



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

CHALLENGES AND OPPORTUNITIES FOR AGRICULTURE OF CENTRAL EUROPE ACCORDING TO FARM STRUCTURE AND ABOUNDING WITH CAPITAL

István TAKÁCS - Waldemar BOJAR

Szent István University, Gödöll, Hungary – University of Technology & Agriculture, Bydgoszcz, Poland

Abstract

Hungary and Poland are two applicant countries, which know the date of the admission into European Union, but the problems of the agriculture are great in both of them. The ways to the recent conditions were different, but the economic situation is similar. In Poland, mainly on the Eastern part of the country, there is a huge number of traditionally small farms operating under the economic size limit, and which are usually have not got adequate farming implements to up-to-date technologies, and their effectiveness is low. At the same time on the Western part of Poland there are Prussian type, better-mechanized, more effective large scale farms. In Hungary as a result of the economic transition the earlier large scale farms were privatised and great number of small farms came into being, which had not got any technical assets to the competitive agricultural production, and there are considerable number of private large farms mainly with “inherited” technical equipment from the earlier large scale farms.

Based on these conditions the questions are: how many farms could be competitive with Western ones and how many farms have to be operated because of employment of rural people; how the efficiency of farm assets could be increased and how many investments are necessary to develop the farms to a competitive level.

(The research was partially supported by an OTKA theme No. T037519)

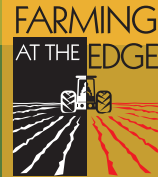
Introduction

In April, 2003 Prime Minister of Hungary and President of Poland signed the joining agreement to European Union in Athens. This act was a result of a long process in which the agriculture was one of the most critical themes along the negotiation at both countries. The recent conditions of the agriculture in both counties have several tension points. Lots of problem of farmers arise from the farm structure which is inherited from the earlier era (Poland) or it is a result of the politic and economic transition in 1990s (Hungary).

At the same time existing in the European Union is challenge for agricultural entrepreneurs and several opportunities are opened for them as well.

Under the last 150 years the Hungarian farm structure has changed in a great extent. In the 19th and the beginning of the 20th century the developing of agriculture was Prussian type. The farm structure, according to ownership and farm sizes, was determined by large scale farms. In 1930s 48% of arable lands belonged to the medium and large scale farms, but these were only 1% of all of them. [Gunst, Lokös 1982] The average farm size was 5.7 ha, but the medium size farms had average 153 ha and the large farms 2480 ha.

INTERNATIONAL FARM MANAGEMENT CONGRESS 2003



After the 2nd World War there was a general agrarian reform, when the large and the great part of the medium size properties were parcelled. The average farm size decreased up to 5.1 ha, but at the same time the rate of 3-6 ha size farm increased a great extent (94%) and the rate of farms under 0.5 ha decreased (67%). These conditions were not long period. At the beginning of the 1950s started a forced kolkhoz type coop organisation and the most of the property owners had to join to

one. Only an insignificant part of them were able avoid the joining.

In 1989 there were only 136 farms in state property, 1246 agricultural coops and ca. 150 enterprises in other state property as well as the collective farm property embodied the enterprise circle of agriculture. These farmed on 89% of the agricultural area. Some 60 thousand farmers, who were more or less independent from the economic organizations made activity as well.

The state farms were transformed to stock companies, or to limited-liability companies, and three quarter of them wholly, and one quarter of them was partially privatised. Some 970 thousand farms in a statistical sense were formed, 0.9% of which are economic organizations (joint company), and more than 99% of them are individual farms. At the same time, the economic organizations use 59.5% of agricultural area and keep 53.3% of livestock

The capital supply of the high numbered small farm is low. The impact of this to the cash flow of the farms is unfavourable. Their operation typically has a deficit. The investment and financial cash flow shows a similar balance.

After the system change, the new organizations could build to this basis, which caused several problems:

- a lot of small farms came into being, the size of which does not reach the economic size limit;
- one part of the owners do not attend to make agricultural production on their own;
- the technical condition system of production did not come into being, because the number of machines belonging formerly to the factory farms was not enough, that each owner could get thereof; need a great amount of money with the aim of investment;
- the vertical integration was reduced even on the larger farms, or it might as well cease at many places;
- when these farms starting their being the inflation ran up, which made the external resources more expensive;
- the credit standing of small enterprises is low.

A process of political destroying of Polish state was started in 1772 and finished in 1795 when three conquerors: Austria, Russia and Prussia divided territory of Poland for three parts and the Polish State existence was not longer legally valid. From the beginning of the 18th century three parts of dependant country started to develop in different ways related to different legal, political and economical systems of the conquerors. Among three provinces (Prussia dominion - Wielkopolska, Russia area- Królestwo Kongresowe and Austrian and Hungarian Empire dominion -Galicja) the fastest tempo of economical and agricultural development has reached Prussia dominion.

After regaining of independency an important reason of economical backwardness of Poland was giving up the radical agrarian reform. This deepened getting poor peasants and shrank essentially markets for industrial goods in the country. So,

this forced industry to limit production. Social structure of Polish society was characteristic for countries being delayed in their economical and social development. In 1931 60 percent of total population was employed in agriculture and the only 27 percent lived in urban areas. In 1935 agrarian overpopulation was estimated for 2.5 million persons and number of seasonal workers for 2 million. Landowner class saving feudal social relations was estimated for 1.80.000 persons, who owned 10.5 million hectares. A half of land owner farms were the owners of farms exceeding 1 thousand ha.

After the 2nd World War 814 thousand new farms were created of average area of 5.4 ha on initial land and 7.9 ha on regained land. 12 % of farmland was taken over by big state farms but 3.5 Million hectares of forestry areas and 1050 objects of agricultural industry were nationalized. It should be emphasised that co-operatives were in minority, compared with public sector (in 1990 public sector share in land property and use was roughly 20% and co-ops 4%). Monopolization of supplying and servicing agricultural machinery and other means of production were not forced farmers to compete. The competition was also very limited because of a lack foreign competition.

After market economy introduction in 1989 and admission of POLAND to countries applied for the EU accession, on the base of Europe Agreement signed on 16-th December 1991, were started to be used in practice many changes in the field of agricultural and rural policy including legal, institutional and financial instruments similar to those used in EU. The adjustment processes were started with very important contribution of agriculture to total GDP which was in 1989 12.9%. GDP was fallen down essentially to 5.1% in 1997¹⁵, what is still relatively high compared with other EU countries. The agrarian structure did not change radically. Family farms are still in majority very small, what is not advantageous for domestic farms. Farms exceeding 20 hectares use the only roughly 25 per cent of total farmland area, while the EU farms exceeding 20 hectares, use roughly 78 per cent of total farm land area.

Based on the factors mentioned above, the aim of this paper is to analyse

- how many farms could be competitive with Western ones and
- how many farms have to be operated because of employment of rural people;
- how the efficiency of farm assets could be increased and
- how much investments are necessary to develop the farms to a competitive level.

Material and methods

The examination of the Hungarian agriculture's technical level was done on the basis of the figures of the General Agricultural Census (GAC) carried out in 2000 by the Central Statistical Office (CSO). The CSO collected data about the tractors, combine-harvesters, tillers and trucks under 20 kW, between 21-60 kW and over 60 kW. In this study tractors are only presented in details. Because of the low supply with assets of the small farms, the supply with tractors on the farms over 10 and 50 hectares was also examined.

The regional inequalities between the statistical regions (NUTS II) can be examined with the help of the dual-index.

¹⁵ Integration Problems No.3, FAPA, 1998

The Polish investigations are based the data of Institute for Building Engineering, Mechanization and Electrification of Agriculture, Warsaw, (IBMER by Karwowski and Wójcicki) (using the data based on Agricultural Census 1996), Institute of Agricultural Economics and Food Economy, Warsaw (IER i G_o – by Wo_o), Agricultural Statistical Report, Warsaw and the object and questionnaire survey based on family and big restructured farms from Kujawy and Pomorze region, Poland.

Results

The traditions of machine usage have changed in the small and medium size farms. The assets are often kept in use after the economic optimum, which makes the costs of instalments and repairs rise, resulting in that the per-unit operation costs exceed the operation costs of the new machine. One explanation for this is based on the farms' machine-supply also. (Table 1) The „inherited” stocks of assets were not able to serve the new farm structure formed after the change of regime. On one hand, there are not enough machines; on the other hand the large-scale plots often cannot meet properly the technological requirements of the small plots. A capacity surplus and a shortage of capacity occurred at the same time.

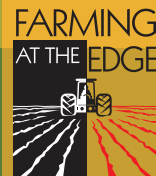
In this article the supply with tractors, which primarily determine the farms' technical potential is emphasized. The density of tractors (Table 2) shows a various picture because of the different economic structure of the regions. The capacity supply reflects also the economic polarization of the country. Western-, Central-, and Southern-Transdanubia have the most favourable position. Northern-Hungary is lagging behind, but concerning certain indices Northern-Great Plain also shows an unfavourable picture. On the basis of the average performance index of the tractors we can draw consequences on the machine-investments of the last decade. Southern-Great Plain was very active in the machine-investments supported by the state. The share of agriculture in this region exceeds the national average. In Northern-Hungary the inherited large-scale pool of machines dominates, indicating that in this region the volume of agricultural investment was low.

It is interest to examine what the supply was look like if only the farms with 10 or 50 hectares had tractors. (One tractor of 50-60 kW can serve 100-250 hectares depending on the production structure. [Takácsné György K. 1994]) Because of the low number of the farms of this category the supply with tractors is provided. Examining the differences it can be seen that there are big differences among farms over 50 hectares in Central-Hungary and Western-Transdanubia. The differences within the regions show a relative homogeneity compared to the national average, since the difference between the extreme values of the latter is mostly much higher than the dual-value of any regions.

The relative position between the statistical small regions within the bigger regions (the difference between the indices of the most favourable and the least favourable areas) shows difference in the counties. While some small regions show 1.8-3.6 times higher figures concerning the number of farms for one tractor than the others, the number of farms over 50 hectares shows 1.4-4.1 times higher differences concerning farm-sizes. These data refer to the difference in exploitation of the existing capacity in the counties.

The low capacity exploitation of small farms causes significant problems in capital-effectiveness. It can be observed that capital-effectiveness is rising with the increase in farm-sizes, which results in the favourable change of the cost structure of the farm. (Table 2)

INTERNATIONAL FARM MANAGEMENT CONGRESS 2003



Asset-effectiveness can be defined the engine-output per land-unit, which is the most favourable on farms over 200 hectares (0,5-1 kW/hectares in the examines counties).

In Poland majority of small farms use a very old and not up-to date equipment, because they are not able to find financial sources for machinery renewing. In according to Wos (2002) a percentage of tractors 11-year old and older increased from 50% in 1992-1996 to 70% in 1996-2000. Findings from own survey based on 76 farms in Kujawy & Pomorze region show that average age of tractors is 24 years. In according to Wos (2002) a share of second-hand machinery increased from 45% in 1996 to 63% in 2000. Hence, depreciation is deepening. In according to results obtained from the object survey (17 farms) an average level of usage of tractors is below 400 hours, while recommended by Karwowski (1998) minimum level is 600-1000 hours a year. Purchases made last years by asked farmers show that 77% all purchased machinery includes cheap equipment of low capacity and quality, what sustains neglected and not competitive production technologies. In opinion of some domestic and foreign authors (Schön, 1991, Karwowski 1998) high mechanization costs are caused not by expensive machinery of high capacity well used but by cheap machinery of low capacity used extensively. Such neglected farm equipment does also not give possibilities to use save material and save energy technology, what stops a tempo of modernization of farming in Poland. Dending on estimated level of minimal number of hours of use of tractors a level of estimated exploitation of capacity is between 11,00% and 68,25% and (according to Bojar's investigations based on a survey 1995-2003) in average 35,74%, what is relatively very low comparing to findings from Takács's investigations, where in Hungary the same indexes are between 32 and 68. Worse usage of machinery in Poland can be explained but much more small family farms not used their mechanization means intensively because of too small areas of plots and too low level of yearly use, what is key factor decided about rational mechanization of farming (Hunt, 1995).

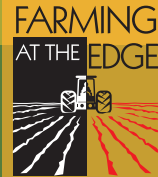
A comparison of the supply with machines and assets per one farm in Poland and in Hungary shows, that both a number of tractors and combines is much higher in Poland (0.51 and 0.16 tractors and 0.05 and 0.02 combines respectively) (see Table 1) than in Hungary, what can be explained by different agrarian structure both countries during communism. Small family farms in Poland against to Hungary were dominant and buy relatively too much tractors and combines relating to their small farmland areas. Opposite situation occurred in relation to tillers and trucks (0.04 and 0.09 tillers and 0.03 and 0.14 trucks respectively). More trucks in Hungarian farms than in Poland can be explained by more intensive usage of tractors and trailers for transportation in Poland while more intensive truck transportation in Hungary. It also can be explained also by better local road infrastructure in rural areas in Hungary than in Poland. More tillers in Hungary than in Poland can be probably explained also by higher level of agro technology in Hungary in general and more closed liaisons Hungarian farms with markets due to historical implications.

Regional characteristics show that regional differentiation is also much more bigger in Poland than in Hungary especially taking attention Southern regions and the remaining ones. Standard deviation expressing difference between regions about specific number of tractors per one farm is for Hungary 0,027 while for Poland 0.150. It is due to historical division of Poland between three conquerors and delaying of development Galicja and Królestwo Kongresowe (nowadays southern and eastern-southern parts) compared to Wielkopolska (Western part).

Conclusion

Presented above figures for description of state of assets deciding about production technology in Poland and in Hungary show essential differences in farm equipment and different activities necessary to solve problems of technical backwardness. It seems

INTERNATIONAL FARM MANAGEMENT CONGRESS 2003



that Polish strategy should base on common usage of machinery in family farms and industrial type of modernization in big former agricultural enterprises similarly to Hungarian big enterprises. For sure, number of farms in Poland being able to compete at international markets should be reduced in some opinions from 2 million now to 600-700 thousand farms in longer perspective. (To compare: recently in Hungary there are same 60-70 thousand family farms and 8 thousand agricultural company and coops.) Reduction and transformation of agrarian structure concerns also Hungarian agriculture. In both compared countries changes in agricultural sector should be supported by appropriate rural and agricultural policy, considering interests of rural population and also interests of all food consumers and taxpayers. The EU and governmental funds should be directed to all those farmers who want modernize their farms. Those funds, like in France in fifties (Bojar, 2002)) should be controlled by self-governments of farmers and local governments as well to join modern agribusiness with development of rural areas. Procedures of the EU projects will be also important mechanism ensuring effective use of funds. This way can be solved different economical and social problems of rural areas like unemployment, not sufficient income of peasant families, what occur especially dramatically now in Poland (still 27% of total population lives in rural areas). To reach it, is necessary distinct and sustain strategy of both countries to realize mentioned above goals.

A chance for rationalization of exploitation of farm machinery for Polish family farmers is a development of mutual neighbour mechanization services, which are the most popular forms of non-profit co-operations between farmers (Wójcicki, 1998). This way farmers can use their machinery more intensively, making specialization of work simultaneously and decreasing relevant fixed cost of exploitation. In Northern and Northern-Western regions of Poland, where transformed big state farms are concentrated, family farmers can decrease costs of exploitation also buying mechanization services from agricultural enterprises (Bojar, Milano, 1994).

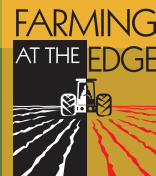
Joining to the European Union is a good opportunity, but also a great challenge for the Eastern European countries so for Hungary and Poland as well. Conditions of the agriculture of these countries causes that only a small part of the farms are well capitalized and has enough assets for production. In Hungary only 10% of farms can be accounted to become competitive on a long term according to these aspects.

The high technical level is a key element of competitiveness and on the other hand the inadequate utilization of the capital, invested into the assets, causes problems in the effectiveness and profitability.

Examining the supply with tractors (as a key machine) of the country, it can be stated that larger farms may have the necessary power-machines, they may even have significant capacity surplus. For their adequate exploitation, the different mutual usage of machines can provide an adequate framework.

On the different parts of Hungary there are significant differences concerning the supply with capacity which exceed even the regional differences and which can be equalized only with a conscious, systematically and comprehensive concept for technical development which covers the whole country, supported by the government and which is based on professional and scientific knowledge. The regions in Northern and Eastern Hungary have the most unfavourable position (based on the results of the detailed research).

INTERNATIONAL FARM MANAGEMENT CONGRESS 2003



To show the negative trends in the supply with agricultural assets – on the basis of the data of GAC 2000 and the test farms – by examining the problems of capital-effectiveness in the case of tractors, as expensive and key-machines, we can state:

- The supply with capacity of the small farms is not satisfying. Most of the farms do not have – and from economic aspect they do not need to have – a pool of power- and working machines. The current capacity needs can be met with appropriate organizational and economic system, by establishing virtual large-scale farms (partnerships and cooperatives for machine utilization).
- A small proportion of small farms has significant capacity surplus, which results the low effectiveness of the engaged capital into the assets. Under average circumstances the sale of the capacity surplus (in the form of giving service) results in considerable improvement in effectiveness.
- The level of up-to-dateness and the technological level of the assets and the quality of production show a gradual backwardness compared to the countries with developed agriculture, which claims the launch of a new technical development program soon.

Investigations have proved that the capital-effectiveness of smaller farms is lower than that of the larger ones at present. Only a few farmers choose those methods which could improve the effectiveness of their capital, engaged in their assets. The concepts for economic growth should provide the refund of the expenditures of both the businesses and the national economy by supporting methods of capital-effectiveness.

References

- Bojar W. (2002). Przes_anki rozwoju rolnictwa i obszarów wiejskich w Polsce na tle do_wiadcz_e krajów europejskich w: Prace naukowe Akademii Ekonomicznej we Wroc_awiu, Agrobiznes 2002 pt. Przemiany w agrobiznesie i obszarach wiejskich oraz ich nast_pstwa, Tom 1, pp. 110-116, Wydawnictwo AE im. Oskara Langego, Wroc_aw, Poland.
- Bojar W., Drelchowski L, 1994, Management and work organization requirements for a restructuring of agricultural state enterprises in Poland. XII C.I.G.R World Congress and AgEng '94 Conference on Agricultural Engineering, Milano (Italy), 29th August – 1st September, pp. 1346.
- Gunst, P. - L_kös L. (szerk.) (1982) A mez_gazdaság története. Budapest. Mez_gazdasági Kiadó. 270 p. (*History of agriculture*)
- Hunt D. (1995) Farm Power and Machinery Management, IOWA State University Press Ames the U.S.A., pp 3-8.
- Karwowski T., Principles in Common Usage of Farm Machinery (Podstawy Zespo_owego U_ytkowania Maszyn), IBMER, Warsaw 1998, Poland, pp 27-31, 145-146,
- Shön H., (1991), Neue Technik Grösser-Besser-Unbezahlbar? DLG Mitteilungen/agrarinform nr 11, Germany.
- Takácsné György K. (1994) A családi gazdálkodás méretére ható tényez_k modellvizsgálata I., II. 1994. Gazdálkodás. 38. 4. 65-69 pp.; 38. 5. 54-60 pp. (*The model-examination of factors influencing the size of family farms*).
- Wo_ A. (2002) Rolnictwo i sektor _wno_ciowy w 2001 roku / oprac. Augustyn Wo_, Instytut Ekonomiki Rolnictwa i Gospodarki _wno_ciowej (IER i G_), Warsaw, Poland.
- Wójcicki Z. (1998) Wyposa_enie rolnictwa w _rodki techniczne – stan i kierunki przemian w uk_adzie sektorowym i regionalnym, IBMER, Warsaw, Poland, pp 125.

INTERNATIONAL FARM MANAGEMENT CONGRESS 2003

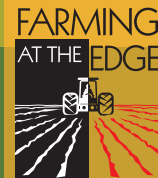


Table 1 Supply with machines and assets per one farm

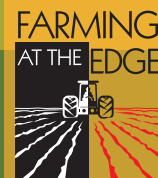
Description	Unit	Hungary ^{a)}			Poland ^{b)}		
		Total farms	Farming types		Total farms	Sectors	
			Private farm	Agricultural enterprise		Private sector	Public sector
Tractors totally	piece/farm	0.16	0.11	5.08	0.51	0.41	7.53
Out of it: 20 kW	–	0.03	0.03	0.27	0.07	..	..
21 60 kW	–	0.10	0.07	3.25	..	..	..
61 – kW	piece/farm	0.03	0.01	1.56	..	..	..
Combine	piece/farm	0.02	0.01	1.05	..	..	..
Combines for cereals	piece/farm	..	..	..	0.05	..	..
Tillers	piece/farm	0.09	0.08	1.69	0.04	..	..
Truck	ton/farm	0.14	0.05	9.83	0.03	0.02	0.78

Source: **a) Hungary's agriculture in 2000; own counting;**
b) Own investigations on the base of Wójcicki findings (1998), IBMER

Table 2 Regional characteristics of supply with tractor of private farms

Hungary ^{a)}				Poland ^{b)}			
Statistical regions	All farm s	Over 50 hectar es	Over 10 hectar es	Statistical regions	All farm s	Over 50 hectar es	Over 10 hectar es
	(piece/farm)				(piece/farm)		
Central-Hungary	0.12	14.9	2.3	Middle	0.62	3.7	1.2
Cental-Transdanubia	0.14	13.8	2.4	North- Eastern	0.70	2.9	1.2
Western-Transdanubia	0.17	29.1	3.6	Northern	0.81	3.3	1.4
Southern-Transdanubia	0.12	15.3	2.5	Western	0.78	3.6	1.6
Northern-Hungary	0.09	12.5	2.1	Southern	0.44	3.7	1.4
Northern-Great Plain	0.12	13.6	1.7	South- Eastern	0.50	2.9	1.2
Southern-Great Plain	0.16	16.3	2.0	Middle	0.60	3.3	1.3
Total	0.13	15.5	2.2	Total	0.62	3.7	1.2

INTERNATIONAL FARM MANAGEMENT CONGRESS 2003



Nominal power per farm (kW)	15.5 2	851.3	120.9		30.1 0	102.0	40.3
-----------------------------	-----------	-------	-------	--	-----------	-------	------

Source: a) Hungary's agriculture in 2000; own counting;
b) Own investigations on the base of Wójcicki, IBMER(1998) and Agricultural Statistical Report, 1998, Warsaw.

Table 3: Estimated exploitation of capacity (%)

County	Under 30 ha	30.1-60 ha	60.1-100 ha	100.1-200 ha	Over 200 ha	Total
Hungary ^{a)}	26	33	47	38	82	50
Poland ^{b)}	29	47	..	..	34	35

Source: a) own collection of data; b) own investigation on the base of survey made by Wójcicki (1998), IBMER.