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COOPERATION AMONG FARMERS FOR COST SAVING MACHINERY

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Summary

The agriculture of the Central-Eastern European countries were considerably transformed during the 1990s. The property structure became fragmented, arable land and means of farming were privatized by different methods in different countries and – as a consequence of this – the hegemony of large-scale farming was wound up but to different degrees. Most of the newly formed small farms had no appropriate equipment and power machines for performing competitive production. The integration of these countries into the European Union has brought significant changes which further strengthened the need for competitiveness. Producers in the agriculture of Western European countries represent major market power due to the cooperation models (cooperative movements, machine and farm ring movement, producer organisations, etc.), but requirements of productivity, efficiency and profitability are also highlighted within these cooperation arrangements. The paper focuses on cooperation arrangements for joint machinery use and examines the factors affecting their expansion. The starting point of examinations is a former situation analysis made about the equipment supply of agricultural plans of a Romanian settlement and the cooperation willingness of producers. The survey which was carried out in 2002, was complemented by primary research through deep interviews in 2012, during which the observable changes and the impacts of access to the European Union were explored.

Keywords: *agriculture, efficiency, trust, risk, competitiveness*

INTRODUCTION

During the transition the ownership and property structure of arable land was basically transformed in most of the Central Eastern European countries [21]. In addition to the changing of ownership the farm structure has also changed and the property structure diversified [20]. The new property structure resulted significant changes in land use [4]: many small-scale, divided farms were set up. The restrictions of land market [8] conserve or permanently maintain the diversified property structure. Ensuring the technical background for these farms is quite a challenge for both the farmers and the governments.

The economic-social processes and evolving economic and social tensions point out that new structures should be formed to treat the new problems [9] and – as a new challenge in the countries of the region – the economic, social and environmental interests and sustainability of local communities should also be considered.

In the countries of the region, the cooperation willingness between producers is significantly different. It is affected by historical and cultural impacts as well as the socialization of farmers and new scientific explanations should be found for the attitudes of local communities regarding cooperation [12].

The presentation – considering the widely cited thoughts well-known – focuses on those aspects of the issue which help to reveal the reasons of machinery sharing arrangements (and needs) of farmers – who are in the centre of the present research – or the non-cooperation (and economic rationality behind decisions).

One of the key questions of machinery sharing cooperation is the moral risk which can be either moral risk of labour or moral risk of equipment [1]. We speak about moral risk of equipment when the user of the equipment does not consider the interests of the owner because he is not interested in preserving the long-term value of the equipment in use, since it is not his or only partly [6], which means imperfect supervisory rights above the equipment (in case of joint ownership, lending or leasing machinery).

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According to the experiences the machinery sharing arrangements can lead to losing or forced giving up of independence, loss of face, sometimes professional jealousy or envy which is often also due to generation gap and farmer pride [5]. The Hungarian experiences prove that the dark side of machine sharing is the growing dependence of individual and the force for coordination in case of decisions or actions [14, 11, 15].

MATERIAL AND METHODS

The research was carried out in two phases: the first phase was a questionnaire survey in 2002. The questionnaire survey was performed with sampling among the farmers of Madaras (Mures county). The following questions can be related to the issues of present paper:

- Size of farms, features and traditions of production (area, qualities of land, sowing structure, size and composition of livestock, product output, yields);
- Utilization of products produced in farms (own consumption, sales, volumes);
- Features and methods of sales, present and potential markets;
- Technical supply of farms, features of technical supply and level of development;
- Current forms of cooperation between farmers, survey of cooperation willingness (with whom they would cooperate, with whom they would not);
- Development reserves of farms (savings), bank relations;
- Quality of farm management.

The survey was made with open and closed questions. The interviewers were the students of Szent István University, Faculty of Economics and Social Sciences, Correspondence Course in Mircurea Ciuc.

The questionnaires were completed for families. 120 families were interviewed in the settlement. Altogether 443 persons belonged to the interviewed families, they represent 34.5% of the total number of citizens and 65% of them work for the farm. Thus about one-third of families were asked. The respondents were random selected.

The total agricultural area of the examined 120 farms is 542 ha. 9.2% of the farms used rented land. 39.6% of the total land of these farms was rented.

The *average size* of farms is 4.5 ha (in case of tenants it is 11.0 ha). The smallest farm was 0.12 ha, the largest was 74.8 ha. The dispersion is 7.67, indicating that the number of median farms is relatively big.

Several papers were published about the outcomes of representative survey made in 2002. [13, 18, 19]. Ten years later, during the summer of 2012, based on a structured question list, twelve deep interviews were made in Madaras (Mures county) among some of the former interviewed farmers. We compared their economic situation ten years ago with the actual, and try to verify the realization of former recommendations.

RESULTS AND DISCUSSION

Technical supply of examined farms

The technical supply and the quality of equipment on the farms of the settlement was low in 2002. There was at least one tractor on every tenth farm (1.46 on average), horse used as draught, on another 32% of farms. (Table 1) The remaining 57.5% used cattle as draught animal or external services for crop production activities and transportation. The equipment stock was based mostly on basic equipment (plough, harrow, sowing machine, truck or trailer, spraying machine in case of farms with tractors, inter-row cultivator).

The farms were obviously arranged for livestock: 91% of them had stables, 93% had shed or sheds, almost half of them had barns or hay barns.

Table 1: Draught force and tractor supply in farms

Title	Measuring unit	Total sample	Weighted average	Number of farms	Lowest value	Highest value	Dispersion
Draught force	(pcs)	44.00	1.16	38	1.00	3.00	0.437
Tractor	(pcs)	19.00	1.46	13	1.00	4.00	1.127

Source: own work

In 2012, the farmers whom were visited for deep interviews reported that they made some major investments during the last ten years, purchased power machines or high-performance machines. The investments were typically financed from own savings. Most of them abstained from taking out a loan and did not apply for government subsidies considering it too complicated. The interviewed farmers and those who had proper knowledge of their activities declared that farmers reluctantly applied for grants except for normative subsidies.

As the result of investments – according to the estimations of farmers – the hauling power of tractor pool increased by 30-50% at the level of the settlement and the role of animal draught force decreased. As regards machine investments, the share of purchasing second-hand machinery was still considerable. New farm buildings were built and seemingly up-to-date livestock sheds were made in the firms we visited. The renewal of equipment and the extension of modern production technologies was obvious. For example, one of the key conclusion of the survey of 2002 was that dairy farms did not produce silage fodder at all, and – as a consequence – the quantity of milk was lower, the quality was worse than it could be under given conditions. During the past period the farms started silage production, created the necessary technical conditions and thus they reached obvious milk yield increase and the nutritional value (including fat as a key parameter) improved significantly and permanently. The milk quality is also affected by the milking technology but we got very mixed experiences in this issue. Many farms with great cow stock invested in milking equipment but some of them did not implement it and went back to the traditional milking by hand.

In spite of these investments, however, the situation was still the same: major part of firms had no appropriate machinery for performing all the technological steps of field crop production but the well-to-do farmers, who already had adequate equipment, further increased their capacity surplus. Thus some forms of the machinery sharing cooperation have become necessary. These already work, although according to the experiences, farmers prefer those arrangements which result the lowest trust level and the lowest dependence (primarily rented machinery services), undertaking even the higher fees for rented services – as opportunity cost.

Cooperation willingness among the examined farmers

Former research projects clearly confirmed that the low level of equipment supply raises the necessity of cooperation, which improves the equipment effectiveness and reduces the capital investment need [14].

In 2002, the deep interviews which were performed for basing the questionnaire survey made it clear that, on the one hand, the equipment supply on the farms of the settlement is not adequate, on the other hand, the willingness to cooperate with fellow farmers is low. Therefore one of the main targets of questionnaire survey was to explore the existing forms of cooperation and review the awareness of prospective forms of cooperation.

According to the survey, 39% of farmers regularly help others or get help from others. Mostly they cooperate with relatives and friends, which is the continuation of social traditions. 60% of farmers used to be a member of a producing cooperative and practically none of them intends to become the member of a similar organization. 36% of them mentioned that there are some particular fellows with whom they would not cooperate at all. Out of the possible cooperation arrangements, the producer organizations (56%) and machinery rings (33%) were mentioned the most. (Table 2)

The cross table analyses show a very unfavourable picture. As regards the question about the existence of cooperation and the possibility of a future cooperation, negative responses were similarly overwhelming in general as well as among farmers who need cooperation the most.

Table 2 Cooperation willingness, farm size and cooperation of farmers (2002)

Question ('Yes'=1; 'No'=0)	Ratio of 'yes' replies (%)
Is there any cooperation?	39.2
Is there anybody with whom you would later cooperate?	36.7
Is there anybody with whom you would not?	35.8
Do you have savings for individual purchase?	10.0
Do you have any savings for joint purchase?	6.7
Were you member of a cooperative?	60.0
Have you ever applied for loan?	0.8
Have you heard about: Cooperative	50.0
Machinery cooperative	14.2
POs	55.8
Machinery sharing arrangement	16.7
Machine ring	33.3
Rented services	11.7

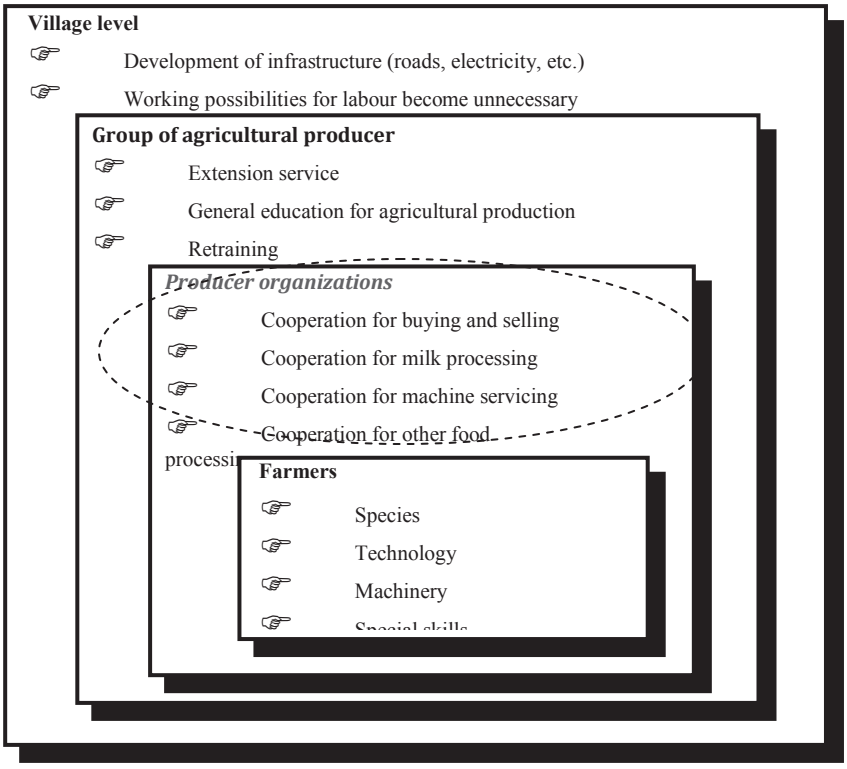
Denomi-nation	Cultivated area (ha)	Count and % within Farm size category	Do you have cooperation?		Total
			No	Yes	
Farm size category	0-3	Count	49	22	71
		%	69.0%	31.0%	100.0%
	3-6	Count	13	14	27
		%	48.1%	51.9%	100.0%
	6-9	Count	4	6	10
		%	40.0%	60.0%	100.0%
	9-12	Count	3	3	6
		%	50.0%	50.0%	100.0%
	12-15	Count	1	1	2
		%	50.0%	50.0%	100.0%
	15-	Count	3	1	4
		%	75.0%	25.0%	100.0%
Total		Count	73	47	120
		%	60.8%	39.2%	100.0%

Source: own work

The recommendations drafted on the basis of the outcomes of research made in 2002 (Figure 1) gave high priority to the development of cooperation arrangements.

Considering all the above, the key question of deep interviews performed in 2012 was the identification of changes in the state of cooperation. The interviews made it clear that obvious progress was reached only in the organization of milk collection yet not in the form of cooperation but an enterprise coordinate the producers. In case of field crop production – which requires the most machinery – large farms with adequate machines provide rented services. None of the farmers has adapted the formerly suggested German sample that is to set up a machinery and farm-assistance ring model. They also rejected all kinds of cooperatives.

Figure 1 Connection among the main areas of the development and the role of the improvement of cooperation among the main goals



Source: Based on Takács & Takács-György, 2003

The possible forms of cooperation among agricultural firms (Table 3) have different advantages, but the disadvantages paired with advantages also mean risks for the farmer. Our recommendation was to implement the machinery and farm assistance model owing mainly to the advantages which are detailed below [10]:

- The purchase expenses can be reduced by harmonizing machine investments.
- The utilization can be improved and thus the operational costs can be decreased by the coordinated operation of equipment owned by the members.
- The organized use of machinery will result that appropriate machine capacities will be available for all the tasks within the cooperation.
- The knowledge and expertise of members will concentrate thus the implementation and development of technical-mechanical background is based.
- Beyond machinery use, the cooperation can be extended on almost all the fields of activities among the members thus improving the conditions of farming. .
- By applying unified internal fee system, the services provided by the members to each other can be accounted, but the price of services will stay within the group which creates and operates the cooperation arrangement and thus it does not withdraw sources from the local communities.

According to the German experiences, the model of machinery and farm ring is an adequate form of cooperation for the farmers of Madaras-like villages because the farmers can preserve their independence and – at the same time – their capacity surplus and capital need is decreased due to the coordinated investments and machinery use. The return on asset is also ensured owing to more efficient utilization, as well as profitability is improved because lower specific fixed costs are built in the production costs.

It is also confirmed by the data of Haag [5]. Haag collected the experiences on his own farm and in the frames of a machinery and farm assistance ring, a machinery sharing arrangement in which he participated. Prior to a coordinated development, investment, the value of machine pool owned by the members of the cooperation was 3324 EUR per hectare in 1993. It was reduced to 620 EUR/ha by 2004 due to the purchase of new machines and sale of unnecessary equipment made by joint decision and participation of members.

During the deep interviews performed in 2012 we also tried to find out why no steps were made to adapt the organizational model in spite of the advantages well-known by most of the farmers. We came to the conclusion during the research that the reasons should be searched in the relation of farmers to risk and in the level of general and actual trust they feel.

According to the experiences, the attitude of interviewed farmers towards risk is different. It can be due to a lot of factors, especially cultural and sociological factors can have major impact in the attitudes. Many respondents mentioned the unfavourable experiences obtained in former producer organizations or a picture made on the basis of information from hearsay.

The outcomes of the research correspond to the Hungarian experiences, according to which the expansion of cooperation arrangements requiring lower trust levels and dependence (Figure 2) is typical. International experiences offer some examples to this, too. While in the Scandinavian countries, those forms of cooperation are frequent which need higher trust levels and closer dependence [7, 2], in Germany, for example, there are some provinces where the machine and farm assistance rings involve almost all the farms (e.g. Bavaria). In other provinces (e.g. Hessen) the machinery services offered by entrepreneurs are more typical [17].

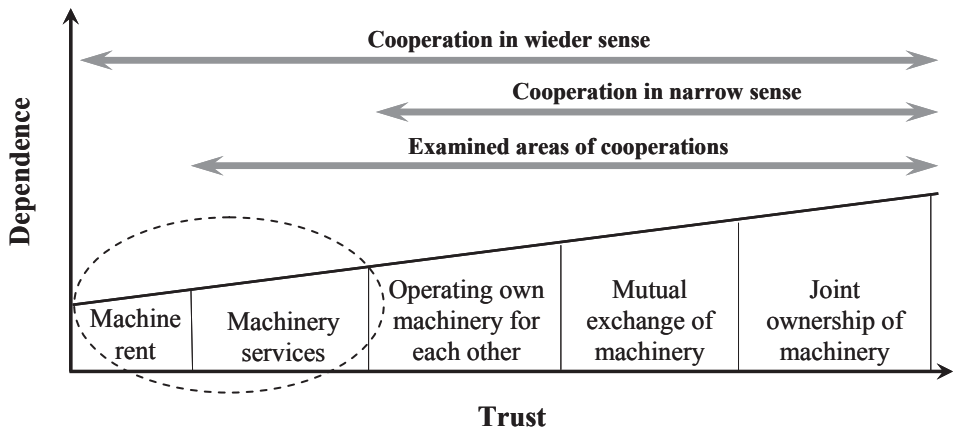
According to the experience of the previous research, the successful cooperation has some staff conditions, too. In addition to recognizing the interests, at least one farmer is needed who undertakes the extra tasks connected with organization and in the first times often without any financial compensation. It is also important that the fellows approve those who undertake leadership.

Table 3 Cost-efficient, joint machinery use arrangements which can be applied in agricultural firms

Joint ownership, joint machine use		Private ownership, coordinated (joint) machine use	Private ownership, private machine use and using rented services	
Machinery sharing	**Machine cooperative**	**Machinery ring**	**Service providing**	**Machine rent**
Main characteristics				
- Joint purchase. - Joint use.	- Cooperative purchases. - Members share.	- Private machine investments with specialization. - Surplus capacities sold within a closed group.	- Machinery owned by entrepreneur. - Machine work service provided for fee.	- Machinery owned by entrepreneur. - Machine lending to farmers.
Advantages				
- Machine investment and operational costs are divided in ratio to operation. - Expertise of members is cumulated.	- Advantageous in case of special equipment or production line. - Smaller specific investment and machine operation costs. - Adequate machine use and operation.	- Divided investment and operational costs. - Machine can be selected for all types of tasks. - Clear accounts.	- High quality job with modern machinery. - Cost saving. - Less capital employed.	- Investment and operational cost saving. - No commitment to utilize.
Drawbacks				
- Competency and use can be disputed. - Difficult to dissolve the partnership.	- Difficult to solve optimum exploitation. - Higher administration and organizational costs	- Greater organization needed. - Does not work without cooperation willingness.	- Difficulties in organization and coordination. - Optional machinery solutions are less.	- Greater risk in machine use. - Unknown machine – changing quality.

Source: Based on Takács et al. (1996) 8. p. and Nagy (2004)

Figure 2 Partnership of farmers in machine use, in the space of trust and dependence levels



Source: Based on Takács & Baranyai 2010, 180. p.

During the deep interviews it was indirectly examined, whether there is somebody among the leading farmers of the settlement who would perform such an organizational role and whether there is a person who is trusted enough, who would be approved as the head of such cooperation arrangement, like the machine and farm assistance ring.

On the basis of the replies it can be concluded that most of the farmers recognizes the necessity of cooperation but personally they do not want to participate in the organizational work and there is nobody who has that kind of a general acceptance which would make him suitable to successfully manage such an organization.

CONCLUSIONS

The new situation created by the social-economic changes required new responses from the participants. The transformations that proceeded in Central-Eastern Europe in the 1990s have significantly affected the agriculture of the countries in the region. That sector of the national economy which has considerable role in the life of rural population is almost the only source of livelihood for the population of many settlements.

The countries of the region joined the European Union in the 2000s and thus the agricultural producers became part of the unified market where the farmers of the more developed member states have significant competitive advantages. Growing up – among others – to the outstanding technical and technological advantage is very difficult for the agricultural producers of the new member countries.

Among the factors hampering the convergence, the lack of capital have highlighted role, because it prevents the creation of a modern machine pool, which can be efficiently operated and meets the criteria of the environmental-economic-social sustainability of the 21st century.

The lack of capital is – on the one hand – absolute, and – which is even worse on the other hand – it is also relative. It means that more equipment is needed from the less efficient ones (which requires more capital, too). The efficiency, however, can be improved by the means of organization and thus the relative capital needs can be decreased, too.

The ownership structure that was set up in the frames of the transition in the early 1990s, and the developing and somehow concentrating agricultural farm structure on the basis of this has a typical feature: large number of farms below viable economic size unit. Many cooperation models have proved in the 20th Century in Western Europe that through them the farmers could improve their competitiveness and give adequate economic-social responses to the changing circumstances.

The most comprehensive response can be given by the machine and farm assistance model through which – besides cost efficient machine use arrangements – the community can also offer support to the individual in case of personal crisis, and opens possibilities for the urban population (e.g. holidays, vacation) as natural part of their life. In addition to this, they participate in the organization and performance of community services in the local living environment (e.g. looking after public areas, joint marketing of rural tourism services, etc.) thus they reduce both the community and the individual financial expenses.

One of the main obstacles of implementing cooperation models is the lack of trust among farmers, and owing to this, those solutions are primarily expanding in the region which result less dependence and can be operated at a lower trust level.

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