in 1982 was almost by one half lower than that of 1981. An effect of these constraints is a clear drop in animal production in state farms. It is estimated that approximately 10 % of the stands in the breeding lots in the state farms was not used in 1982 because of a shortage of feedstuffs.

II. The costs and profitability of grains production in state farms

When speaking of the profitability of grains production G. Blohm stated[1]:

> "Grains production is today the most profitable extensive crop, due to the great difference between revenues and inputs and due to the unusually small variations of prices and the yields achieved".

The analysis of costs and profitability of grains production in Poland as a rule confirms this view. Also in Poland conditions of yields variates, as compared to an average year trend of ± 6 to 8 %, while the yields of root crops vary even ± 15 to 20 %. The profitability index for grains production is also higher than that for the other extensive crops.

To give an idea of the dynamics of production costs and profitability in the state farms, we have presented in Table 4 the basic elements of costs of grains cultivation in the years 1960-1980. An analysis of this material permits to determine some significant regularities.

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[1] G. Blom: Ekonomika i organizacja gospodarstw rolniczych / Economics and organization of farms; Polish translation / , published by PWRiL, Warszawa, 1961.

In the whole post war period / i.e. since 1945 / the profitability of wheat and barley production in Poland was much higher than that of rye and oats. This was first of all due to the higher nutritional value of wheat and barley as compared to the remaining grains, and on the other hand, this depended on the higher soil and fertilizer requirements of the former two grains. As we have stressed it before, in Polish agricultural land dominate light soils / post-glacial formation /. They do not constitute the most favorable conditions for the cultivation of wheat. Thus, despite the price preference incentive, the dominating grain crop grown in Poland remains still rye. This grain, while more extensive when compared to wheat and barley, is nevertheless in the soil and climate conditions of Polish agriculture less failure-prone and may be grown on poor soils as well. Not without importance is the fact, that with rye the producer obtains more straw, which is necessary in the traditional style animal breeding in peasant farms.

The observation of the past 20 years period permits nevertheless to notice some important changes in the grains plantations composition. This concerns primarily state farms, as can be seen in Table 1. The introduction of the more intensive grain varieties, the rather rapibly increasing fertilizer use as well as a dropping demand for straw, once modern technologies of animal breeding are introduced / including industrial feedlots / - all these may be enumerated as the reasons for the increasing share of wheat and barley in grains production composition.

The technology of grains production was also subject to rapid changes. More rapidly than in other branches of crop production the labor inputs decreased, substituted by increasing inputs of tractors and machines. In the second half of the 1960's rapid mechanization was started of the harvest of grains. Since about 10 years this harvest is executed in state farms practically only by combine grain harvesters.

As can be seen from Table 4 the composition of the inputs was subject to important changes. For instance, the share of labor in the total inputs dropped from about 16 % in 1960/61 to 7 % in 1980/81, while the share of machine costs increased insignificantly. This is proof of the high effectiveness of the mechanization introduced in grains cultivation. According to J. Bała[1)] in grain production in the period 1961-1972 on the average in the state farms sector one hour of work of a tractor, with combine harvester work converted into tractor work hours as well, substituted 6.7 manhours of work and 3.2 hours of horse work; the respective rations for potatoes were 1 tractor hour / other machine work converted as well into tractor work hours / substituted for 3.5 manhours of work and 2.3 hours of horse work; in sugar beet cultivation these figures were 3.6 and 2.0 respectively.

Table 5 presents information on the inputs of labor and machines in state farms in recent years.

Among the most important changes in grains cultivation in the 1960-1980 period one should point to the progress in fertilizer use. In this period one may distinguish two subperiods may be determined:

- until 1965 areas planted to grains received more fertilizer than the average use. In 1960 for example per one hectare of wheat in the state farms 135 kilograms of NPK were used, respectively for rye 103 kilograms, while the average figure per hectare of agricultural land was 87 kilograms.
- in the consequent period, that is after 1965 this relation was changed. The rate of growth of fertilizer use per 1 hectare of agricultural land was higher than the respective growth of fertilizer used for grains. For instance in 1980 the use

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1) J. Bała: Efektywność mechanizacji w państwowych gospodarstwach rolnych / Mechanization effectiveness in state farms /, published by PWN, Warszawa, 1977.

Table 4. Changes in costs and profitability of grains production in state farms researched by the Institute of Agricultural Economics, 1960-1980.

	1960/61	1965/66	1970/71	1975/76	1980/81
			Spring wheat		
Gross costs, in zloty per hectare	6 310	7 358	8 005	11 433	21 678
in this: labor	1 007	808	444	404	1 389
draft power and machines	747	886	785	1 509	2 336
fertilizers	2 142	2 285	3 332	4 427	6 430
seeds	620	780	898	962	1 604
Net costs, in zloty per hectare	5 472	6 345	7 062	9 675	19 028
Yields, in tons per hectare	1.80	2.25	2.14	3.61	3.03
Costs, in zloty per ton	3 040	2 820	3 300	2 680	6 280
Price in zloty per ton	3 080	3 760	4 000	4 230	5 860
Profitability index, in per cent	101	133	121	158	93
			Spring barley		
Gross costs, in zloty per hectare	5 400	6 955	7 808	10 041	19 052
in this: labor	936	906	534	391	1 317
draft power and machines	633	930	841	1 431	2 270
fertilizers	1 824	2 024	2 848	4 087	5 965
seeds	434	613	579	676	946
Net costs, in zloty, per hectare	4 640	6 215	6 966	8 967	17 379
Yields, in tons per hectare	2.09	2.26	2.70	2.94	2.59
Costs, in zloty per ton	2 220	2 750	2 580	3 050	6 710
Price, in zloty per ton	2 830	3 460	3 640	3 720	5 390
Profitability index, in per cent	127	126	141	122	80

Continued on next page.

Table 4 - continued.

	1960/61	1965/66	1970/71	1975/76	1980/81
			R y e		
Gross costs, in zloty per hectare	5 623	6 967	7 236	10 432	20 391
in this: labor	946	898	497	449	1 424
draft power and machines	697	900	809	1 530	2 483
fertilizers	1 946	2 049	3 135	4 232	6 206
seeds	416	595	594	589	1 003
Net costs, in zloty per hectare	4 665	5 924	6 290	8 745	17 836
Yields, in tons per hectare	1.84	2.17	1.85	2.83	2.44
Costs, in zloty per ton	2 530	2 730	3 400	3 090	7 310
Price, zloty per ton	2 200	2 800	3 180	3 370	4 630
Profitability index, in per cent	87	103	94	109	63
			O a t s		
Gross costs, in zloty per hectare	5 486	6 980	7 650	10 144	19 670
in this: labor	959	911	595	417	1 389
draft power and machines	648	910	866	1 458	2 340
fertilizers	1 858	2 075	2 962	4 139	6 059
seeds	435	595	615	578	981
Net cozts, in zloty per hectare	4 748	6 210	6 798	9 128	18 012
Yields in tons per hectare	1.97	2.25	2.32	2.49	2.37
Costs, in zloty per ton	2 410	2 760	2 960	3 670	7 600
Price, in zloty per ton	2 050	2 620	3 050	3 060	4 700
Profitability index, in per cent	85	95	103	83	62

SOURCE: Institute of Agricultural Economics statistics.

Table 5. Inputs of labor and draft power in production of the basic four grains in state farms researched by the Institute of Agricultural Economics in the years 1975/76 and 1980/81.

Input of work hours per one hectare	1975/76	1980/81
Workers	34.3	31.0
Traktors	19.5	19.6
Combines	1.7	1.9

SOURCE: Research by the Institute of Agricultural Economics. In 1975/76 an area of 9 250 hectares of grains was researched, in 1980/81 13 266 hectares.

of NPK per 1 hectare of wheat was 302 kilograms, for rye 262 kilograms, while the average use of fertilizer per 1 hectare of agricultural land was 294 kilograms. This slower rate of growth in fertilizer use for grains in the second sub-period was explained by reaching a level of fertilizer use saturation and by the need to increase fertilizer use for other crops than grains, principally the fodder crops, where the marginal productivity of fertilizer use was higher than that in grains production.

Definitely a fault in the fertilizer management in state farms, one should recognize is, not the level of fertilizer use, but the composition of the fertilizers applied. The level is high enough but the share of nitrogen fertilizers is too low. For this reason it is foreseen that in the coming years the general level of fertilizer use per 1 hectare planted to grains will be maintained, but the application of nitrogen fertilizers will be increased.

The statistics in Table 4 show that in 1980/81 the profitability of grains production dropped rapidly. The most important reason for this without doubt was the low level of yields in that year / lower than that in the previous years / and at the same time a significant growth of the labor costs. The effect of these growing outlays was a deterioration of the relative profitability of grains as compared to the other crops. For comparison one may add that in 1980/81 the profitability index for the production of one grain unit was 109 % for crop production in general, while for the most profitable grain, that is wheat this figure was only 93 %, for rye respectively 63 %. Such low profitability of grains production did not appear once in the past 20 years. Thus, aside from the reasons considered earlier, it was the low, insufficient profitability of this line of production which was one of the reasons for the limiting of this crop in state farms.

The important change of prices which was started in 1981 and continued in 1982, resulted in a significant improvement of the profitability of grains production. The present prices, identical for all grains, have been increased on the average 2.5 times for wheat and over threefold for rye and oats. Thus, the identical prices for all grains changed the internal relations of their profitability. The attraction of growing wheat and barley deteriorated relatively compared to rye and oats, as the former require better soils and more fertilizer. This resulted naturally in a change of the grains plantings composition. We have spoken about this in the first part of the paper.

The general picture of grains production in the state farms sector is influenced by the differentiated situation of the over 1 200 enterprises operating today. Having in mind the determination of the particular differences between the state farms in the population researched by the Institute of Agricultural Economics, we have selected those in which the share of grains in the total area planted exceeded 50 % and on the other hand, those in which this share was below 33.5 %. Table 6 shows the principal indexes characterizing the two groups of state farms.

As one sees from the presented data, the share of grains in the total area planted did not exert a significant influence on the general level of profitability in the enterprises; in both groups this figure was similar, as the value of the production exceeded by over 10 % the total of outlays. There were however important differences in the soils quality, the share of green fodder crops in the total area, in the yields of grains and in the size of animal breeding. We have found great differences among the enterprises researched in the respect of the labor inputs / calculated as the number of workers employed per 100 hectares of agricultural area /. Despite the 23.5 per cent points difference in the grains share in the total area planted, the production of grains per 1 hectare of agricultural area in both state farms groups is quite close / slightly smaller is the production of grains per hectare in the group of farms with the larger share of grains in the total area planted /.

Table 6. Major production and economic indexes in state farms researched by the Institute of Agricultural Economics in 1981/82.

	Group I	Group II
1. Average share of grains in the total area planted, in per cent	54.7	31.2
2. Index of production profitability in per cent	112	111
3. Number of workers employed per 100 hectares of agricultural land	10.64	17.20
4. Soil quality index[a/]	0.91	1.12
5. Yields of four basic grains, in tons per hectare	2.14	3.46
6. Share of permanent meadows and pastures in the total agricultural area, in per cent	30.0	16.4
7. Production of grains per 1 hectare of agricultural area, in tons	0.802	0.839
8. Use of concentrate feedstuffs per 1 hectare of agricultural land, in tons	0.610	1.193
9. Purchases of concentrate feedstuffs per 1 hectare of agricultural land, in tons	0.243	0.854
10. Use of concentrate feedstuffs to produce 1 kilogram of meat, in kilograms b/	4.34	4.35
11. Production of meat per 1 hectare of agricultural land, in kilograms b/	140.6	272.2
12. Livestock inventory in large animal units per 100 hectares of agricultural land	45.2	72.6

N o t e: Farm in Group I had at least 50 % of the agricultural area under grains, the farms in Group II had no more than 33.5 % of the total agricultural area under grains.

a/ The soil quality index was calculated as follows: class I soils = 1.80, class II soils = 1.60, class III soils = 1.20, class IV soils = 1.00, soils of class V = 0.80, soils of class VI soils = 0.50.

b/ For method of calculation of convertible meat units see note 1/ on p. 10.

The discussed statistics describing the opposite groups of the farms researched confirm the preciously presented opinion, that the fundamental reason for the limiting of the area planted to grains in the state farms, compared to the potential capacities, was the past practice of the government agendas of the central level of administering upon the state farms a high rate of animal production growth.

The reform of the economic and financial system introduced in 1981 assumes complete independence on the part of the state farms in the sphere of planning the production composition. The economic effects of the introduction of the new system, at present only a partial assessment is possible, are however clear enough to point to the principal trends in the production composition. On one hand, 1982 saw a limiting of the animal production, on the other an increase of the share of grains in the crops composition, and as a consequense of this a decrease in the grains and concentrate feedstuffs deficit of the sector discussed. These appear to be the principal changes.

Research conducted by the Institute of Agricultural Economics in 1982 concerning the production plans of state farms has permitted to determine / in general terms / the foreseen future trends[1)]. The principal aim is to limit the size of animal production to the available own feedstuffs stocks, this will take place principally through giving up young cattle breeding and further production growth in grains.

[1)] L. Wiśniewski, Z. Kaprzyk: PGR w pierwszym etapie wprowadzania reformy gospodarczej / The state farms in the first stage of the introduction of economic reform /, published in Wieś Współczesna monthly, no. 9, 1982.

A general assessment of the economics of grains production in the state farms permits to propose the following conclusions:

1. The production of grains in the socialized sector presently and in the past does not cover the needs of this sector;
2. The size of grains production in the state farms is not in conformity with the potential capacities in this respect;
3. The changes in economic conditions and administration introduced in 1981, as well as the new system of management and assessment of the state farms operations, permits prefering the most profitable lines of production, which in effect brings about a significant increase of grains production;
4. In the national plan of economic development in agriculture preferences are foreseen, in terms of production and incomes, for the production of milk and grains. For both lines of production there is a considerable potential for growth in the state farms, this is expecially true of grains. One may thus foresee that in the coming years the share of grains in the total area planted in the state farms will be increasing at an annual rate of about 3 %. Thus the state farms will become not only self-sufficient in grains production and concentrate feedstuffs balance but will also be capable of delivering these to the small private farmers, to supplement their own feedstuffs production.

May 1983, Warszawa.

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INCOME SITUATION OF WHEAT AND MAIZE PRODUCTION

Production of cereals is one of the most important branches of agriculture in Hungary, as their area is 2,7-2,8 million hectares, 60-62 percent of arable land. Large farms / state and cooperative farms / have a decisive role in cereal production and they are almost the only producers of wheat, barley, oats and rye. Because of the large area and higher than average rentability, cereal production has a very important role in the income earning of the large farms. The majority of wheat produced / 85 percent / is directly sold to purchasing firms, while one-third of maize produced is "sold" through the animals of the producing farm.

Because of the good results, the strong demand of the animal sector and the favourable export situation, expansion of cereal production is continued. It was necessary in 1982 to raise both cereal area and yields to raise production volume by 13 percent, compared with the previous year.

Several changes took place in the financial regulations of the enterprises in 1982. Of those concerning production costs, the most important were raising energy prices by 10 and again by 7 percent, on the average 15 percent higher transportation charges, 3 percentage-point higher social insurance contribution and the repeated raising of the credit rate. These measures raised of course the cost of agricultural production, though part of the mid-year energy price increase was refunded as a subsidy from the state budget. No substantial changes took place in the official prices of important production requisites / fertilizers, insecticides, fungicides, herbicides, feedstuff and producer prices of agricultural commodities.

Realization of grain production targets required improvement of the material interest of the farms and the government took some important measures in 1982 e.g.:

- An additional grain production bonus was introduced for those farms which raised production compared with the 1976-1980 average plus 10 percent;
- Farms with below average soil quality /"unfavourable endowment farms" / get higher price-subsidies for grains.

As a result of the incentives and - especially for maize - very favourable autumn weather, grain production reached record volume in 1982. Total grain production was 14.7 million tons, though combined wheat, barley, oats and rye production somewhat lagged behind the plan.

Costs and income of grain production can be summarized on the basis of wheat and maize production results of large farms in 1981-1982 as follows:

1. Almost all large farms produce grain and the concentration of production is comparatively high as average wheat area per farm was over 900 hectares, maize 650 hectares in 1982.
2. Wheat production costs per hectare rose in 1982 6,6 percent, maize by 7,2 percent. It is interesting to note, that though material and energy prices rose considerably, these costs were only 5-7 percent higher, than a year earlier because of the result of the favourable weather and good management on the large farms, there were savings. In maize production e.g. early varieties and spreading of the energy saving wet-storage method had an important role in keeping dehydration costs only 7 percent higher than in 1981, though production rose by 14 percent.

3. Wheat yield per hectare rose 9,7 percent and reached 4.4 tons, maize 16.7 percent, 7.4 tons. Income from grain production rose even more, mainly as a result of the considerable grain production bonus. Thus wheat income per hectare rose by 47 percent to 3861 Ft, maize 82 percent to 6438 Ft.

4. Increase of both wheat and maize yield was higher than of production costs and this resulted in lower net cost than in 1981. Net cost of wheat declined 3 percent, maize 8 percent. Thus farms achieved, partly as a result of the production bonus and price subsidy, much higher income from a unit of grain, than a year earlier.

SUMMARY

The results of wheat and maize production in 1982 considerably improved as a result of good weather and new incentives. Average yields were higher, especially maize yields were soaring. As a result of cost saving net costs declined and income considerably improved.

Budapest, June, 1983.

Cost and income of wheat and maize production on large-scale farms

	Unit	1981	1982	1982 index 1981=100
Wheat				
Average yield	t/ha	4,01	4,40	109,7
per hectare:				
- production cost[1]	Ft/ha	11 208	11 947	106,6
- price income 2)	Ft/ha	11 653	13 323	114,3
- profit 3)	Ft/ha	2 627	3 861	147,0
per 1 ton main product sold				
- net cost	Ft/t	2 796	2 715	97,1
- price income 2)	Ft/t	3 450	3 592	104,1
- profit 3)	Ft/t	654	877	134,1
profit per 100 Ft production cost 3)	Ft	23,44	32,30	138,0
Maize				
Average yield	t/ha	6,33	7,39	116,7
per hectare				
- production cost[1]	Ft/ha	17 365	18 621	107,2
- price income 2)	Ft/ha	13 630	17 147	125,8
- profit 3)	Ft/ha	3 533	6 438	182,2
per 1 ton maize product sold				
- net cost	Ft/t	2 722	2 511	92,2
- price income 2)	Ft/t	3 281	3 393	103,4
- profit 3)	Ft/t	559	872	156,0
profit per 100 Ft production cost 3)	Ft	20,50	34,59	168,7

Note: 1) = total costs less value of by product

2) = including items raising profit of cereal production / price-subsidies, premium prices, bonus etc./

3) = production value less production cost

Cost and income of wheat production on large farms

No	Unit	1981	1982	1982 index 1981=100
1. Number of farms	-	1 324	1 326	100,2
2. Wheat area	1000 ha	1 062,6	1 209,6	113,8
3. Average wheat farm	ha	803	912	113,6
4. "Gold-crown" rent of the land	ak/ha	22,1	21,6	97,7
5. Total wheat production	1000 t	4 260,3	5 322,8	124,9
6. Wheat sold	1000 t	3 889,5	4 486,2	115,3
7. Average yield	t/ha	4,01	4,40	110,0
8. Seed cost	Ft/ha	1 102	1 195	108,4
9. Fertilizer cost	Ft/ha	2 453	2 551	104,0
10. Herbicid, fungicid, etc. cost	Ft/ha	460	464	100,9
11. Energy cost	Ft/ha	8	9	112,5
12. Other material cost	Ft/ha	225	220	97,8
13. Total material cost	Ft/ha	4 248	4 439	104,5
14. Wages	Ft/ha	179	174	97,2
15. Sepreciation	Ft/ha	24	26	108,3
16. Maintenance firm cost	Ft/ha	10	13	130,0
17. Tractor costs	Ft/ha	1 583	1 665	105,2
18. Truck costs	Ft/ha	264	275	102,2
19. Combine costs	Ft/ha	916	957	104,5
20. Dehydration costs	Ft/ha	400	444	111,0
21. Other auxiliary firm costs	Ft/ha	104	116	111,5
22. Total of auxiliary firm costs	Ft/ha	3 272	3 457	105,7
23. Other costs	Ft/ha	1 211	1 279	105,6
24. Deductions fordamage and loss/-/	Ft/ha	- 387	- 267	69,0
25. Total direct /variable/costs	Ft/ha	8 557	9 121	106,6
26. Value of by-products /-/	Ft/ha	- 462	- 499	108,1
27. Enterprise level overhead cost	Ft/ha	1 256	1 316	104,8
28. Gross costs of main product	Ft/ha	9 351	9 938	186,3
29. Farm level overhead cost	Ft/ha	1 531	1 705	111,4
30. Land tax	Ft/ha	326	304	93,3
31. Production cost	Ft/ha	11 208	11 947	108,6
32. Price income of main product	Ft/ha	11 653	13 323	114,3
33. Production value	Ft/ha	13 835	15 808	114,3
34. Profit	Ft/ha	2 627	3 861	147,0
35. Gross costs of main product	Ft/t	2 333	2 259	96,8
36. Net cost of main product	Ft/t	2 796	2 715	97,1
37. Average selling price	Ft/t	3 450	3 592	104,1
38. Income of main product sold	Ft/t	654	877	134,1
39. Profit per 1000 Ft production cost	Ft	23,44	32,30	138,0

Cost and income of maize production on large farms

No	Unit	1981	1982	1982 index 1981=100
1. Number of farms	-	1 224	1 217	99,4
2. Maize area	1000 ha	817,6	779,7	15,4
3. Average maize farm	ha	668	657	98,4
4. "Gold-crown" rent of the land	ak/ha	23,54	23,19	98,5
5. Total maize production	1000 t	5 176,5	5 907,3	114,1
6. Maize sold	1000 t	3 396,5	4 024,4	119,0
7. Average yield	t/ha	6,33	7,39	116,7
8. Seed cost	Ft/ha	1 040	1 157	111,3
9. Fertilizer cost	Ft/ha	2 751	2 961	107,6
10. Herbicid, fungicid etc. cost	Ft/ha	1 697	1 759	103,7
11. Energy cost	Ft/ha	37	36	97,3
12. Other material cost	Ft/ha	257	237	92,2
12. Total material cost	Ft/ha	5 782	6 150	106,4
14. Wages	Ft/ha	121	119	98,3
15. Sepreciation	Ft/ha	173	170	98,3
16. Maintenance firm cost	Ft/ha	37	34	91,9
17. Tractor costs	Ft/ha	1 919	1 994	103,9
18. Truck cost	Ft/ha	392	428	109,2
19. Combine costs	Ft/ha	1 338	1 467	109,6
20. Dehydration costs	Ft/ha	1 867	1 997	107,0
21. Other auxiliary firm costs	Ft/ha	107	133	124,3
22. Total of auxiliary firm costs	Ft/ha	5 623	6 019	107,0
23. Other costs	Ft/ha	1 315	1 591	121,0
24. Deductions fordamage and loss/-/	Ft/ha	- 139	- 162	116,5
25. Total direct /variable/ costs	Ft/ha	12 902	13 921	107,8
26. Value of by-products /-/	Ft/ha	-73	-67	93,0
27. Enterprise level overhead cost	Ft/ha	1 606	1 734	108,0
28. Gross costs of main product	Ft/ha	14 445	15 588	107,9
29. Farm level overhead cost	Ft/ha	2 426	2 676	110,3
30. Land tax	Ft/ha	365	357	97,8
31. Production cost	Ft/ha	17 365	18 621	107,2
32. Price income of main product	Ft/ha	13 630	17 147	125,8
33. Production value	Ft/ha	20 769	25 059	120,7
34. Profit	Ft/ha	3 533	6 438	182,2
35. Gross costs of main product	Ft/t	2 282	2 111	92,5
36. Net cost of main product	Ft/t	2 722	2 521	92,6
37. Average selling price	Ft/t	3 281	3 393	103,4
38. Income of main product sold	Ft/t	559	872	156,0
39. Profit per 100 Ft production cost	Ft	20,30	34,59	168,7

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THE GRAIN AND FEEDSTUFFS PROBLEM IN SMALL AREA PEASANT FARMS

The peasant farm economy in Poland is characterized by a considerable dispersion on the agricultural land. Peasant farms with a small area are a permanent feature of the agrarian structure in Poland, since the changes of this structure, aiming in the direction of increasing the farm area are taking place very slowly[1)]. According to the National Census of 1978 the number of small farms, i.e. with an area between 0.5 and 3 hectares, in that year was 950 thousand, which represented 37 % of the total population of farms in Poland with an area of 0,5 hectares and more. The small farms occupy about 10 %, that is 1.5 million hectares, of the total agricultural area used by private farms in Poland.

In the specific situation in Poland's food economy the small farms are expected to produce to supply for the farmer family's own needs and for the market. A considerable number of these farms fulfils these expections. As effect of the large number of the small area farms in Poland, their production, especially animal is an important position in the national food balance.

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1) According to National Census statistics there were in 1950 997 thousand farms with an area between 0.5 and 3 hectares, which was 34 % of the total farm number, in 1960 the respective ficures were 1 257 thousand and 39 %, in 1970 - 1 142 thousand farms and 38 %.

The general economic crisis in Poland today and especially the tight balance of payments forces a limitation of the grains imports. Thus we will discuss more extensively the grains and feeds problem in small farms[1].

The small area of arable land does not favor the development of grains production in the farm group discussed. Grains, to be profitable, require a large scale of production, while in the group of small farms with large resources of labour, the revenue per person employed obtained from grain production would be too small.

It is the small area of the farm and the considerable resources of labor which point to other production orientations, more labor intensive and more productive in character. In crop production very profitable for small farms is the growing and sale of industrial crops, such as tobacco, hop, sugar beet, fruits and vegetables. However only a few of the farms in this group appear to be engaged in these lines of crop production.

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[1] The grains and feeds problem in small farms we will discuss basis statistics obtained from agricultural bookkeeping. The average small farm performing agricultural bookkeeping has an area of about 2.01 hectare of agricultural land, in this the area planted is about 1.55 hectare. Statistics from agricultural bookkeeping provide information on the economics of farms in five area groups: less than 3 hectares, between 3 and 7 hectares, between 7 and 10 hectares, between 10 and 15 hectares and over 15 hectares. These farms achieve production results better than the average, especially the production results in animal breeding. For this reason these statistics cannot mechanically be assumed as average for the whole country, in the respective area group. On the other hand they are an excellent representation of the dynamics of changes taking place in the farms' economics, particularly in a longer time horizon.

A questionnaire poll conducted by the Institute of Agricultural and Food Economics had shown[1] that only 6.2 % of the small farms was selling vegetables, 10.7 % fruits, while on the other hand 24 % of the small farms was selling grains. The production of milk and breeding swine may be profitable for small farms provided the scale of production is right and that concentrate feedstuffs are used sparingly. A poll conducted in 1981 has shown, that small farms still continue to prefer this orientation of production. As many as 56 % of farms were selling milk and slaughter beef and almost 48 % slaughter pork, 33 % were selling eggs.

The crop composition in small farms is subordinated to the requirements of animal production. In the population of farms performing agricultural bookkeeping grains represent about 50 % of the area planted; potatoes account for 21 %, fodder crops for 21 %, industrial crops for 5 % and vegetables for 3.5 %.

The most important changes during the passing decade were a growth of the share of fodder crops in the composition of the area planted, from 16 to 21 % respectively, a dropping share of potatoes from 24.0 % to 22 % and of the industrial crops from 6.5 to 5.0 %. Some changes were observed also in the grains composition. The share of rye in the total area planted dropped from 19 to 14 % as well as that of oats from 9 to 6 %, while the share of barley increased from 4.5 to 7.5 % and so did that of mixed grains from 2.3 to 6 %. The share of wheat in the area sown decreased from 17.0 to 16.7 %.

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[1] In 1981 a poll was conducted in 189 village throughout the whole country. Results have shown that 87.2 % of farms with an area between 0.5 and 3 hectares was selling agricultural products. The remaining farms were producing to cover the needs of the farm household.

In the years 1970-1980 the yields of grains increased from 2.09 ton to 2.65 ton per hectare[1]. In this period on the average from a hectare of wheat 2.63 tons were harvested, 2.43 tons of rye per hectare, 2.91 tons of barley, 2.63 tons of oats and 3.03 tons of mixed grains per hectare. The grains yields were characterized by large fluctuations, caused principally by the changing weather conditions. 1978 was the best year for grains. It was then that the yield of wheat was 3.18 tons, that of rye 3.0 tons, barley 3.17 tons, oats 2.9 tons and mixed grains 3.43 tons.

During the decade discussed one observes two sub-periods from the point of view of changes in the total grains production. In the first period, i.e. from 1970/71 to 1974/75 a permanent growth of production had place - from 1 829 kilograms to 2 479 kilograms per farm, which meant a growth of 36 %. The second period, starting 1975/76 is characterized by fluctuations; every second year a production drop was experienced, followed by a slight growth the next year. The highest level of grains production / rye, wheat, barley and oats / per farm was achieved in 1978/79, equalling 2 483 kilograms.

The feeding of grains to animals in small farms increased more rapidly than the production of grains. From year to year the share of feeding in the crop total increased. And so, in the beginning of the 1970's feeding required about 60 % of the crop, in the middle of the decade this share was 75 % and by the end of the 1970's and the beginning of the decade over 90 % of the crop was earmarked for animal feeding.

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[1] The grains yields achieved by farms run by farmers performing agricultural bookkeeping are by 0.2 ton higher than the national average.

Table 1. Production, purchase and use of grains in farms performing agricultural bookkeeping, with an area of less than 3 hectares, in kilograms per farm

Year	Harvest	Purchase	Animal feeding	Sale	Consumption	Seed material
1970/71	1 829	543	1 178	434	626	178
1971/72	2 220	518	1 294	552	643	186
1972/73	2 259	510	1 421	518	608	187
1973/74	2 385	586	1 659	536	627	187
1974/75	2 479	629	1 603	665	601	172
1975/76	2 211	724	1 674	470	621	179
1976/77	2 377	566	1 578	519	587	168
1977/78	2 235	751	1 840	407	621	165
1978/79	2 483	836	1 990	461	607	170
1979/80	2 028	737	1 778	317	584	171
1980 a/	1 982	795	1 803	229	588	161

a/ Starting 1980 agricultural bookkeeping is done on a calendar year basis

The grains are ground before feeding. About 50 % of the total ground grains is fed to swine, 30 % to cattle, 7 % to horses and 12 % to poultry. Approximately 30 % of the grains earmarked for feeding animals is fed to poultry without grinding.

Beside the ground grains farmers feed animals considerable quantities of concentrate feedstuffs. The use of these increased in the first half of the 1970's by 40 % and in the second half of the decade, as the problems on the feedstuffs market aggravated and rationing of these feedstuffs was introduced, the purchases of concentrate feedstuffs by small farms dropped by 39 % /see Table 2/. Almost 63 % of feedstuff mixes are earmarked for swine, 24 % for cattle and about 13 % for poultry.

The human consumption of grains dropped in the 1970's by about 40 kilograms per farm. Farm families, regardless of the size consume principally processed grains purchased outside the farm. A drop in the natural consumption of grain products was visible already in the 1960's. Gradually the baking of bread in the farm households decreased, while the purchases of processed grain

products, such as wheat flour, cereals, macaroni and bread increased. The 1970's witnessed a further denaturalization of grains consumption. The share of natural consumption in the total consumption of processed grains dropped from 48.4 % in 1971/72 to 15.5 % in 1980 /or 19.7 % in 1979/80 /.

Table 2. A complete balance of sales and purchase of grains and feedstuffs, processed grain products in farms performing agricultural bookkeeping with an area of less than 3 hectares, in kilograms per farm

	1970/ 71	1973/ 74	1974/ 75	1975/ 76	1978/ 77	1979/ 78	1980
Total grains sales Purchase of grains	938	1 269	1 299	1 295	1 011	872	849
in this: concentrate feedstuffs	780	1 091	1 091	1 025	730	644	574
Grains purchased for seed material	45	47	43	45	44	43	44
Purchases of processed grain products for consumption, calculated as grains	340	361	378	409	506	466	476
Total grains purchase	1 323	1 677	1 720	1 749	1 561	1 381	1 369
Balance/sale - purchase/	-889	-1 141	-1 055	-1 279	-1 100	-1 064	-1 140

The deficit of grains and concentrate feedstuffs per one farm with an area of less than 3 hectares was 0.9 ton in the beginning of the 1970's, it increased to 1.3 ton in the middle of the decade and by the end of the 1970's it dropped to 1.1 ton and has stabilized at this level in the beginning of the 1980's.

Small farms are not capable, as effect of their small crop area and large animal stock, to produce such a quantity of grains which would cover their production and consumption needs. If the group of agricultural bookkeeping farms with an area below 3 hectares was to achieve self-sufficiency in grains production, they would have

to increase their crops by 75 % over the present level. This would mean in effect planting to grains the whole area under cultivation. Despite the large purchases of grains, feedstuffs and processed cereal products, the group of farms below 3 hectares did sell grains from their own production. This sale represented 27 to 15 per cent of the crop. Thus the production of grains in small farms cannot be of a commercial character because on this scale it is not profitable and the whole crop should be processed in the farm itself in animal production. Only bigger farms, over 15 hectares of agricultural area, are self-sufficient in grains. They are capable of covering their needs / that is animal feeding, consumption, seed material etc. /. Agricultural bookkeeping data shows that the "net" sale / this meaning less than the quantities of grains and feedstuffs concentrates purchased / in these farms was on the average in these farms between 0.8 to 1 ton per year, depending on the crop.

In relation to the available resources of feedstuffs the farms in the below 3 hectares group have a high animal stock. In 1980 the group of agricultural bookkeeping farms with an area below 3 hectares had per 100 hectares of agricultural land 109 head of swine, 86 head of cattle, in this 59 cows.

The highest indexes of animal stock per unit of agricultural area in the small area farms we have observed in 1973/74. Per 100 hectares of agricultural area in this group of bookkeeping farms we found 189 head of swine and 107 head of cattle.

The breeding of swine and cattle developed well in the beginning of the 1970's, that is until 1974 in all of the farm groups, principally as result of a sufficient supply of the imported grains and concentrate feedstuffs. In the second half of the past decade difficulties appeared in the field of imports, and prices of grains increased on the international markets. It was then that the supply of feedstuffs to peasant farms were limited. The farms'

own feedstuffs base was not sufficient to maintain such a high stock of animals, particularly of swine, this resulted in a drop of animal production in all farm groups. This drop was especially acute for the small area farms and the decrease in animal production was the greatest there.

As animal production developed, with simultaneous intensification, which resulted in improved productivity and a shortened breeding cycle, the farmers departed from the traditional breeding systems, in which grains were added to the feedstuffs. Grains became now the basic feedstuff especially in industrial feedlot type technologies of animal feeding.

In the 1970's and particularly in the second half of this period one observed an increase in the grain requirement of animal breeding also in the peasant farms. This phenomena also was observed in farms with a small area. Potatoes, the main fodder so far, were gradually substituted with concentrate feedstuffs. The change in animal feeding technologies, particularly swine, consisting of substitution of potatoes with grain feedstuffs caused in effect an increase in the land intensity of animal production. This resulted in a drop of the potential production capacity of the farm's own feedstuffs and required supplementation with purchased concentrated feedstuffs[1)]. Nationwide the growing grain of animal production meant a necessary of increasing the imports of grains and feedstuffs.

In the beginning of the 1970's the growth of concentrate feedstuffs use was caused by a significant increase of the breeding animals numbers and by the changes in the feeding technology, this especially in the second half of the period discussed. The traditional technology of feeding animals based mainly on potatoes is very labor consuming. Thus the farmers, valuing more their

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1) The feeding value of potatoes is approximately 3.5 times lover than that of grains. But when one takes into consideration the yields per unit of area - then from one hectare of potatoes one obtains twice as much feeding units compared to a hectare of grains.

labor / many have undertaken additional work outside the farm / have moved away from it. The demand for concentrate feedstuffs aggravated the deficit in the national grains balance.

In the 1960's in the group of farms below 3 hectares to produce 100 kilograms of slaughter pork approximately 180 kilograms of concentrate feedstuffs were required and about 800 kilograms of potatoes. In the 1970's respectively 220 kilograms of concentrate feedstuffs and about 680 kilograms of potatoes were needed.

Table 3. The feeding of concentrate feedstuffs in farms performing agricultural bookkeeping with and area of less than 3 hectares, in kilograms per hectare.

	1970/ 71	1973/ 74	1974/ 75	1975/ 76	1978/ 79	1979/ 80	1980
Feeding, total	1 995	2 739	2 693	2 690	2 715	2 414	2 373
Farm's own concentrate feedstuffs	1 020	1 481	1 395	1 404	1 709	1 550	1 524
Purchased concentrate feedstuffs	975	1 258	1 298	1 286	1 006	864	849
in this: grains	158	178	208	270	281	228	279
mixed concentrates	817	1 080	1 090	1 016	725	636	570
Share of purchased feedstuffs in total feeding	48.9	45.9	48.2	47.8	37.1	35.8	35.8
Share of mixed concentrates in total concentrate feedstuffs	41.0	39.4	41.6	37.8	26.7	26.4	24.0
Use of concentrate feedstuffs in kilograms per 100 kilograms of pork production	205	209	219	231	252	240	248

Note: The share of purchased feedstuffs in total feeding and the share of mixed concentrates in total concentrate feedstuffs are in per cent.

The feeding of concentrate feedstuffs in small farms in a large degree depends on feedstuffs purchased. In the first half of the 1970's the feedstuffs purchased constituted nearly 50 % of the concentrate feedstuffs fed to the stock. In 1976 a rationing system was introduced in Polish agriculture, in which only farmers selling hogs in the system of government procurement may buy specific quotas of concentrate feedstuffs, as well the deliveries of feedstuffs to the private sector of agriculture were limited. This situation forced the small area farms toward greater feedstuffs self-sufficiency. As the latter improved at the same time the farms in the below 3 hectares group eliminated part of the livestock. Many small farms got out of breeding completely.

The reaction of farms to decreasing supply of concentrated feedstuffs was limiting animal production. They maintained however the feeding technology based on considerable quantities of grains, despite the fact that they were capable for instance of increasing the feeding of their own production potatoes.

In the second half of the 1970's the effectiveness of feeding of concentrate feedstuffs dropped, which was caused by the decreasing supply of the industrial mixes.

As result of the problems with purchase of concentrate mixes the group of farms with an area below 3 hectares began to use more grains, without additions, principally ground, what most important without feed components including protein. In the 1980's the situation on the feedstuffs market deteriorated even further. The feeding of concentrate mixes did not reach even the 20 % level in the total use of concentrate feedstuffs. The effectiveness of grains feeding without the protein components, which are lacking, is low.

As effect of the employment of such a technology of animal feeding the small area farms have significantly decreased the production of slaughter pork, and to a lesser degree of slaughter beef[1]. This drop in animal production in the small farms aggravated the national meat balance in Poland.

Despite the growing grain intensity in animal production in small farms it is still less than that in the big farms. To produce 100 kilograms of slaughter pork they use about 60 kilograms of concentrate feedstuffs less than the big farms / 250 and 310 kilograms, respectively in the beginning of the 1970's / [2].

The small area farms group still conducts a more traditional way of breeding, where beside the concentrate feedstuffs and potatoes also fed are relatively large quantities of green fodder and household cooking wastes, which of course is not possible due to the scale of production and the limited resources of labor in the big farms.

The present crisis situation forces Poland to limit its imports of grains by about 3 million tons. This means that the domestic production of grains should increase. The small area farms indeed

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[1] In the beginning of the 1980's the small area farms produced per 1 hectare of agricultural land over 100 kilograms pork less and about 30 kilograms beef less than in 1973. In 1973/74 286 kilograms of pork and 122 kilograms of beef were produced. The relatively smallest drop was in milk production by about 150 liters per one hectare of agricultural land / compared to the 1973/74 production of 2 100 liters /. The milk production per cow decreased from 3 300 to 3 100 liters per year. The egg production remained unchanged at the 1 330 eggs per one hectare of agricultural land level.

[2] On the average in Polish agriculture peasant farms used 30 to 60 kilograms of concentrate feedstuffs more than the farms performing agricultural bookkeeping.

grow too little grains but they in fact have no possibilities of increasing this production through the expansion of the area planted. Thus the production growth will have to be achieved through a growth of the yields, due to better fertilizer application and improved agrotechnics. During the last few years the small farms have been feeding pure grains. This is a great waste since the effectiveness of such feeding is low. The improvement of this effectiveness is necessary and may bring considerable savings of grains. It is necessary thus to enrich the feed grains with the required high protein content components. It is also necessary to limit the losses of nutrition components during harvest, storage and feedstuffs conservation. Of great importance is maintaining the proper quality of the feedstuffs supplied to farmers, which frequently is substandard.

In the present crisis situation, with the dropping grains imports the concept of farm self-sufficiency in grains is promoted. For this reason it is necessary to achieve a drop in the grains requirement of animal production. For the small farms, if they are not to further decrease their animal production in this situation, this means that a part of the grains fed previously must be substituted by other feeds, such as dried potatoes, sugar beet pulp, as well as high protein content fodder crops. The feeding of potatoes should also be increased, enriched with high protein components in the feed to improve the effectiveness of feeding.

Warszawa, April 1983.

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THE PROFITABILITY OF CEREAL FARMING UNDER THE CONDITIONS PREVAILING SOUTHERN FINLAND, 1978 - 1981

1. General

A very considerable proportion of the arable area of Finland is under cereals. In recent years the combined area under bread cereals and feed cereals has amounted to about 1.17 million hectares. The figure accounts for almost half the total arable area. The most widespread cereal is barley, which was cultivated on some 540 000 hectares in 1982, for instance. The area under oats is likewise considerable, about 460 000 hectares. Oats are used almost wholly as feed, as is a substantial proportion of the barley grown. The area under wheat during the year in question was as follows: spring wheat 127 000 hectares and winter wheat 16 000 hectares. The area under rye is roughly equivalent to that under winter wheat.

The area under cereals was distributed by farms of various size in 1979 as follows:

- 10 ha farms	18.3 %
10 - 20 -"-	31.2 "
20 - 30 -"-	20.3 "
30 - 50 -"-	17.8 "
50 -	12.4 "
Total	100.0 %

A considerable proportion of all cereal farming is accounted for by small farms. For instance, farms of under 10 hectares account for one fifth and those of under 20 hectares for about one half. Farms of more than 30 hectares are left with only one third of the total area under cereals despite the fact that these farms put more than 60 per cent of their arable area into cereal farming. In fact, the larger farms normally do set a far higher

proportion of their arable area aside for cereals than do small farms, as indicated by the following figures.

Arable area of farm	Area under bread cereal[1] %	Area under feed cereal %	Area total %
10 ha	2.3	25.8	28.1
10 - 20 "	3.5	39.9	43.4
20 - 30 "	5.9	48.5	54.4
30 - 50 "	9.9	53.6	63.5
50 - "	14.6	51.0	65.6

On farms of under 10 hectares the proportion of the total arable area accounted for by cereals was just under one third in 1979. The proportion rises as farm size increases. On farms of more than 50 hectares about 65 per cent of the arable area was put under cereals, thereby leaving no more than about one third of the arable area for other crops.

In regional terms, cereal production is concentrated in the southern and western parts of the country. Oats and particularly barley are grown in more northerly areas. It is worth pointing out that in 1982 1 600 hectares were under barley in the Lapland agricultural centre area, while the corresponding figure for the Oulu agricultural centre area was some 51 300 hectares.

2. The profitability of cereal farming on cereal farms in southern Finland

1. Areas under cultivation and crop yields

In what follows we will seek to analyse the profitability of cereal farming between 1978 and 1981 in the southern Finland research area on bookkeeping farms engaged mainly in the production of cereals. The following table shows the number of farms and the proportions of the total arable area under cereals.

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[1] rye and wheat

Cereal farms in the southern Finland research area

Farm size category	Farms number	size ha	Crop area as a percentage of arable area on southern Finland cereal farms Rye %	Wheat %	Barley %	Oats %	Total %
1978							
10-20 ha	19	15.1	0.7	18.5	42.1	23.9	85.2
20-30 "	17	25.7	3.7	14.4	36.6	24.2	78.9
30- "	41	63.0	5.7	15.9	39.4	19.9	80.9
1979							
10-20 ha	15	15.1	4.8	6.2	48.5	24.1	83.6
20-30 "	18	25.6	5.3	11.9	37.5	25.4	80.1
30- "	45	65.7	4.7	11.6	40.9	21.9	79.1
1980							
10-20 ha	18	14.9	9.0	13.3	43.8	15.0	81.1
20-30 "	18	24.9	5.9	17.6	29.0	26.7	79.2
30- "	51	64.4	7.2	15.4	36.1	17.8	76.5
1981							
10-20 ha	19	15.0	3.1	18.1	42.5	15.8	79.5
20-30 "	24	25.2	4.8	17.7	31.9	24.1	78.5
30- "	60	62.6	6.3	15.5	36.7	16.8	75.3

The area under rye on these farms is fairly small, normally no more than 3-7 per cent of the arable area. The area under wheat, which includes both spring and winter varieties, varies between 15 and 18 per cent, with the exception of 1979, when it was lower. On these farms barley is far the most widely grown cereal, accounting for 35-40 per cent of the arable area. The corresponding proportion for oats is 20-25 per cent. Between 1978 and 1981 the total area under cereals on these farms has remained roughly unchanged, i.e. at about 80 per cent of the arable area.

The following figures indicate the size of the crop yields for these farm groups. The table also gives the average yield per hectare for the country as a whole.

Farm size category	Crop yields per hectare on cereal farms in southern Finland and for the whole country on average				
	Rye	Winter wheat	Spring wheat	Barley	Oats
1978					
10-20 ha	987	2 322	2 080	2 623	2 603
20-30 "	2 474	2 762	2 161	2 922	2 646
30- "	2 158	1 840	2 767	2 804	2 985
Whole country	1 940	1 880	2 120	2 570	2 420
1979					
10-20 ha	1 267	1 826	3 446	2 551	2 107
20-30 "	2 053	-	2 411	2 604	3 345
30- "	2 511	2 109	2 465	2 914	3 212
Whole country	2 090	2 240	2 090	2 610	2 840
1980					
10-20 ha	2 794	3 223	3 077	2 601	2 067
20-30 "	2 313	3 700	2 774	2 999	3 239
30- "	3 096	3 688	3 113	3 416	3 420
Whole country	2 320	3 250	2 760	2 880	2 810
1981					
10-20 ha	1 189	1 884	2 039	1 952	1 990
20-30 "	1 364	2 209	2 388	1 933	2 341
30- "	1 375	1 654	2 382	2 326	2 640
Whole country	1 570	1 830	2 250	1 900	2 320

Crop yields per hectare normally range between 2 000 and 2 500 kg. The crop yields vary sharply between one year and the next. The best crop yields were obtained in 1980, when, for instance, the yield of winter wheat came to about 3 600 kg per hectare. The other years reviewed are far poorer owing to the rather unfavourable weather conditions. 1981 was a particularly bad year, which is reflected in the crop yield figures. When a comparison is drawn between hectare yields on cereal farms in the southern Finland research area and those of the country as a whole on average, we see that the yields for the former are normally somewhat higher.

2. Gross return from agriculture

The gross return from agriculture on the cereal farms in southern Finland for the period under review in shown in the following table. By way of comparison it includes the gross return for bookkeeping farms engaged mainly in milk production in the same area in corresponding farm size categories.

Gross return from agriculture on cereal and dairy farms in southern Finland

	1978	1979	1980	1981
	marks/hectare			
10-20 ha farms				
A. Cereal farms	2 019	2 206	3 377	3 224
B. Dairy farms	6 410	7 263	8 219	9 763
A as a % of B	31.5	30.4	41.1	33.0
20-30 ha farms				
A. Cereal farms	2 534	2 952	3 958	3 648
B. Dairy farms	5 858	6 451	7 320	8 119
A as a % of B	43.3	45.8	54.1	44.9
Over 30 ha farms				
A. Cereal farms	2 504	2 964	4 342	3 877
B. Dairy farms	6 116	6 976	7 791	8 093
A as a % of B	40.9	42.5	55.7	47.9

The figures show that the gross return per arable hectare on cereal farms falls far short of that for dairy farms. In the 10-20 ha farm size category, for instance, it is only about a third of that for dairy farms, and even in the larger farm size categories just under half of the gross return for dairy farms.

1980 is quite distinct from the other years in that the return on cereal farms was then higher than in the other years, as were the crop yields. The fact that the gross return on dairy farms is higher than that on cereal farms is, of course, explained by the fact that on dairy farms the crop is processed into milk. The return is therefore higher than it would have been if the crop had been sold in unprocessed form.

3. Agricultural production costs

Agricultural production gives rise to a great number of costs. Modern agriculture requires many supplies that have to be purchased outside the farm. These include fertilizers, fuels and lubricants, pesticides and herbicides, electricity as well as building supplies. Today's agriculture incurs high expenditure on machinery and equipment. The following figures give the production costs of agriculture on cereal and dairy farms between 1978 and 1981.

	1978	1979	1980	1981
		marks/hectare		
10-20 ha farms				
A. Cereal farms	3 035	2 901	3 830	4 373
B. Dairy farms	7 510	8 406	9 538	11 202
A as a % of B	40.4	34.5	40.2	39.0
20-30 ha farms				
A. Cereal farms	3 080	3 119	3 567	3 986
B. Dairy farms	6 340	6 981	7 743	8 822
A as a % of B	48.6	44.7	46.1	45.2
Over 30 ha farms				
A. Cereal farms	2 476	2 811	3 101	3 538
B. Dairy farms	5 914	6 444	6 908	7 495
A as a % of B	41.7	43.6	44.9	47.2

The agricultural production costs per hectare on cereal farms in southern Finland vary between 2 500 and 4 000 marks. These include the costs incurred in agricultural production, including the estimated wages of the farmer and his family. The calculation is based on the average wage received by agricultural workers. Compared with dairy farms, production costs on cereal farms amount to only 40-45 %. The most important factor here lies in the fact that on dairy farms demand for labour and thereby also labour costs are manifold due largely to the work involved in livestock management,

which does not occur in cereal farms at all. The amount of human labour on dairy farms is raised in part by the fact that mechanizing production is more difficult than on cereal farms. Whereas demand for labour on cereal farms varies between about 40 and 70 hours per hectare, the figure for dairy farms is 140-290 hours. As shown by the following figures, demand for labour declines as farm size increases on both cereal and dairy farms. The proportions of the total working hours accounted for by the farmer's family are given in brackets next to the number of working hours.

Day-to-day agricultural work on various farm types, hours/hectare and % share accounted for by farmer's family

	1978		1979		1980		1981	
	h	%	h	%	h	%	h	%
10-20 ha farms								
Cereal farms	78	(94)	50	(100)	62	(100)	70	(100)
Dairy farms	292	(96)	276	(98)	285	(98)	287	(99)
20-30 ha farms								
Cereal farms	60	(88)	62	(98)	58	(93)	59	(97)
Dairy farms	211	(91)	208	(95)	201	(96)	194	(97)
Over 30 ha farms								
Cereal farms	39	(63)	42	(71)	41	(76)	40	(73)
Dairy farms	154	(78)	147	(80)	136	(78)	142	(82)

In addition to farm size, the line of production and degree of intensity pursued have a considerable effect on the level and structure of costs. The following sets out some data on the distribution of costs and on their relative contribution to the total.

Certain costs and their contributions to production costs on southern Finland cereal and dairy farms in 1981

	Labour costs		Cost of supplies[1]		Machinery and building costs	
	marks/ha	%	marks/ha	%	marks/ha	%
10-20 ha farms						
Cereal farms	1 410	32.2	1 423	32.5	1 030	23.6
Dairy farms	5 133	45.8	3 317	29.6	1 884	16.7
20-30 ha farms						
Cereal farms	1 155	29.0	1 270	31.9	989	24.8
Dairy farms	3 477	39.4	2 949	33.4	1 700	19.3
Over 30 ha farms						
Cereal farms	773	21.8	1 258	35.6	896	25.3
Dairy farms	2 467	32.9	2 856	38.1	1 540	20.5

Milk production on farms is widely known to involve a comparatively high degree of processing. The farm must first produce feed, which is ultimately sold by the farm in the form of milk. This calls for a great deal of human labour. The figures show that labour costs on dairy farms are about three times higher than those on cereal farms. The proportion of total production costs accounted for by labour is lower on cereal farms. Both the cost of supplies and that of machinery and buildings on the latter amounts to no more than about half the corresponding costs on dairy farms. The proportion of production costs accounted for by supplies is of roughly the same order, i.e. about 30-35 %, in both milk and cereal production. Machinery and building costs on cereal farms (about 25 %) are comparatively higher than those on dairy farms, on which they are no more than 17-20 %.

In addition to the line of production, the cost structure depends on a number of factors specific to individual farms. Costs are influenced in particular by the type and age of the farm buildings. The degree of mechanization is likewise subject to wide variation between one farm and the next.

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[1] Purchased fertilizers, feeds, fuels, lubricants and eletricity.

4. The financial result of agriculture

A. The result per unit of area

Expressing the financial result of agriculture always poses problems. The financial result can be examined from the point of view of the farm or the farmer's livelihood. The problems are multiplied when a comparison is made between farms producing different products and between farms of different sizes. In this context the problems involved in measuring the financial result will not be dealt with. Differences in profitability between farms have been analysed using only a few traditional parameters.

When all other costs except the estimated wages of the farmer and his family and the interest on the capital invested in agriculture are deducted from the gross return from agriculture, we arrive at the net return. Thus the net return represents that portion of the gross return that is left for the farmer's and his family's wages and for interest on invested capital. The following table gives net return figures on southern Finland cereal farms and, by way of comparison, also those on dairy farms.

	Net return marks/hectare			
	1978	1979	1980	1981
10-20 ha farms				
Cereal farms	17	128	667	260
Dairy farms	2 510	2 727	3 162	3 657
20-30 ha farms				
Cereal farms	194	778	1 335	781
Dairy farms	2 003	2 318	2 649	2 682
Over 30 ha farms				
Cereal farms	425	628	1 786	920
Dairy farms	1 770	2 264	2 605	2 732

When the net return figures for the farm groups under review are compared, those for cereal farms are found to be very much lower than those for dairy farms. Production on the latter is substantially more intensive than on the former. Indeed, this is also indicated by the gross return figures. Since milk production calls for far more human labour than does cereal production, most of which is done by the farmer's family, most of the net return amounts to wages for the labour contributed by the farmer's family. The capital invested in agriculture is also lower on cereal farms than on dairy farms, as is shown by the following figures:

Farm assets on southern Finland cereal and dairy farms in 1981

	10-20 ha farms	20-30 ha farms	Over 30 ha farms
		marks/hectare	
Cereal farms	15 100	15 800	15 000
Dairy farms	22 600	21 400	20 200

The differences in invested capital are due, among other things, to the fact that dairy farms have invested substantial amounts of capital in livestock. All in all, however, we can say that despite the far lower labour input by the farmer's family and the similarly lower capital investment on cereal farms the proportion of the gross return from agriculture on cereal farms retained by the farmer's family is extremely low during the years under review, with 1978, 1979 and 1981 being particularly poor, as indicated by the crop yields. Only 1980 can be considered normal. The net return figures also show the extent to which weather conditions affect the production results returned by cereal farms. The risk involved in cereal production is thus far greater than that in milk production. This is particularly true in Finnish weather conditions. The farther north you go, the greater the risks involved in cereal and special crop farming.

B. Relative profitability

The result obtained from agriculture can be measured in a number of ways. One measure used is the profitability coefficient, which is obtained as follows.

$$\text{Profitability coefficient} = \frac{\text{Net return}}{\text{Estim. wage of farmer's family} + \text{Interest claim on capital}}$$

The farmer's family's wage is estimated below on the basis of the average wage rates paid to agricultural workers, and a 5 % rate of interest has been calculated on capital. Thus the profitability coefficient is a ratio which indicates the relation of the result obtained (the net return) to the goal set: to obtain the same wage for the work done by the farmer's family as that paid on average to agricultural workers, and a 5 % rate of interest on invested capital. If the value of the coefficient is 1.00 the result obtained and the goal are equal, and the goal has thus been achieved.

	Profitability coefficient			
	1978	1979	1980	1981
10-20 ha farms				
Cereal farms	0.01	0.39	0.37	0.12
Dairy farms	0.56	0.57	0.57	0.59
20-30 ha farms				
Cereal farms	0.14	0.49	0.81	0.41
Dairy farms	0.62	0.63	0.66	0.60
Over 30 ha farms				
Cereal farms	0.42	0.56	1.45	0.69
Dairy farms	0.75	0.88	0.97	0.87

The figures given indicate that the goal set has not been achieved, for the value of the profitability coefficient falls short of 1.00, with a single exception. The differences in profitability between cereal farms and dairy farms are similar to the case where the net return is used as the measure of profitability. They are neverthe-

less relatively lower here because, in calculating the profitability coefficient, account was taken of the sacrifices made (the amount of labour contributes by the farmer's family and the capital invested), and these are smaller on cereal farms than on dairy farms.

The profitability coefficient is normally lower on cereal farms than on dairy farms. The only exceptions came in 1980 for 20-30 ha and over 30 ha farms, for which the dairy farm coefficient is lower. In comparing the various years we see that the cereal farm coefficient varies widely. In contrast, the coefficients for dairy farms were suprisingly even from year to year. The best results in both cereal and dairy farms were obtained in the over 30 ha farm category and the poorest in the 10-20 ha farm category.

C. The financial result per hour of work and farmer family

The best picture of the financial result is perhaps afforded by a comparison of earnings per working hour and per family. The following figures calculated per hour show that in cereal farming on small farms the hourly wage has also been low during exceptional years. We also see that earnings per hour in cereal farming on larger units were rather satisfactory during favourable years. The hourly wage in milk production is not high, but seems secure.

Earnings per hour and family per annum

	10-20 ha		20-30 ha		Over 30 ha	
	marks/ hour	marks/ family	marks/ hour	marks/ family	marks/ hour	marks/ family
Cereal farms						
1978	0.13	150	1.82	2 700	5.21	10 000
1979	1.30	1 100	7.12	11 800	8.06	17 200
1980	6.09	6 200	12.54	18 200	23.95	52 100
1981	2.20	2 500	7.40	11 400	12.53	25 000
Dairy farms						
1978	6.92	29 600	7.63	36 700	9.33	46 100
1979	7.93	33 300	8.75	43 500	12.39	62 300
1980	8.84	38 100	10.34	49 700	15.05	71 200
1981	10.16	44 600	10.42	49 100	15.34	78 100

The figures calculated per family or farm show that especially on small farms the family's total earnings are low owing to a low labour input. This applies equally to the more favourable years. Not until we get to the larger farms can cereal farming provide the family with a livelhood. Owing to the larger labour requirements involved, earnings per family in milk production on medium-sized farms are satisfactory. In Finland the susceptibility to risk is substantially lower in milk production than in cereal farming.

THEME III.

MARKETING PROBLEMS

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NEW INTERFIRM RELATIONS AND THEIR ROLE IN THE PROMOTION OF AGRICULTURAL FOREIGN TRADE

The vital role of foreign trade in the Hungarian national economy is a widely known fact and thus the importance of an efficient food and foreign trade intersectoral relationship for an export led growth strategy is easy to understand. In the past years however, because of the rigidities of the organizations and the conflicting interests of producer - and foreign trade firms - involved just the efficient interrelationship got into progressive difficulties. This situation became particularly onerous because of the bad shape of world economy and the sharply increasing market requirements in the 1970's. As a consequence there is a growth effort to ease tensions and resolve conflicting interests among producing and foreign trading firms since the second half of the 1970's.

This paper tries to give a description of those experiments which attempt - in the sphere of agricultural exports[1] - to modify interfirm relationships and the organizational system. The paramount aim of these changes was an improvement in responses to foreign market impulses and the stepping up of the risk taking capacity of the firms. Preconditions should be set to achieve higher interest of all participants in more efficient foreign trade. At the start mainly an improvement of interfirm relationships was envisaged, but later it became progressively clear that organizational changes have to be started, too.

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[1] "Agricultural exports" is used in the paper for food, beverage, oilseed etc. / SITC 0, 1, 22, 29, 4 / exports.

The preconditions

Foreign trade is in Hungary - like in all socialist countries - a state monopoly, exercised by the state foreign trade organization. The "foreign trade organization" is a term for all firms, organizations, authorities which are involved with strictly defined competences at different stages in the management of foreign trade; in this paper, however "foreign trade organization" is used in a narrow sense, referring to foreign trade firms only.

Producer firms are the following:

- agricultural firms / state farms , cooperative farms, household farms of co-operative members, simple types of co-operatives, private farms etc. /;
- food industrial firms / in addition to processing, some purchase and transport raw products for export also /;
- supplying and servicing firms of agriculture / e.g. commercial organizations of co-operatives / TSzKER / and of state farms / ÁGKER /;
- interfirm organizations / joint enterprises, production systems, combinates, agro-industrial associations /.

Foreign trade firms are in direct contractual relationship with state farms, co-operatives, food industry firms and commercial organizations of producer firms. In this paper the most important interrelationship, that between foreign trade and industrial firms, is used to present the problem.

Organization of foreign trade and food industry

The organizational system and the types of interrelationships of firms are an outcome of the economic policy and the control and management system of the state.

An exploration of new ways and means in economic management started in the years 1956-1957, with the aim of a partial and gradual transformation of the planning and management system. Apart from smaller modifications however, the directive planning and management system remained in force until 1968. With the introduction of the new economic management system however, at the 1st January 1968, a new chapter of the national economy was started, despite the fact, that in 1973-1978, efforts concentrated on the development of production somewhat pushed into background the progress of economic reform.

The new economic management system very strongly emphasized foreign trade but did not interfere with the state monopoly of foreign trade. The idea of a closer co-operation between production and foreign trade was raised in the course of the preparatory work already, but the institutional system remained despite this untouched, as there were no plans for a modification of this. Improvement of foreign trade efficiency was expected to result from the closer co-operation of production and foreign trade and of a transformation of the relationships.

The organizational system of foreign trade was shaped by the fact that foreign trade firms were created in the post 1945 years with state owned capital as distinctly separated organizations from the production. The assignment of the handling of products and product groups to the very few and very large foreign trade firms was fundamentally made accorting to product and not demand relations. Every firm was specialized for handling strictly defined products. This specialization was reflected in their internal organization, too.

This foreign trade organization was the necessary outcome of the strict separation of production from marketing, of the domestic from the foreign market, and the outstanding importance attached to a bureaucratic / easy / control system as all the economic control and management of the national economy was based on directive methods.

The organization of foreign trade was modified after 1968; in the course of this a producer firm / State Farm Bábolna / in the agriculture and food sector was entitled for self-managed export. Authorizations for self-managed export were given in this time in rising numbers in other sectors, and firms having already self managed export-import authorization got extensions of the handled products. /9 large firms in metallurgy and engineering got self-managed export authorization in 1957 already /. Commissionary firms were established in this period also, in the form of joint-stock and limited liability companies.

From 1978 onwards authorizations for self-managed export and permissions for individual foreign trade deals were again extended on a larger scale.

However really substantial changes, interfering with the organization started only in 1980 when authorization for "parallel export" i.e. export of products that were handled by some other foreign trade firm was given for strictly defined products, to the GENERALIMPEX foreign trade company, which was established without fixing the goods handled by the firm. Since this, producers firms in the agricultural sector may choose whether to export fresh, preserved, deep frozen fruits and vegetables through the specialized foreign trade firm HUNGAROFRUCT or through GENERALIMPEX.

The monopoly of foreign trade firms was again somewhat loosened in 1981-1982 with extension of parallel foreign trade to further products.

The organization of food industry was set up in view of the requirements of the directive management system similarly to the foreign trade organization. The present situation is the outcome of alternative centralizing and decentralizing periods. All the concepts declared that organizational changes were made with the aim of increasing the independence of the firms. The state-owned firm is the most important organizational form according the rulings of the establishing authority under the supervision of a ministry or council / municipal, district etc. / with complete management and accounting independence, or belonging to a "trust", or having the position of a monipolistic enterprise. Firms belonging to a trust have greater independence than those belonging to a monopolistic enterprise; the firm of a trust is an independent legal entity having own financial statement. Food processing exists outside the state food industry also, in plants of state farms, farmers' and consumers' co-operatives.

Monopolistic state enterprises were dominant before 1968 in food industry; after this trust firms became prevailing. There were 10 monopolistic enterprises in 1964 and 4 trusts with member firms while in 1971 3 monopolistic enterprises remained and the number of trusts augmented to 10. Substantial organizational changes started in 1980 when 3 trusts /wine, sugar, tobacco / and 1 monopolistic enterprise / confectionary industry / and in 1982 when 3 other trusts / poultry, canning and brewing industry / were dissolved. At present there exist 2 monopolistic enterprises / refrigerating and vegetable oil industry /, 4 trusts / meat, dairy, distilling and milling industry / and 64 independent firms.

Types of interrelationships

Interrelationships of producer and foreign trade firms also developed confirming the requirements of economic control and management.

Prior to 1968, the producer and foreign trade firms entered so called supply or "plan" contracts the later referring to the obligation to put down plan targets into interfirm contracts. The foreign trade firm purchased at a price fixed by the authorities from the producer firm and sold on own account; there was no close relationship between the purchased and the selling price. Both the producer and the foreign trade firm were interested in the volume. Foreign trade firms had no means for effective commercial activity since they did not dispose of financial assets necessary.

Contractual relationships between producer and foreign trade firms significantly changed after 1968. Commission became the predominant contractual relationship with pool, joint account etc. agreements, and export and import on own account of the foreign trade firm which was the dominant form previously, was allowed only on permission. At the request of the consigner it was obligatory for the foreign trade firm to enter a contract of commission i.e. a compulsory consignatary relationship was created. Because of the fixed commodity handling competence of the specialized foreign trade firms however, the producer firms could sell their goods to a single foreign trade firm only. Thus a monopolistic situation and a compulsory relationship existed for both partners.

For some commodities - e.g. grain - this was a working interrelationship while for others changes were necessary which started from 1978.

Grain trading is characterized by the following. The commodity flow and the prices of bread grains are fixed; only firms belonging to the Grains Trust / Gabona Tröszt / are entitled to purchase and trade bread grains at prices fixed in advance. Bread grain / wheat / produced by state farms and farmers' co-operatives is purchased by the local firm of the Gabona Tröszt. Wheat is

delivered to the store of the purchaser or remains at the producer on a storage contract. / There are jointly operated storehouses also /. Firms sell wheat destined for export on account of the volume of stocks and the consumption expected to the Gabonaforgalmi és Malomipari Szolgáltató Vállalat / Grain Trading and Milling Industry Servicing Enterprise /. This is a firm of the Grains Trust in direct interrelationship with AGRIMPEX foreign trade firm[1]. Interrelationship is based on commission contracts including profit interest i.e. the producer and the foreign trade firm share profits achieved, at a fixed ratio.

Sale outlets for feed grains are somewhat different. Gabona Trószt is not the sole purchasing and marketing agency; production systems also can participate. / Share of these however, is only about 5 percent of total feed grain turnover/. The same is true of the production and marketing of fixed feeds, with the difference that imported protein used for the production of fixed feed, imported by AGRIMPEX can be purchased only by the Grains Trust and the Feed Association Agárd - Bábolna - Környe; thus other mixed feed producers must buy imported protein from these organizations. The share of Grains Trust in imported protein is 70 percent, that of the Feed Association 30 percent. Protein import is made, on the basis of a simple commission contract, without profit sharing.

Both parties consider the interrelationship of Grains Trust and AGRIMPEX as good. AGRIMPEX transfered since 1968 some of its development fund to the Grains Trust for the promotion of exports but this is not enough for the construction of new silos, storehouses and is usually used for the purchase of grain loading machinery and other storage equipment. Commission contracts serving as a basis of the interrelationship comply with the characteristics of grain trading i.e.:

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[1] AGRIMPEX was established in 1952 and deals e.g. with export and import of grains, oilseeds, vegetable oil, sugar, starch, import of protein feed, export of dehydrated flour for feeding, etc.

- bread grain has central role in the supply of the population,
- grains are subject to central management,
- export transactions are generally centrally made involving great quantitites,
- produce is typically homogenous, etc.

There is no intention to modify the interrelationships of grain marketing in the future and there are no plans for the introduction of self-managed foreign trading either.

For several products however the commission contract which is almost universal since 1968, does not really work. New regulations were introduced in 1978 to ease existing tensions, urging a closer co-operation of the partners and establishing suitable preconditions. In compliance with the new regulations producer and foreign trade firms can establish foreign trade associations and agencies without legal entity. So far eight foreign trade associations and agencies were established for the export of agricultural and food products. All these have in common that business for the association is done by the foreign trade firms with the respective operational units performing necessary administration. It is envisaged for these associations and agencies in the future to be transformed into organizations with greater independence, having their own accounting etc. Members of these associations and bureaus, i.e. producer and foreign trade firms share profits and losses. Decisions are made collectively at the meetings of the Board of Managers made up from the representatives of the member firms.

Foreign trade associations and agencies were established to enhance co-operation of member firms and thereby to augment hard currency income from export and to increase efficiency of production for export. In addition both producers and foreign traders tacitly hoped to obtain profits supposed to accumulate at the partner.

Producer firms also thought it would be easier to get self-managed export authorization in this way.

But according to experience available, foreign trade associations and agencies have realized only to some extent these are somewhat exaggerated hopes.

Production and marketing undoubtedly moved nearer to each other; production managers get from direct information a better insight into problems of foreign trade and foreign trade managers get deeper knowledge of the difficulties of production; pricing improved also. A better coordination of production and the market opportunities, however, did not succeed. Two main conclusions arise:

a/ the new interrelationships are not much better than the earlier,

b/ this is quite obvious, as new interrelationships did not result in more capital available and the very restricted commercial capital did not start to function properly.

There are still very little freely disposable financial resources in the hand of foreign trade firms and this makes even reasonable risk taking hardly possible. / New income regulation introduced in 1980 reduced instead of increasing free financial means of foreign trade firms /.

Much more important in my opinion than the setting up of associations and agencies was the initiation in 1980 of organizational changes; loosening of the monopoly of specialized foreign trade firms by granting parallel export rights and easing of compulsory interrelationships.

For the sake of accuracy, it must be stressed however that parallel export rights exist for the time being only within a very narrow sphere. But the future lies undoubtedly in the liquidation of compusory interrelationships and the creation of the basis of free choices, i.e. the establishment of the preconditions - last but not least financial resources - for such decisions.

Budapest, May, 1983.

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RECENT DEVELOPMENTS ON THE INTERNATIONAL GRAIN MARKETS AND THEIR IMPLICATIONS FOR THE GRAIN BALANCE IN POLISH AGRICULTURE

I

The global volume of food production, including grains, has grown significantly since the world food crisis of the early 1970's. Despite this fact, some of the international grain market characteristics, which are very unfavourable for the importers persist, even though their origin was in the crisis years. What more, there are reasons to believe, that with the passing of time, these negative phenomena will rather undergo consolidation, while their listing will come to include further negative aspects.

1. First of all, many things point to the fact, that the arrangement where it is the exporter who dictates the terms of trade will continue. This situation originated in the 1972/73 to 1975/76 period. The potential conditions for such as a state of things were formed long before the 1970's decade as a result of interregional disproportions in the agricultural production potential growth rates. From a rather large group of countries shipping grains, there emerged a small group of the so called structural exporters. Having at their disposal great potential possibilities of production growth already in the 1950's this group of countries began to determine the world grain supply situation. The other exporters did not only stop exporting grain but together with the countries, previously self-sufficient in grain production joined the importers group.

The transformation of the world grain market into a producers' market, both in the 1950's and 1960's was counteracted mainly by stagnation trends in the import demand. These were in turn the effect of the progress of the so called "green revolution" in the agriculture of the developing countries, existing agricultural protectionism systems in the importer region of Western Europe and also the result of the autarchy model of agricultural development in the countries of Eastern Europe. These factors were instrumental in the cumulation of large grain surpluses on the markets of the exporting countries, since the effective demand for grain imports was increasing more slowly than the supply.

During the last dozen years the arrangement of the international grain markets has changed fundamentally. Without going into the reasons of these changes for the moment, one should state that first of all the scale of the world imports demand has increased greatly. It was found that the crisis of the yearly 1970's has uncovered only a part of these needs. It was in the following years that a great number of countries appeared, representing various levels of economic development, which began to increase markedly their imports of wheat and/or coarse grains. What more important, new customers appeared, buying both types of grain on a mass scale, which in the final effect resulted in a growing rate of concentration of the demand sources.

During the last several years, according to IWC and FAO estimates, the world trade includes, per annum, about 210 million tons of grains, in this 95 to 100 million tons of wheat, 102 to 103 million tons of coarse grains and 9 to 10 million tons of rice. The first figure should be related to 138 million tons registered during the crisis years. Quite apart from this, important changes have taken place on the side of supply. In fact, the group of exporters dwindled down, since the USSR became an importer, while the exporting position of the USA was considerably strengthtened. According to FAO statistics in the years 1976/77-

1980/81 it was in the USA where about 65 % of the exportable surpluses of the principal exporting countries was concentrated, in this about 50 % of wheat and 80 % of coarse grains surpluses. The respective shares for the period 1971/72-1975/76 were 59, 47 and 72 %. To present an idea of the potential of this and other major exporting countries to influence the world grain market situation, we will only say, that 6 countries / USA, Canada, Argentina, Australia, France and the Republic of South Agrica / control today over 90 % of world coarse grain trade and 92 % of the wheat trade.

2. Another phenomenon is beginning to take on a permanent character; the tendency to deteriorating commercial conditions for buying grains on the international markets, originating in the crisis years, while a new element are upward movements of prices also during periods of abundant supply. This trend is supported, first of all, by growing capacity of the world grain market. At the foundations of this lies the impossibility to cover with the domestic production in some regions of the world, the growing demand for cereal products. One should also enumerate here the acceleration of the rate of grain utilisation for feed in many parts of the world. It is true, that the progress in animal feeding and the weakening domestic demand for products of animal origin, due to recession, have decreased gradually the import demand of the until recently leading importer region - Western Europe, nevertheless when one considers the dynamics of the global demand for grains, the second half of the 1970's differs none from the period of the food crisis. Available statistics show, that in the years 1976/77-1980/81 the per annum rate of growth of the grain trade amounted to 5.9 %, the respective figure for wheat was 4.1 % and coarse grains 7.6 %, thus being only a little lower than the comparable rates for the 1971/72-1975/76 period / respectively 6.8; 4.4; 9.3 %.[1)].

[1)] While in the years 1971/72-1975/76 the world grain trade amounted on the average to 126 million tons of grains /excluding rice /, than in the years 1976/77-1980/81 this quantity increased to 167 million tons and in 1981/82 amounted to 203 million tons. When including rice into the global turnover in 1980/81 the figure was 214 million tons, constituting 15 % of the global production and representing approximately 49 billion US dollars.

The discussed changes in the capacity of the world grain market one should attribute, among other to the growing import needs of many countries in Africa, Latin America, the Near and Far East, described in general as developing countries. After a few years of limited expansion, these countries have marked again strongly their presence on the international grain markets in the beginning of the 1970's, when faced with a series of poor crops, a drop of per capita grain production and the threat of hunger as effect of this. In fact, in the period 1971/72-1975/76 they increased their imports by about 50 %. The development of the import demand in the later part of the 1970's remains in a close connection with transformations in the world energy and raw materials economy. The phenomena accompanying the deterioration of the global energy and raw materials balances / such as the growth of prices of basic inputs used in agricultural production - fertilizers, pesticides, as well as the basic machines and tools / have lead first of all to a slowing down of the food production growth rates and correspondingly increasing of the import needs of the low-income countries, which don't have at their disposal resources of raw materials worth mention. This particularly pertains to the countries of Africa, where for years now the per capita grain production has been dropping, as well as to substantial group of countries in Latin America and the Far East, which in order to maintain the nutrition of their population at least at the level of the physiological minimum, must expand their grain imports, quite regardless of the changing conditions of the international markets.

The changes in the grain economies of the producers and exporters of petroleum profiting by this product's growing prices, be it members of OPEC or countries outside that organization, and the changes in the grain demand by the rapidly developing countries of the so called Third World, e.g. The People's Republic of China and Brasil, exert however a much greater influence on the global demand for grains, than the previously discussed group of countries. Despite the significant progress in development of

domestic grain production the agriculture of these countries is not capable of facing the growing demand pressure, both for processed cereals as well as for the products of animal origin, which stemm from the growing population numbers and the improving income situation of the populations. Some of these countries have, during the recent years, commenced the realisation of programmes of animal production growth, in this also projects of feedlots type. Already today these producers constitute a factual threat to the bargaining positions of the coarse grains importers.

It was above group of countries, principally the PRC, Brasil, Egypt, Mexico and the OPEC countries which appeared on the international market with magnified demand for grains and as a result of this, the group of developing countries as a whole in the period 1976/77-1980/81 was responsible for 56 % of the global increment of the world gross grain imports[1)], while their share in the world grain trade increased from 38 % in the years 1971/72-1975/76 to 43 %.

A new, different element of the global market situation was the joining of the competition on the grain market, particularly the coarse grain market, by the European CMEA countries. During the previous periods these countries in a very limited extent depended on grain supplies from third countries. The realization of programs of accelerated animal production development aimed at improvement of the nutrition standards of the population, undertaken in early 1970's, resulted in a radical change of the situation. It was against this background that the deficits became aggravated in the importing countries / the GDR and Czechoslovakia /, the limiting of the grain surpluses in Romania and Bulgaria, while the Soviet Union, the only important exporter of grains in the CMEA faced a necessity of taking up mass scale imports. It is true, that in most countries during the last years, one observes a significant increase of the grain crops, nevertheless, to maintain the desired rate of animal production growth, since the labor-saving but grain intensive animal feeding

1) This share was 42 % in the case of coarse grains and 86 % in wheat, according to FAO statistics

technologies have become quite universal, it is necessary to expand the imports further. In the years 1976/77-1980/81 the gross grain imports increased, in comparison with the previous five year period by 50 % / the net growth was 87 % /, reaching the level of 36.4 million tons, of which two thirds were coarse grains. One should add that from this volume, averagely 22 m. tons per year / 62 % / were absorbed by the recognization as prospective USSR market. Of these 22 m. tons, 6 m. tons was wheat. In the period discussed the CMEA countries contributed to almost 30 % of the increment of the volume of the global trade in grains[1], while their share in the world grain trade amounted to 22 %, compared to the 19.4 % in the previous five year period.

The growing demand for grains of Japan, one of the traditional great importers, results in identical effects on the world grain market. Since there is no real potential for expanding domestic grain production, this country in order to develop its animal production must depend in an increasing degree on foreign supplies[2].

Secondly, the possibility of further deterioration of the trends as regards the economic conditions of grains purchasing on the international markets, is supported by the directions of change which the economies and national grain policies of the major grain exporting countries are undergoing.

Having released during the food crisis period the surpluses burdening the domestic markets, these countries have in the period 1976-1981 rapidly increased the volume of their grain production, taking the opportunity of the favorable market

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[1] In the case of wheat this share was 13 %, while in coarse grains it exceeded 34 %.

[2] Available statistics show, that every five years the Japanese imports of grains increased by about 4 m. tons, which means an annual rate of growth of the imports volume of approximately 5 %. In the years 1976/77-1980/81 the Japanese market absorbed on average 5.5 m. tons of wheat and 18 m. tons of coarse grains, while the share of this country in the global trade in grains oscillated around 14 %.

situation. To present the scale of changes taking place, we quote the fact that during the time discussed the total grain crops of the principal exporting countries / excluding the EEC / have risen at a rate of 3.1 % per annum / the respective rate for wheat was 4.3 % and that for coarse grains 2.8 % /, which compares to the 2.8 % annual rate in the years 1971-1975.

With the present level of society affluence and the standard of nutrition in major exporting countries, a growth of the population incomes and linked increments of demand for food of animal origin, don't cause so extensive, as in the other countries, effects in the area of grain utilisation. The total domestic use of grains[1] usually increases moderately, and presently in a situation of economic recession, this rate has dropped to almost zero dimensions[2]. With this state of things the rapid growth of grain production in a rather short period of time lead to a considerable growth of the surpluses and the renewal of the process of stock accumulation, which resulted among others in the lowering of export prices in the years 1975/76-1977/78. These phenomena appeared in intensive form in the countries distinquished by a high production growth rate, this particularly the USA and Canada.

The awareness of the extensive implications of the changes in the trade balances, in the farmers' incomes and the governments' budgets outlays for the agricultural prices supporting programs, which would have place if the grain prices on the international markets would drop, have resulted in the exporting countries in intensification of the efforts aimed at counteracting a possible repeating of such developments. Extra pressure in this direction is exerted by process taking place of growing prices of the inputs

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1) It is worth to mention here that in countries like Australia, Canada, USA the use of grains per capita annually is in the range of 800 to 1000 kilograms of which 80 % constitutes feed use.

2) According to FAO statistics in the years 1976/77-1980/81 the domestic use of wheat in the principal exporter countries / EEC including / increased in comparison with the years 1971/72-1975/76 by as little as 1.9 % and of coarse grain by 1.5 %.

and services used for production purposes, which leads to increasing per unit costs. The latter makes maintaining the income parity of the rural population difficult as well.

Due to their position on the international grain markets the USA for many years now lead in the efforts aimed at the protection of the interests of the exporting countries. In this country most sensitive to the influences of changes taking place on grain markets, the system of protecting agriculture from deteriorating market conditions has been perfected for dozens of years, and recently new elements to this system have been added. Without going into details we will limit ourselves to the statement that the recent changes in the price support programs assume far reaching government intervention in the sphere of production, domestic turnover and a narrowing down of the export subsidies only to cases justified by the interests of the US foreign policy. A totally new element is the exclusion from domestic turnover and from external trade specified quantities of grains from the current crop, the size of which is determined by the situation on the domestic and international markets. The removed grain is meant to be added to the so called farmer-owned reserve. When it may be necessary to cut down the area planted to grains this reserve may be used as compensation for the crop lost in effect by the farmers. One needs not to comment, that such a construction of the programs permits considerable maneuver when managing the export supplies flows, which in turn gives the possibility to counteract to some extent, the dropping prices in a situation of abundant supply (See table No 1).

Let us add to this, that the discussed activities aimed at counteracting the downward movements of grain prices on the world market, are not limited only to the domestic market. It is enough to mention the quite recent initiatives by the USA concerning the creation of a wheat exporters' cartel or the coordination efforts undertaken by this country to manage the trade policies of the principal exporters.

Thirdly, one observes when thinking about the future price developments on the world grain market, that so far relatively high rate of growth of the grain trade has been shaped in unusually unfavourable conditions, such as the continuing economic recession, growing unemployment, serious disruptions in functioning of the monetary systems etc. Due to the balance of payments difficulties numerous importing countries, both developing and the socialist countries, are forced to constrain the rate of growth of their grain imports. In the group of high developed countries, both those with a deficit and those with surpluses of grain production the recession affects strongly the market potential for produts of animal origin, and thus indirectly limits the requirements for grains used in livestock feeding. This concerns both domestic and foreign producers who are the traditional suppliers of animal products to the markets of this group of countries.

Table 1. The dynamics of grain stocks held by the principal exporters and export prices of wheat and maize

	Stocks in m. tons		Export prices in US dollars f.o.b. Gulf	
	Wheat[a]	coarse grains[b]	Wheat Hard Winter 2 ordinary	Maize Yellow Corn n. 2
1971/72	52.3	56.5	60	52
1976/77	55.6	37.7	112	108
1977/78	53.5	51.5	116	96
1978/79	55.8	57.7	141	103
1979/80	49.2	58.8	175	115
1980/81	47.1	41.9	183	142
1981/82	52.7	81.9	170	118

a/ USA, Canada, Australia, Argentina, EEC.

b/ USA, Canada, Australia, Argentina, Republic of South Africa

Source: FAO Statistics.

One should rather expect that as respective economies will come out of the recession, the demand for grains on the international market will keep growing which of course will not remain without influence on the demand and supply equilibrium and the price levels.

3. There are reasons to believe that the phenomenon of a structural absence of stability on the international grain markets is becoming a permanent feature. An intensive manifestation of this disstability was observed during the crisis years of 1972/73-1975/76 and since that the trade is taking place in a situation of high insecurity.

While it is true, that demand supply, as well as the prices on the international grain markets have always undergone certain fluctuations, nevertheless our recognition of this phenomenon today, permits to state, that the scale of these fluctuations, together with the dimensions of their effects is quite incomparable with the previous changes. In addition, in contrast to the previous periods when market fluctuations in the final effect came down to rather small price changes, in the 1970's we observed a new development - this being the insecurity caused by a lack of quarantee of the possibility to buy on the international market the required quantities of grains.

If one essays to find the reasons for this state of things, one observes that in the 1970's the influence of changes in the volume of the world grain crops in the situation on the international market has increased greatly. This occurence is linked with the expansion of the geographical area of the grain trade, to include countries with large market potentials, the agriculture of which at the same time is particularly susceptible to climatic variations of frequently subject to natural disasters, such as floods, droughts etc.

In this situation even small changes in the global volume of the grain crops, have serious repercussions. They result in fluctuations of the turnover volume, rapid changes in the demand-supply ratio and leaps of prices. The experiences of the years 1972/73-1975/76 have shown that the occurence of poor crops in the principal production regions may lead to a situation when it is impossible to cover the import demand for grains because of a lack of supply.

At the same time, recently, to natural factors which have always to some extent influenced the market situation, new elements have been added. The insecurity situations as to the possibilities and economic conditions of grain purchases, which add to the nervousness of the grain trade participants and the growing speculation are magnified namely by:

- firstly, the discussed previously, difficult to foresee, while recently more and more frequent changes in the national grain policies of the leading grain producers and exporters as well as other participants of the grain trade.

- secondly, we are faced with repeating and growing in importance practices by some of the exporting countries aimed at achieving specific political effects on the international scene. This concerns particularly the United States in which the consequent administrations have declared officially food trade and food aid as a political weapon. Food trade is used to excert pressures on the food importing countries, accompanied, when required by the whole system of legal and financial measures, including formal embargoes, which secure control over the volume and directions of the geography of the exports. These activities lead to a desintegration of the global market and exert a strongly destabilizing incluence. The experience of the 1980 and 1981 shows that particularly extensive are the effects in this respect of the recently frequently employed embargo and restrictions of other type.

II

4. The complex nature of the links of the grain-feed-livestock sector in Polish agriculture with the international grain markets, resulting from the core of the concept of solving the grain problem in Poland, presumed some years ago, mean in effect, that the shaping of the fundamental proportions of the national grain balance remains in close connection with the developments on the world market.

The conditions of the world grain market exert no influence on the dimensions of the direct grain consumption. The wheat and rye crops in Poland have always considerably exceeded their utilization in production of grain products, and with the passing of time this use represents a dropping share of the total grain utilization. While it is true that since a long time ago wheat is imported to Poland, but this is a characteristic substitution import, since the quantity of this grain necessary to improve the quality of the domestically produced flour varies between 1.0 to 1.5 million tons, of which 0.1 to 0.3 million tons is durum and other hard wheats.

The situation is quite different when it comes to the feed use of grains. The domestic production of grains and feedstuffs is insufficient to cover the growing feed requirements of the livestock sector, which in turn must produce enough to meet the domestic market needs and to secure at the same time the position of an exporter on the animal products' international markets. It is also too low in comparison with the processing capacities of Polish agriculture. These considerations generally were the reason why in fact it was in the second half of the 1950's the concept of self-sufficiency in grains was given up. The idea then was to increase grain imports, while developing exports of animal products. Since then, the dimensions of grain utilization for feed, and what follows the size of animal production, became dependent on the dynamics of exports profitability and the access to the

markets where animal products could be located and on the other hand by the possibilities of grain and feedstuffs import.

During the last 25 years, exept for the five year period 1966-1970, the scale of grain imports was increasing. In the years 1955-1965 with an increased flow of imported grains, from about 1.75 million tons per annum in the 1956-1960 period to about 2.7 million tons in the 1961-1965 period. Poland became an important exporter of meat, meat products, poultry, eggs and dairy products to international markets, particularly to the developed countries. The exports of animal origin products which has bound, according to estimates, about 50 % of the imported grains and feedstuffs, constituted over 60 % of the dimensions of Polish agricultural and food products exports. The surplus of convertible currencies thus obtained became one of the principal sources for the financing of imports of investment goods for the needs of the industrialization of the country.

The size of the grain imports reached its peak in the second half of the 1970's. Since the domestic production of grains in this period dropped, compared to the years 1971-1975 by about 7 %, reaching a low 19.5 million tons, then the imports reached the level of 6.8 million tons per annum / this including maize and sorghum /. This was twice the size of imports in the previous five year period and threefold more than in the second half of the 1960's. In these conditions the importance of imports in the use of grains in feeding increased considerably. It is estimated that in the beginning of the 1970's the imports covered up to 20 % of the total grain used for feed, then in 1975 this share increased to 30 % and in 1980 it already exceeded 40 %. This was accompanied by the dropping level of grain self-sufficiency. In the years 1976-1980 the index of domestic grain supply to the total reguirements was about 74 %, while in the 1971-1975 period this was 85 % and in the years 1966-1970 90 % respectively.

5. The experience of the 1970's shows that maintaining in a long run the size of grain imports at this high level results in a far reaching dependence of the livestock production on the supplies of grains and feedstuffs from abroad is neither possible nor desired.

This dependence is no longer possible especially in the light of the deteriorating economic conditions of purchasing grains on the international markets. The realization of such a great scale of grain imports results, first of all, in the problem of the growing costs of it, which must be covered by exports returns. Some idea of the effects of the growing import prices and their influence on the outlays connected with the grain imports is presented by the following figures. According to statistics provided by the Polish Central Statistical Office GUS to total outlays for the grain imports / excluding high protein feedstuffs / amounted to 17.8 billion exchange zloty, that is 5.78 billion US dollars. This sum was twofold higher than the value of the imported grains calculated in 1970 prices, which means in effect that one half of the outlays borne was the result of the growth of prices paid in imports. To complete the picture, let us add, that in 1981 grain imports valued 4.59 billion exchange zloty / equivalent of 1.38 billion US dollars / constituted about 47 % of the total value of the food and agricultural imports and almost 9 % of Poland's total imports. In 1971 the foreign currency outlays for grain imports amounted to 804 million zloty / 201 million US dollars / being the equivalent of 30 % of the total agricultural and food imports and 3.8 % of the total imports.

On the other hand the growing prices paid for the imported grains have magnified the effect observed in Polish agriculture, that the growing use of grains in animal production caused the growth of the foreign currency costs involved in it, which of course did not remain without effect on the profitability of the exports of the animal origin products. While it is true that the growing

prices of the imported grains were accompanied by growing prices obtained in the exports of the animal origin products, nevertheless it is estimated, that the prices of animal products are growing rather slowly, compared to the prices of grains. As effect, the Polish exports are loosing their purchasing power due to the deteriorating terms of trade.

Similar effects as those above also result from the today narrowing down possibilities of placing animal products on the international markets. It becomes more difficult to balance the costs of grain imports with these animal products exports, the market for which is constrained by the extended recession, protectionist policies in the developed countries etc. As effect of the above in the 1970's the import quotas alloted to Poland were decreased, concerning a number of important Polish export products, among these being bacon and young slaughter cattle. Nothing seems to indicate at present that the situation in this respect will undergo changes soon.

Together with the domestic considerations / such as a demand pressure on the domestic meat products market in Poland / which in important manner influenced the export supply potential, the previously discussed factors were determinant, that in contrast with the former periods, when the import-export transactions would bring a considerable hard currency surplus, in the 1970's the balancing of grain imports costs with revenues from meat product exports was no longer possible. Already in the final years of the period 1971-1975 a deficit was registered in the trade in grains and feedstuffs and livestock products, which in the consequent years became permanent. The ensuing deficit in the food and agricultural products trade was an important element shaping the general foreign trade deficit and debt situation in Poland.

The difficulties in this respect / i.e. the balancing of foreign currency outlays for grain imports / are additionally aggravated by the fact that the remaining CMEA countries also experience deficits in their national grain balances thus the potential supply from these markets is presently minimum. This is important since in respect to these markets Poland could balance its trade with exports of industrial goods. It was in the beginning of the 1970's decade that these countries were an important supplier of grains to Poland, particularly USSR, covering about 70 % of the Polish requirements for grain imports. By the end of the decade this share dropped to 5 %, while the principal supplier became the United States / 41 % of the total grain imports, in this 23 % of the wheat and 54 % of the coarse grains imports / as well as Canada and France.

The limiting of grain imports, and in a further perspective the achievement of self-sufficiency in grain production becames a necessity when faced with progressing political influences on the grain trade. The developments in recent years, casus of the USSR in 1980 and Poland 1981, have supplied more than required proof to confirm the thesis that self-sufficiency in grain production and more broadly in food production are the real foundation for economic and political sovereignity of a country.

May 1983, Warszawa.

Seppo Koivula
FINNISH STATE GRANARY

THE POSITION OF FINNISH STATE GRANARY IN THE GRAIN POLICY IN FINLAND

I The position and facilities of Finnish State Granary

Finnish State Granary (Valtion Viljavarasto) is an organisation acting under Ministry of Agriculture. The basic role and activities of the company are determined in a separate law on State Granary, which was renewed in 1980. The company, itself, had its 50-years celebration a few years ago.

In order to perform the functions put forward by the government, State Granary has a separate fund outside state budget. Because State Granary has the obligation to act on business principles, this fund can be accumulated mainly through the returns of the business activities, or if this is not sufficient by borrowing from the domestic capital market or hopefully, by receiving assets from the state budget. State Granary owns and operates the silo and reserve stock capacity. The total grain stocking capacity owned by State Granary was at the end of 1982 936 000 metric tons in 17 different locations throughout the country. There are three port silos: Naantali, Helsinki and Rauma, others are situated inland. Some have been built at the connection of flour mills. The main import and export silo is situated at Naantali with a storage capacity of 200 000 tons for bulk grain. Because of the limitation of the draft Naantali can receive vessels up to abt 30 000 metric tons. The amount of personnel of the whole company was at the same time 348.

State Granary operates under the supervision of Ministry of Agriculture and Forestry and has its own Board of Directors representing different interest groups: Ministry of Agriculture

and Forestry, Ministry of Finance, Board of Agriculture, producers, consumers, flour mills, army etc. The managing director of State Granary acts as a chairman of the Board. There are six different departments performing different functions in the company.

II The functions and activities of the State Granary

The national food security requires a reasonable rate of self-sufficiency in basic food commodities, which are produced in relatively unfavourable climatic and geographical conditions. Also the relatively big agricultural labour force and the very important aspects of regional and employment policies concerning northern and eastern Finland must be taken into account in the national agricultural policy. This reguires a certain degree of import protection. The main objective of the agricultural production policy, at present, is an attainment of a better balance between agricultural production and domestic consumption.

The general agricultural policy and conditions are, of course, the backround for the existence of the State Granary, its position and activities.

Most of the functions performed by the State Granary are included in a separately law on State Granary. In addition to, what is stated in this law, government may give additional tasks.

The different functions and obligations to be performed by the State Granary are as follows:

1. The important and central function is the obligation to hold reserve and stabilization stocks of grain and grain seeds and to make sure that there is always in all circumstances enough grain in the country to meet the consumption needs. Government confirms each year the minimum reserve stock level. For the

current crop year 1982/83 this minimum level is 233 000 tons of bread grain (wheat and rye). This reserve is planned to be increased by 1987 to 400 000 tons equalling to one year's commercial consumption of bread grains (100 000 tons of rye and 300 000 tons of wheat).

For the feed grain there is currently no fixed reserve stock level, but the target is to build up by 1987 another 400 000 metric tons reserve in feed grains (barley and oats), equalling to half a year's commercial consumption.

Because of the difficulties experienced in the seed grain production and due to the fact, that the imported seed varieties, have very often proved to be unsatisfactory in our conditions, the reserve stocks for seed grains are planned to be increased to 100 000 metric tons equalling to one year's commercial consumption. Current minimum level for seed grain stocks is 20 000 tons.

The basic principle is, that increase of stocks should originate from domestic production. In early eighties build-up of stocks has not been possible due to very bad harvest especially in crop year 1981/82.

The reserve and stabilization stocks can be considered to be necessary in a country, like Finland, who has had very big fluctuations in the production from year to year. There is also a confirmed reserve stock level for certain other agricultural commodities, f.i. grass seeds. Presently this reserve consists of 1 200 tons of timothy seed. In practice there is also a reserve stock for peas, although no exact minimum stock level has been confirmed.

The reserve stocks of grain and other products are owned by the State Granary. Most of them are stored in elevators owned by the State Granary. Out of grain reserves 23 000 tons can be stored on farms and the grass seed is stored by the private trade.

2. The second and as well a very important function of State Granary is stabilization of domestic grain prices through buying and selling in the domestic grain market or alternatively by exporting or importing grain.

2.1. Domestic grain trade. The State Granary has the oblication to buy all surplus grain offered by farmers by the end of each crop year at a price confirmed annually by the government.

Its market share differs of course, from year to year, but tends to be about 25-30 %. State Granary buys through the domestic co-operatives and independent whole-sale corporations and sells to the milling and compounding industry.

2.2. Foreign grain trade. In certain years foreign grain exchange - either imports or exports - has been a very important instrument in stabilizing the domestic grain market. Because of this and because of the fact, that domestic grain prices differ substantially from the international grain prices, the foreign trade of basic grains has been concentrated on the government agency, State Granary, which has necessary facilities to handle large amounts of grain and is able to make the necessary co-ordination of export and import measures. Import and export decisions are made by the government and the Board of Marketing.

Because of the great fluctuations in production and trade pattern part of the "unnecessary exchange" is planned to be compensated through reserve stocks, although the financial implications are still to be reviewed.

3. In addition to its commercial activity in the grain market State Granary has also been addressed the obligation to supervise and control the domestic grain trade. This function is mainly carried out through the silo personnel in different locations of the country.

4. State Granary should also look after, that the grain production has the right distribution in the country in regard to the climatic and soil conditions. The possibilities to affect this target are limited, because State Granary is not able to decide the most important tool in this respect: the price and price relations of different grain. However, certain preliminary and subsidiary measures are carried out by the State Granary. These include f.i. payment of acreage subsidies, after the government has decided the amount of payment.

5. The State Granary was originally established to supply grain and other food-stuff to state institutions and this function still exists, although it is no more the central role of the company.

6. State Granary is not directly involved in the processing of grain, although it has its own seed handling facilities, where seed grain is cleaned, certified and packed. The marketing to the farms is carried out through domestic grain trade. To some extent State Granary is also involved in the export and import of seed grains.

In addition to the functions described above State Granary performs grain research and testing through its research laboratories, represents the country in differents international occasions including FAO and International Wheat Council, co-operates with the Ministry of Foreign Affairs in food aid questions etc.

Altogether it can be stated, that Finnish State Granary does play an active role in the grain marketing structure in Finland and other matters related to grain.

Voitto Koskenmäki
RAISIO FACTORIES

GRAIN AND FEED TRADE IN FINLAND

1. Structure of grain consumption, changes and new areas

Background and structure of consumption. The national grain market in Finland has changed very much after the second world war. However, the development has been nearly the same in all European countries. In Finland, I suppose, the increasing of commercial grain has been one of the strongest developments, because the structure in the milling industry changed very much at the same time as farmers' own consumption decreased roughly. (Figures 1a-c). We can easily understand the rationalization and development in the milling industry, if we compare the number of mills in 1950, what was about one hundred, and today we have only seven enterprises working on milling industry, and only the biggest ones have several milling units. We have to say that it is the new technology, which has made it possible for this to happen, and it is no suprise to anybody, if I tell you that in Sweden they had made a survey, which came to the result, that only one milling unit would be enough for the whole Swedish market. Anyway, we haven't got that far in Finland, but our milling enterprises are pretty big ones, and we believe, they are big enough to develop new products of grain and to introduce them effectively to the consumers.

Changes of bread grain consumption. As we all know very well, the Finnish market is relatively well protected against the foreign competition on the grain branch, like most today, European countries today, including the Common Market. Although it is a fact, that it is not easy to import grain products or meal to Finland, we have to compete in the market all the time against other products and other services, which are continuously offered to the consumer. We can fully agree with

the philosophy that if we stop promoting grain products and bread, we will very soon lose the market to other foodstuffs, and the consumption level shall dive down. Maybe it is just strong promotion and advertising for grain products what has kept the consumption per capita on the fixed level during the last ten years. (Figure 2). If we compare the development in other countries in Europe during the same period, we can very easily find out that the consumption level has dropped in most of the countries and now averages 83 kg per capita. If we still compare Finland to the countries, which have similar standard of living, we can find out that for instance in Sweden they are now trying to stabilize the bread and grain consumption on a level, which is very much (abt. 10 kg/capita) lower than the Finnish level is.

I have talked that long about the consumption and it's development, because the consumption is the basis of the market for farming, for milling, and for marketing. I also want to underline that as difficult as it is to import the grain products to Finland, it is as difficult to export them. Milling and bakery industry is very clearly limited to the domestic circles in Finland.

The total milling quantity of rye is today abt. 100 000 tons a year, and quantity of wheat is abt. 290 000 tons a year. When we realize the consumption level per capita and the number of consumers, which doesn't change at all nowadays, we can understand that the grain market of wheat and rye is nearly the same from the year to year. Additionally I have to mention that so called "technical use" of wheat, for example starch, is increasing in Finland roughly. For these purposes we are using about 40-50 000 tons of wheat a year.

Feed grain. On the feed grain section the situation is completely different. The consumption of animal feed has increased roughly during the whole 1970's. (Figure 3). The feeding of animals itself has changed a lot. Especially in milk production we are

using more feed grain today than it used to be ten years ago. Also the quantity of animal production has increased especially in pork production. But if we think of the development during the next five years, we don't believe the increase of feed consumption shall continue the same. Instead of increasing we expect that the market to slightly decrease because of rough limitation of animal production through our agricultural policy. One reason for the structural development on feed branch has been specialization by farmers. Some of them have specialized to grow grain, and some of them to animal production, milk, pork, meat or eggs. That means that still smaller quantities of feed grain are consumed on the farms themselves, but the grain comes to the commercial market and goes to the consumption in the form of compound feed. If we look at statistics we will find that the quantity of commercial feed grain used for compound feed has increased suring the last ten years from 280 000 tons to 900 000 tons. Roughly we can say that the quantity has doubled.

On the feed branch there has been found also totally new uses for grain: considerable quantities of grain are nowadays used for compound feed for fur-bearing animals and fish. This utilization was not even considered thirty years ago.

The most remarkable new area in utilization of grain is the technical and chemical grain processing areas. The chemical fraction of grain ingredients and their utilization areas have been developed, and this development work has opened quite new areas for grain. This development work has at the same time opened the international view and market to the Finnish grain branch. In our country this new thinking is now leading to a remarkable production, that also compensates for import especially in our starch supply.

2. Structure of grain trade

We can most easily study the structure of the Finnish grain market through the attached picture. (Figure 4). There are about four hundred retail shops in the market, which are involved in the commercial grain business. Most of them are members in the bigger country-wide marketing chains, of which three are co-operative ones. The industrial processing (milling, compounding, packaging, marketing) is run through seven milling enterprises and six feed factories, of which some are working both the milling and on the compound feed sections. The grain itself is ofter delivered directly from the farm to the mill, but also stored by a retail shopkeeper in his small local granary. Mills and feed factories have the majority commercial grain stores in the country, about 600 000 tons. The retail shops and central firms themselves don't store the grain very much, but they have a remarkable storing capacity also, about 300 000 tons. The main responsibility for storing grain in the country is on the State Granary, which has the storing capacity nearly as big as the commercial capacity altogether. The State Granary also has an exclusive right to import or export grain as we already during the seminar have studied. So, if the mill or feed factory needs grain, it can buy it directly from the market through central firms and retailers or, in some cases, also directly from the farmers, or from the State Granary, which is responsible to import, if there is not enough grain in the country. When the mills and feed factories cannot buy all the grain what is offered in the market, the State Granary is obliged to buy it and to store it for the following years, or, in case the national storage level is high enough, to export the grain to the world market.

3. Legislation and regulation of grain trade

The acting of the State Granary is based on a special law given in the latest renewed form 31.12.1980, and this law is an important part of the regulating system of the grain market in Finland. (Figure 5). But the grain trade itself is still regulated by another law, "the law on grain trade", given in 1972 and renewed in 1978. This law guarantees to the farmer very good security and rights to make claims if he thinks the analysis of grain is not made by the official way etc. etc. For the farmer it is very important to get guarantee of analysis of his grain because the variation of the quality is very strong in the Finnish weather conditions. The basis price of the grain is given by the government, basing again on the negotiation results between government and farmers' union, and this basis price is so called target price. The variation around the target price level in Finland is rather little, most of variation comes from the quality pricing system.

The supervising of the law belongs to the ministry of agriculture, who has given practical control work to the State Granary. The personnel making the grain analysis, taking samples, and so on, must be qualified through a certain examination based on the law. The State Granary's central laboratory has a right to accept the equipment in the laboratories and time to time the State Granary controls the condition of equipment and the analysis methods as well as the punctuality of the analysis. Also based on the law, the ministry of agriculture has given out the orders how to declare the analysis results and price setting factors to the farmer in order to make it easier for farmer to understand pricing lists and compare them between each. After the orders, the buyer who has bought the grain and taken the sample and made an analysis of the grain, has to store the double sample for two weeks after the date when the analysis result has been given to the farmer. This is in order to give the farmer possibility to make his complaint, if he wants to.

4. Production and trade of special cereals

Malting barley. Finland can with a good reason be mentioned as a pioneer in the world as far as production of malting barley concerned. (Figure 6). We produce malting barley on the contract basis, which is less used in other remarkable producer countries. This means that the Finnish malt can always be made of pure varieties of barley. On the other hand, we have to admit that without specialized production it has not been possible for us to achieve barley to meet the high germination and other quality demands in our country for malting purposes.

The cultivation of malting barley is a special area of grain business in our country, and without purposeful work Finland would even now buy malting barley from Central Europe. Instead of it Finland is even capable to export malt to the world market, and Finnish malt is desired as well in the East as in the West, thanks to the high quality. However, Finland's selfsupport of malting barley needs continuous care and also security storing. Last autumn we had a very good crop of malting barley, and in this kind of situations export is very important to balance the production, otherwise the continuous and steady maintenance of this special area would not be possible.

Oilseeds. Cultivation of oilseeds is a production area, which doesn't belong to grain business in the narrowest sense of the word. Anyway, the cultivation of oilseeds uses the same production resources as grain, and because it's effect on our food chain is of great importance both in feed and food support, it is reasonable to examine oilseed production as a part of our grain business.

The oilseed production in Finland was started in 1950 by Oy Kasviöljy, which belongs to Raision Tehtaat. (Figure 7). Until the mid 1970's only winter turnip rape varieties were culti-

vated. After that cultivation concentrated on production of spring varieties, expecially spring rape and spring turnip rape. At the same time the production has strongly increased, our self-support being now of remarkable weight: in regard to vegetable oils Finland is fully self-supporting in net quantity, and in regard to oil cakes an meal abt. 40 % of the demand is covered from the domestic production. As far as vegetable oils is concerned the developing work of oil quality is not ready so far, and we must change part of rape oil into foreign oils, which better meet the demands of feed industry. Furthermore, according to the newest examinations, rape oil is suitable even as fuel for agricultural tractors, which is a thing worth mentioning, if we think, for example, of crisis conditions.

5. Enterprises in commercial grain business and grain processing industry

At last I would shortly present the enterprises and their market shares in the Finnish market. (Figures 8a-e).

The biggest grain purchasing enterprises and their market shares are:

SOK	34 %
Hankkija	27 %
Kesko	24 %
Tuko	10 %
OTK	5 %

The feed marketing enterprises and market shares are:

Hankkija	30 %
SOK	26 %
Kesko	20 %
Tuko	17 %
OTK	7 %

The enterprises and market shares in feed industry:

Suomen Sokeri/Vaasanmylly	27 %
" /Turun Muna	12 %
Hankkija	30 %
Raision Tehtaat	21 %
OTK	8 %
Farmos	2 %

The enterprises and market shares in milling industry are:

Wheat products:

Suomen Sokeri/Vaasanmylly	30 %
Raision Tehtaat	20 %
SOK	16 %
OTK	12 %
Fazer	10 %
Tuottajain Mylly	6 %
Helsingin Mylly	5 %
Others	1 %

Rye products

Suomen Sokeri/Vaasanmylly	35 %
Fazer	18 %
SOK	14 %
Raision Tehtaat	11 %
OTK	7 %
Tuottajain Mylly	5 %
Helsingin Mylly	5 %
Others	5 %

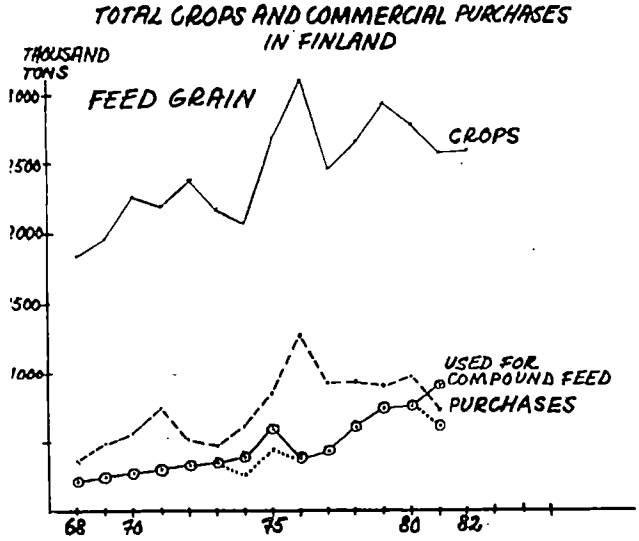


FIG. 1a

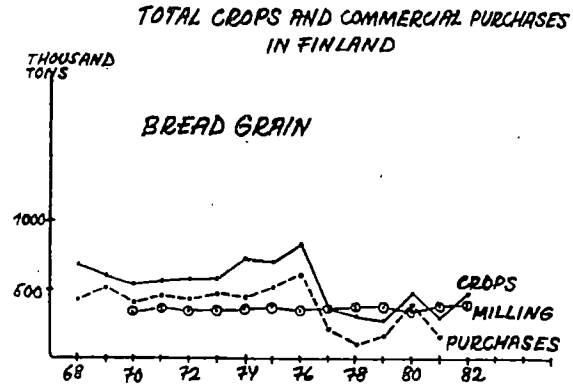


FIG. 1b

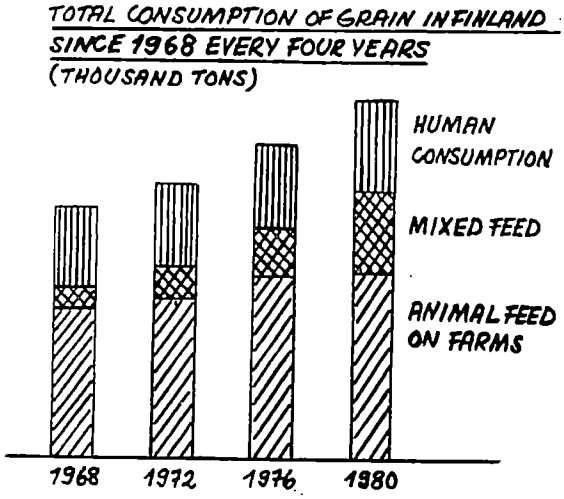
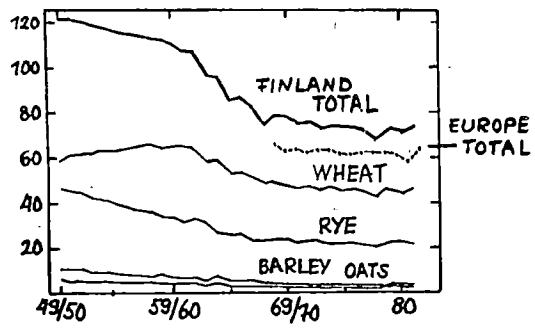


FIG. 1c

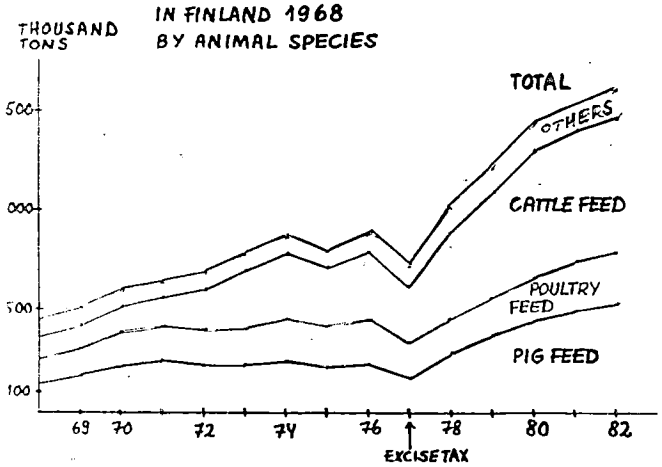
CONSUMPTION OF BREAD GRAIN
PER CAPITA IN FINLAND
IN 1950 – 81
(IN FORM OF MEAL)

FIG. 2



MANUFACTURED COMPOUND FEED
IN FINLAND 1968
BY ANIMAL SPECIES

FIG. 3



STRUCTURE OF GRAIN TRADE IN FINLAND

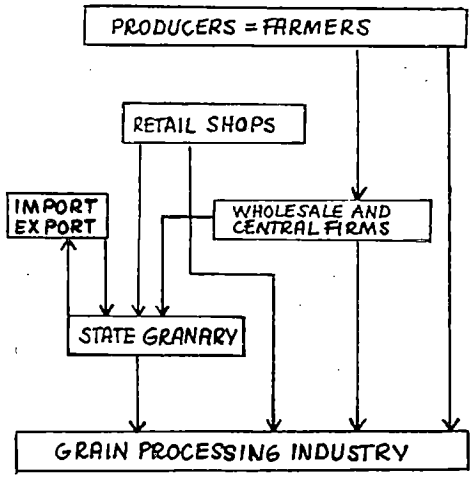


FIG. 4

REGULATION OF GRAIN TRADE IN FINLAND

THE LAW ON GRAIN TRADE
THE LAW ON STATE GRANARY

DETERMINATIONS OF MINISTRY OF AGRICULTURE
- QUALITY PRICING
- QUALITY ANALYSIS
- WAY OF ACCOUNTING

CONTROL OF GRAIN TRADE IS EFFECTED BY STATE GRANARY

PRICE AGREEMENT BETWEEN GOVERNMENT AND FARMERS' UNION

FIG. 5

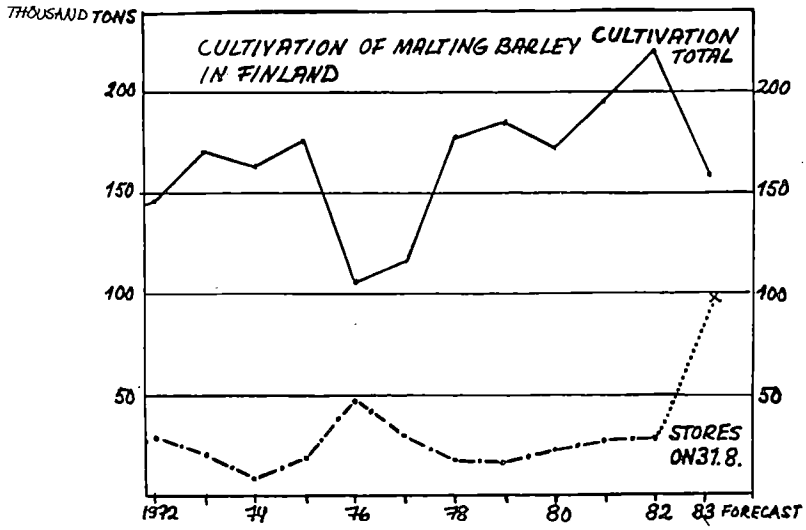

THOUSAND TONS
CULTIVATION OF MALTING BARLEY IN FINLAND
CULTIVATION TOTAL
200
150
100
50
STORES ON 31.8.
1972
74
76
78
80
82
83 FORECAST

FIG. 6

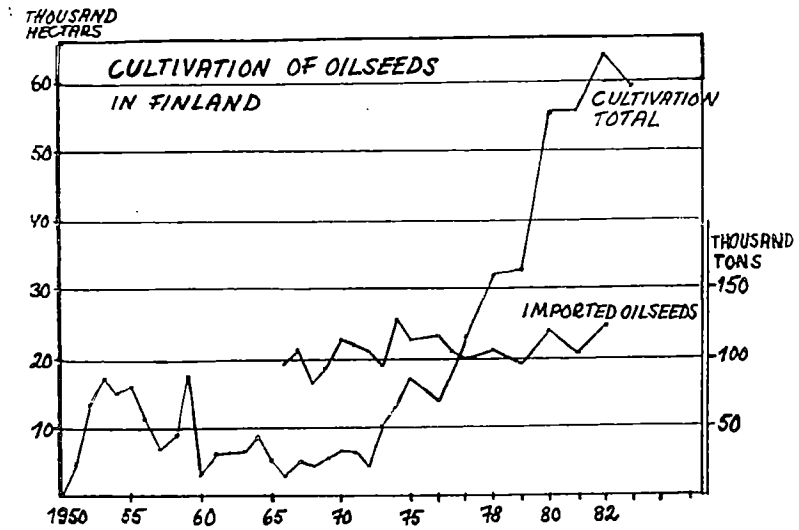
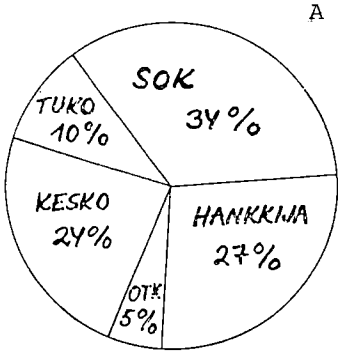

THOUSAND HECTARS
CULTIVATION OF OILSEEDS IN FINLAND
CULTIVATION TOTAL
IMPORTED OILSEEDS
THOUSAND TONS
60
50
40
30
20
10
150
100
50
1950
55
60
65
70
75
78
80
82

FIG. 7

FIG. 8

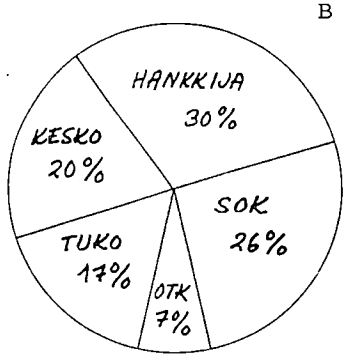
GRAIN PURCHASING ENTERPRISES AND MARKET SHARES

A



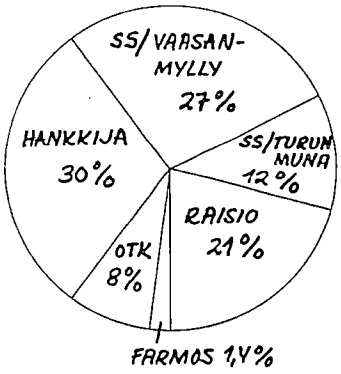
FEED MARKETING ENTERPRISES AND MARKET SHARES

B



ENTERPRISES AND MARKET SHARES IN FEED INDUSTRY

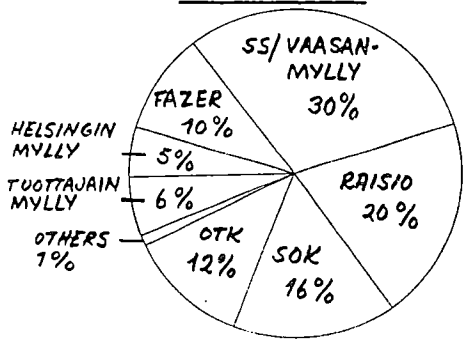
C



ENTERPRISES AND MARKET SHARES IN MILLING INDUSTRY

WHEAT PRODUCTS

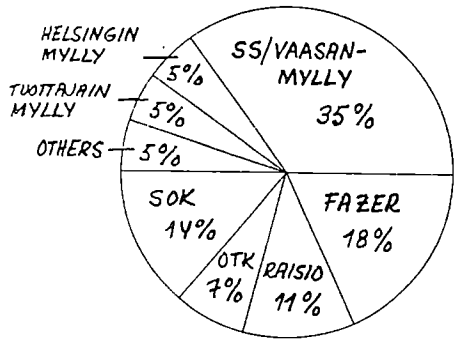
D



ENTERPRISES AND MARKET SHARES IN MILLING INDUSTRY

RYE PRODUCTS

E



THE FIFTH FINNISH-HUNGARIAN-POLISH SEMINAR ON AGRICULTURAL ECONOMICS IN RUISSALO, TURKU, FINLAND, JUNE 13.-17.1983

PROGRAM

Sunday, June 12		Arrival of Hungarian and Polish delegations, accomodation at Hotel Hospiz
Monday, June 13	9.00	Departure by bus to Turku, Hotel Ruissalo
	12.30	Lunch
		Chairman Matias Torvela
	14.30-14.45	Opening Address: Matias Torvela
	14.45-15.15	L. Kettunen: An overlook on plant production in Finland, Hungary and Poland
	15.15-16.00	A. Woś: The grains and feedstuffs problem in Poland: Principal questions and solutions proposed
	16.00-16.30	Pause
	16.30-17.15	J. Marton, T. Ujhelyi: Crop production in Hungary and world market price movements
	17.30-19.00	Sauna
	19.30	Dinner
Tuesday, June 14		Chairman Janos Marton
	9.00- 9.45	L. Csete: Economic factors and the regional structure of Hungarian crop production
	9.45-10.30	E. Haggrèn: The Finnish grain market and it's stabilization policies
	10.30-10.45	Pause
	10.45-11.15	J. St. Zegar: The economics of grain production in private farms
	11.15-11.45	L. Wiśniewski: The economics of grains production in big commercial farms
	11.45-	Lunch

		Chairman Augustyn Woś
	13.00-13.30	E. Szöllösi: Income situation of wheat and maize production
	13.30-14.00	B. Gulbicka: The grains and feedstuffs problem in small area peasant farms
	14.00-14.30	H. Järvelä: The economic results of grain production in South-Finland
	15.00-	Sightseeing in Turku
	18.30	Dinner
Wednesday, June 15		Chairman Tamas Ujhelyi
	9.00- 9.30	Zs. Fülöp: Role of new producer/foreign trade relations in the expansion of foreign trade
	9.30-10.00	M. Kisiel: Recent developments on the international grains markets and their implications for the grains balance in Polish agriculture
	10.00-10.15	Pause
	10.15-11.00	S. Koivula: The position of Finnish state granary in the grain policy in Finland
	11.00-11.45	V. Koskenmäki: Grain and feed trade in Finland
	11.45	Lunch
	13.15	Departure by bus to Raisio, visit at Raisio Factories Sauna, dinner
	c.a. 22.00	Arrival to Hotel
Thursday, June 16	9.00-10.00	Directors' meeting
		Chairman Lauri Kettunen
	10.00-11.00	Closing session; general discussion
	11.30-	Lunch
	14.00	Departure to Helsinki
	c.a. 17.00	Arrival at Helsinki
Friday, June 17	11.15-	Departure to Valtion Viljavarasto (Finnish state granary) Lunch

Participants of the seminar:

Hungary

Professor János Marton	Research Institute for Agricultural Economics
Vice director Lazlo Csete	- " -
Mrs. Zsuzsanna Fülöp	- " -
Dr. Tamas Ujhelyi	- " -
Mr. Endre Szöllösi	Ministry of Agriculture and Food

Poland

Professor Augustyn Woś	Institute of Agricultural and Food Economics
Professor Josef St. Zegar	- " -
Dr. Leszek Wiśniewski	- " -
Dr. Bożena Gulbicka	- " -
Dr. Michał Kisiel	- " -

Finland

Prof. Matias Torvela	Agricultural Economics Research Institute
Prof. Lauri Kettunen	- " -
Agr. Heikki Järvelä	- " -
Agr. Anna-Maija Heikkilä	- " -
Agr. Seppo Hassinen	- " -
Agr. Paavo Mäkinen	- " -
Agr. Heimo Hanhilahti	Ministry of Agriculture and Forestry
Dir. Voitto Koskenmäki	Raisio Factories
Dir. Seppo Koivula	The Finnish State Granary
Agr. Erik Haggrèn	Economic Research Institute of Pellervo Society

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