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AGRÁRGAZDASÁGI KUTATÓ INTÉZET
RESEARCH INSTITUTE FOR
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BULLETIN No 37

ECONOMIC QUESTIONS OF MAIN
AGRICULTURAL BRANCHES
(STUDIES)

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(Studies)

Budapest
1975

INTRODUCTION

The PRESENT NUMBER OF THE BULLETIN—SERIES of our Institute deals with state and economic analysis of main branches of agriculture. Of course, publications selected from the collection of two years may not offer a perfect illustration of the research work done by the Institute within this area. However, they can demonstrate trends and main results of research activity.

It is to be mentioned that abridged studies presented here generally have the character of a fact-finding study and undertake an economic evaluation and a summing-up of experience. In the livestock sector economic aspects at farm level are dominating allowing a double approach to the issue. Publications referring to economic aspects at both branch and farm level are connected with the research program of the institute for the plan period of 1971—1975.

Budapest, March, 1975.

The Editors

STATE OF HUNGARIAN POTATO GROWING AND ISSUES OF LARGE-SCALE POTATO PRODUCTION

by
ERVIN SZEDERKÉNYI

During the period following the Liberation and especially during the decade following the socialist reorganization of agriculture, cropping went through a rapid development. As a result of the widespread use of intensive varieties and high fertilizer doses as well as of mechanization, average yields of bread-grains and corn have doubled. Production level has also increased with labour intensive crops and, in fact, a complex mechanization of sugar-beet and tobacco production is under way.

However, the potato enterprise has been lagging up till recently in this development. There have been minimum increases in average yields and potato area decreased rapidly. Appropriate supplying of the population with potatoes presented difficulties in 1973. Food trading organizations had great difficulties in finding import sources of potatoes in a quantity assuring a full supply of the population.

In order to assure domestic potato supply, a development and modernizing of large-scale production has been started. A favourable development is constituted by the fact that as a result of various economic measures, potato area already showed an increase in 1974 after having decreased in large-scale farms for years. Economic and production results of farms having an intensive potato production for 2 to 3 years are encouraging. They show that by a modernization and overall technical development of the branch, domestic demand of potatoes can for human consumption be met.

In our survey in addition to a general analysis of the enterprise we undertake an examination of the mechanized large-scale production on the basis of farm data. We deal with a few questions of the latest solutions, only, applied in intensive large-scale production started in 1972-1973. A detailed analysis and evaluation of production experience will be offered after processing the production data for 1974.

I. GENERAL CHARACTERISTICS OF THE ENTERPRISE

Importance of potato production

With respect to its area, potato ranks 8th place under the crops grown throughout the world. It is grown on an area of 22 million hectares, 1,6 % of estimated arable land of the world. Its importance is enhanced by the fact that it is rich in vitamins B₁, B₂ and C and possesses good dietary qualities. Although its protein content is low (about 2 %)

human organism makes use of 90 % of it in an efficient way. In countries of cold climatic conditions its usage for feeding and industrial purposes is also significant.

In Hungary, potato is grown on 2,2 % of the arable land and ranks sixth under field crops. However, its significance for the national economy is even greater, because its share in the gross output of cropping amounts to about 7 %. In addition, it constitutes a basic food article and an important component of everyday consumption.

Development of production and its distribution by sectors

In recent years, with the exception of the developing countries, potato area has decreased throughout the world. However as a result of the improvements in production techniques average yields have shown an increase and thus despite decreasing area total potato production has increased by 17 %.

In Hungary characteristics of potato production have shown deviations from those of the rest of the world in many respects. Potato area have decreased rapidly, average yields showed a slow increase and there were considerable fluctuations (up to 45 %) in total production. National potato area and yields showed a development as presented in Table 1.

Table 1.

Total area and yields in potato production

Year	Area ha	Average q/ha	Total production 10 t
1951-1960	227 640	96,4	219 541
1961-1965	219 262	79,2	173 454
1966-1970	158 790	104,5	166 310
1971	128 564	115,7	148 759
1972	118 194	110,9	131 052
1973	106 159	109,4	116 310
1974	108 290

With the rapid decrease of the total area, yields increased slowly. In fact, in the period between 1960 and 1965 there was a setback since the average yield of 79,2 q/ha did not even reach that of 96,4 q/ha recorded during the fifties.

A sectoral examination of the production offers the possibility of a more elaborate analysis than the aggregate national data. With the socialist transformation of Hungarian agriculture, a considerable and for commodity production decisive part of the potato area had been transferred to large farms. Cooperative farms and state farms had in 1955 only 10 %, in 1960 already 37 % and in 1963 51 % of potato area.

Beginning with 1964 total potato area showed a steady decrease. Rate of decrease in large farms exceeded that in household and auxiliary plots. In the years of 1961-1965 total area of collective and state farms amounted to 105 245 ha (48 %) while that of household and auxiliary plots to 114 017 ha (52 %). In 1973 the ratios were 25 % (26 917 ha) and 75 % (79 242 ha), respectively.

The area of large-scale growing increased to 29 852 ha or 28 % in 1974.

Average yields in large farms exceeded the national average by 15 to 20 %, however, yields about 130 q/ha do not assure a competitive position for the labour intensive potato branch and do not entail incomes stimulating technical development. Consequently, the position of this enterprise has become unfavourable in large farms.

Utilization

In Hungary, production of potato for human consumption has priority. This is reflected by the structure of potato utilization presented in Table 2.

Table 2.

Structure of potato utilization in Hungary during the years 1968 - 1972 (%)

Way of utilization	1968	1969	1970	1971	1972
Seeding	22,3	22,8	21,6	20,3	22,8
Human consumption	43,6	42,7	39,9	47,3	37,6
Export	1,2	1,0	3,9	0,8	2,1
Feeding	23,8	24,9	25,9	23,2	26,6
Industry	1,4	0,9	1,3	1,4	2,6
Losses	7,7	7,7	7,4	7,0	8,3

Every year, an overwhelming part of the total production is utilized for human consumption. Apart from minor sectoral deviations the quantities used for feeding correspond to the ratio of lots unsuitable for consumption on grounds of small size, damaged condition etc. It deserves attention that the ratio of seed potatoes exceeded 20 % throughout the whole period under examination. The reason for this seems to be found in low yields, in countries having a well developed potato production, the quantity of seed potatoes used for reproduction amounts only to 15 % of the total production. The ratio of industrial utilization including processing for food is still very low. Distilling and starch industries are utilizing waste potato, only, and they do not want to work on potato basis in the future either. Storage losses amount to 7 to 8 %. With regard this ratio is undoubtedly higher for volumes actually stored because a considerable part of grown potato is directly transferred for consumption without any longer storage.

Ratios of the utilization structure affirm the fact that total demand of potato is basically determined by demand for human consumption. Selling and utilizing production ratios of 20 to 30 % not meeting standard quality constitutes an increasing problem especially for large farms dealing with intensive growing of potato. Similarly to developments abroad there is an urgent need for a multi-purpose utilization of total production in the most efficient possible way.

Consumption

Experience of many countries shows that per capita potato consumption has undergone a slightly decreasing trend in comparison to consumption levels of 10 to 15 years ago. This is also characteristic for domestic consumption and rate of decrease has been considerably rapid in recent years. Data for per capita potato consumption in recent years are summed up in Table 3.

Per capita potato consumption has decreased by 38 % since the early fifties up to these days. The present consumption level of 67 kg per capita is lower than the European average and the rate of decrease is quite rapid. Hungarian consumption is considerably exceeded by consumption levels in Poland (189 kg), GDR (150 kg), FRG (102 kg), Czecho-Slovakia (110 kg), France (96 kg) and Netherlands (85 kg). Consumption in neighbouring Austria and Yugoslavia is similar to that of our country but these countries have not experienced a rapid decline in consumption. In Bulgaria and Italy average consumption is about 30 to 40 kg per capita.

Table 3.

Average per capita potato consumption in Hungary

Year	kg
1934 - 1938	130,0
1950 - 1954	108,1
1958 - 1960	98,9
1961 - 1965	90,6
1966	85,2
1967	84,6
1968	80,0
1969	75,4
1970	75,1
1971	72,1
1972	69,1
1973	67,0

Potato consumption is influenced by many factors and their aggregate effect shapes present and future consumption levels. Development of living standards, urbanization, change of consumption patterns, retail price of potatoes and last but not least quality and distribution factors have played a role in shaping consumption.

It is characteristic of domestic potato consumption that apart from grading, filling in nets and some peeling, the produce arrives at the consumer mostly consumer without processing. Processing for catering is labour intensive and time consuming. These factors contribute to a decline of its consumption.

Another kind of consumption is that in the form of potato-based foods. Processing of potatoes by the food industry and trade in such products is being developed in these days in Hungary.

Variety plays a major role in consumer judgment of unprocessed potatoes constituting the bulk of domestic consumption. The internal properties of a variety determine cooking quality as well as taste and flavour of potatoes. The consumer

demands the variety with the familiar properties. In recent years these have been the varieties „Gülbaba” and „Kisvárdai Rózsa”. Undoubtedly, however, consumption was rapidly declining even in years when these varieties were grown over the most part of the potato area.

Just like in other enterprise a change of varieties is unavoidable in potato growing in these days. New high-yielding varieties including the improved Dutch ones like Desiree, Jaerla, Ostara as well as the Hungarian „Somogy Gyöngye” offer excellent consumption qualities. Thus a change in varieties does not upset the demands set by the consumer.

Foreign trade in potatoes

Foreign trade in potatoes is generally insignificant. Packaging and transport cost is high and may amount even to 30 to 40 % of the producer price. World trade in potatoes is restricted by its properties being perishable and needing tempered transport conditions of short duration. As a result of these factors potatoes are not steadily present on the world market.

Quantities of potatoes in world trade range between 1,8 and 2,8 million metric tons not reaching 1 % of the total production.

When examining world trade it is also to be found that with importing countries imported quantities amount to 5 to 10 % of domestic production at the most. Special importance is to be attached to this because there were such opinions in Hungary that shortages in potato prevailing for years may be solved by basing potato supply mainly of imports from socialist countries. Even if this corresponded to the integrational effort it could hardly be realized as it is obvious from the international trade in potatoes.

Despite general trends toward international integration the experience throughout the world shows that in the production of basic food articles and thus of potatoes every country is striving for the greatest possible extent of self-sufficiency.

In 1973 Hungarian imports of potatoes exceeded 100 000 metric tons several times more than in earlier years. The considerable decrease in potato area of large farms entailed poor domestic production. Such import quantities may not be counted on and a firm supply can only be based on intensive domestic production.

II. CHARACTERISTICS OF LARGE-SCALE POTATO GROWING

Large-scale potato growing plays a decisive role in supply because nearly all government stocks (except import quantities) and 80 % of commercialized potatoes are delivered by large farms.

In 1973 the area of large-scale production declined to such an extent that on the present yield levels central stocks can no longer be assured. In order to establish a steady supply with potatoes, suitable production conditions and economic interest have to be created for the large farms. These are inevitable for assuring that potato quantities meet the demand at all times.

Interest relations of potato growing on the farm may be simplest determined by comparing main characteristics of the branch to those of other competing enterprises. According to our experience the economic position of the branch on the farm is basically determined by capital intensity of production, development of costs and incomes and production risks.

Labour inputs, mechanization and machine investments

On the general level of Hungarian potato production, labour intensity is very high, amounting to about 70 work-days per hectare. Labour intensity of other field crops grown on great areas comes only to a portion of this. With potato growing, 75 % of labour inputs is manual work. The situation of the enterprise is aggravated by the seasonal character of labour requirements. Late August and early September, 65 % of total work-days are needed, and large farms are less and less able to assure these inputs.

With farms under examination having fully-mechanized potato growing, work-days used for 1 hectare have been reduced to 13,5 days. This also indicates that an extremely high labour intensity of potato growing is mostly a consequence of technical backwardness. While in the branches of bread-grain, corn, sunflower and in many others mechanization levels have been increasing from year to year and more and more machines have been employed this cannot be reported with respect to potato growing.

Mechanization level is lowest in the harvesting phase.

One of the preconditions for development of this enterprise is the complex mechanization of production and a reduction of labour inputs. However, development and mechanization may be economically realized only by concentration of production. For the optimal utilization of the presently most common machine systems an area of 140 ha is needed exceeding more than twice the average potato area in large farms.

Productive investment needs of mechanized potato growing amount to 8 000–10 000 Forints per hectare surpassing more than twice the requirements of winter wheat or maize production. Many special, expensive machines (planter, picking-loading machine, combine harvester, soring machine etc.) are needed which cannot be employed by other branches but by the potato branch, only. It is indispensable that they be utilized to the full.

Production costs and incomes

Potato is one of the field crops grown at highest costs per area unit. Production costs and incomes developed in the cooperative farms are presented in Table 4.:

Table 4

Costs and incomes of potato growing in cooperative farms
(data supplied by the Central Bureau of Seadistics)

Year	Average yield	Production costs	Specific costs	Net income
	q/ha	Ft/ha	Ft/q	Ft/ha
1968	110,3	19 674	178,37	- 1 401
1969	114,6	22 201	153,53	3 585
1970	132,4	22 961	173,42	- 1 230
1971	129,6	23 327	179,99	3 703
1972	133,1	25 952	199,98	1 974

The costs of potato growing per hectare surpass several times those of winter wheat (4332 to 5392 Ft/ha), maize (6871 to 7375 Ft/ha) and sunflower (3670 to 4582 Ft/ha). The increase of production costs represented a general trend during the period 1968-1972 and amounted during these five years to about 31 %.

Incomes from potato growing did not exceed that of competing enterprises (winter wheat, maize, sunflower) even in favourable years. Incomes are effected by many factors. Most important of them is average yield. Supposing a good market, with yields of 160 to 170 q/ha an income of 5000 to 6000 Ft/ha may be achieved. This income level may encourage large farms to maintain and develop potato production.

With intensive production systems representing a higher technological level, production may turn out to be economic only with yields considerably surpassing 170 q/ha. The technological approach of mechanical systems requires higher investments and the utilization of import varieties and irrigation boosts production costs.

Role of variety

Like in every branch of cropping in potato production good results can be achieved by a harmonic development of all production factors. Development and modernization of only one factor or component may not result in a breakthrough for the whole enterprise. On the other hand, the absoleteness of a factor may jeopardize the success of overall efforts.

The variety question has been a recurring problem in Hungarian potato production for years. The varieties grown over two thirds of the production area, „Gülbaba” and „Kisvárdai Rózsa” are 30 to 40 years old and aged. They are very susceptible to diseases and their yielding abilities do not correspond to intensive production methods.

For a mechanized intensive production high-yielding varieties are indispensable either suitable Hungarian cultures or if there are not any in adequate number foreign ones. Differences in yielding abilities have a decisive influence on profitability.

The recently improved Dutch cultures (Desiree, Radosa, Marijke, Jaerla) demonstrate excellent yielding abilities under practical conditions, too. In state farms in 1972 Dutch cultures achieved a yield of 287 q/ha even in dry farming, while traditional

varieties yielded 126 q/ha, only. With Dutch varieties taking into account the increase of fertilizer needs by 20 %, the choice of possibly better sites and other subjective factors, their yielding ability may be judged favourable. Their use presents a precondition for a more profitable production.

Storage

Most farms have not solved the problem of up-to-date storage of potatoes. One of the contradictions in the development of the enterprise is that storage is carried out in the traditional way resulting in high decaying losses and high labour inputs. The out dated way of storage in the traditional way entail in many cases a reduced biologic value and yielding ability. These factors call for an urgent solution of potato storage. About 55 % of the national potato production is stored for longer than 3 months. About two thirds of this quantity are potatoes for human consumption while the remaining one third is used for sowing in the next year.

The traditional way of storage is clamping in the field. With this method storage losses are high (15 to 20 %) and so are the risks.

The use of another storage method is increasing. This is high piling combined with ventilation. For this purpose board structures or buildings not in use may be applied. An advantage of high piling is that handling can be mechanized and material and labour requirements are by 60 % less than with the traditional storage.

The most up-to-date method of storage consists of the use of store-houses. Optimal temperature at about 4 °C is maintained by an air-conditioner and a channel system produces artificial ventilation. Their establishment is rather costly. Capital requirements of various storage solutions are presented in Table 5.

Table 5

Capital requirements of potato storage
(For capacities of 10 metric tons in Forints)

Storage method	Building	Equipment	Total
Clamping	—	80	80
High piling with ventilation	4 500	500	5 000
Store-houses:			
Store-house AGRO-KONZUM, Kazincbarcika (1 600 tons)	10 100	1 880	11 980
High piling storehouse, Kisláng (5 000 tons)	24 800	8 520	33 320
High piling store-house, Balkány (1 000 tons)	35 070	7 800	42 870

When comparing the data of various storage methods and facilities, it becomes obvious that high piling combined with ventilation presents an investment burden still tolerable for the farms. More up-to-date solutions, however, require much higher investments. In view of such investment costs farms are able to undertake the establishment of store-houses only if special advantages are granted to them. On the other hand, by the reduction of losses due to perishment investment cost of some store-house types may be recovered within 8 to 10 years. Cooperations established recently are mostly concerned with the solution of storage and marketing problems.

III. TASKS FOR DEVELOPING THE ENTERPRISE

The Ministry of Agriculture and Food has taken several measures to assure steady supply of potatoes for the population. These were aimed at solving tensions at the critical points of the potato system.

In the framework of a general development of the branch including household plots and private farms the measures aimed at assuring high-quality seed potatoes, fertilizers, pesticides as well as basic and special machinery.

The intensive potato production program is promoting the quick realization of a modern technological path ranging from the variety up to the final product. In the program, large farms growing potatoes over extensive territories on a profitable production level may take part which are willing to assume the investment costs of machineries and buildings and meet other stipulations of the program, too. As in the case of other intensive programs in crop production, the Ministry is granting subsidies of 70 % for investments and comprehensive mechanization and of 50 % for investments serving storage and preparation excluding ready-to-serve processing. These subsidies are granted to farms participating in the program and to joint investment projects realized by the latter and trading cooperatives.

Conditions of granting special subsidies the joint ventures of large farms and procurement agencies are as follows:

- the minimum area is 500 ha and the minimum volume of production is 8000 metric tons, for human consumption;
- environmental and economic conditions on the farm have to be favourable for intensive potato growing;
- during the development period the objective of establishing an up-to-date, closed production system has to be set;
- one of the modern ways of potato storage has to be introduced;
- producers and purchasers must have a contract of sale for five years.

Large farms and procurement organs began their activity in 1974 over an area of 14 000 ha assuring step by step the conditions of high technological level in potato growing. In the future, production cooperations will extend over 70 % of the large-scale farming area by enlarging the potato area of the participating farms to a certain extent. This program is a basic contribution to the potato supply of the population, safeguarding government stocks relying on domestic production.

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