The role of the Rural Development Programme (RDP) in creating growth in the agricultural sector. The case of countries from East-Central Europe[1]

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Abstract: The evolution of the agricultural sector requires a permanent combination of activities related to raising the competitiveness of farms, improving the quality of life of the rural population and maintaining natural resources. Such tasks in EU countries are performed by rural development programmes (RDP), created under the second pillar of the Common Agricultural Policy. The aim of the paper is to define the role of RDPs in driving the transformation of the agricultural sector in selected countries of East-Central Europe – the Czech Republic, Hungary, Poland and Romania – for the years 2007-2013. The authors attempt to find certain interrelationships between the premises of rural development programmes and the funds directed their way, and changes in the agricultural sector for each of the economies. The work uses critical analysis of subject literature, meta-analysis, deductive and inductive reasoning, as well as a comparative analysis using elements of time series analysis (analysis of dynamics and structure changes). The main conclusion is that: 1. the second pillar of CAP was undoubtedly an important element of support for rural areas in the countries of East-Central Europe; 2. the accumulated effects of the support led to a considerable improvement in the income situation of agricultural producers; 3. investment expenditures led to structural changes at farm level. In relation to the above, the key issue is to keep a relatively high level of funding for the second pillar of CAP for EU-12 countries after 2020.

Keywords: rural development, agriculture, structural changes, investment, support

JEL: Q10, Q12, Q15, Q18

Introduction

The Czech Republic, Hungary, and Poland joined the structures of the European Union in May 2004, followed by Romania in 2007. EU funds, including those related to the Common Agricultural Policy (CAP) started flowing to these countries. New support mechanisms,

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combined into two CAP pillars, began to influence these countries' agribusiness and the environment. The first pillar primarily included direct payments (partly also market intervention), the second one concerned instruments connected with broadly defined rural areas. The money received largely complemented the income of farms, increasing the level of consumption and expenditure for the purposes of current production. Rural development programmes (RDP) detailed tasks of a typically investment-oriented nature, which were supposed to change the agricultural production structure and make it more competitive in the integrated market. EU resources were also used to finance other activities, including subsidies for less favoured areas (LFA), agri-environmental programmes, non-agricultural business activity development or the improvement of rural infrastructure.

The aim of the paper is to define the role of the rural development programme in driving the transformation of the agricultural sector in selected countries of East-Central Europe. It presents the basic information concerning RDP and then relates it to the changes taking place in agriculture. The spatial scope of the research includes the Czech Republic, Hungary, Poland, and Romania. These countries underwent a political transformation in the 1990s which determined the development of the sector over the next two decades. The Czech Republic, Hungary, and Poland joined the European Union and were included in the mechanisms of the EU's agricultural policy at the same time, while Romania joined just under three years later. Thus, it was possible to carry out a comparative analysis of the functioning of the agriculture of the above-mentioned economies in the context of CAP.

Methodology

The research is theoretical and cognitive in nature and contains an analytical part. The authors use critical analysis of the subject literature, meta-analysis, deductive and inductive reasoning, as well as a comparative analysis using elements of time series analysis (analysis of dynamics and structure changes). Due to objective obstacles in carrying out a quantitative analysis, the assessment is qualitative in nature, with elements of inductive reasoning. Firstly, the CAP second pillar includes activities oriented directly at carrying out investments on farms, but there are also some which may indirectly impact the level of such expenses (e.g. subsidies for less favoured areas (LFA) or agri-environmental payments). Hence, it is impossible to determine the precise amount of money which was allocated for specific purposes. Secondly, the quantitative measurement of the influence of the funds of the second pillar of CAP on the amount of investment expenses, production asset growth and other variables determining the changes in farm production structures for a period of time is difficult, due to the fact that the redistribution of subsidies occurred in different years for individual activities, in accordance

with the RDP schedule, whereas expenditure for investment and production purposes was made on an ongoing basis, in order to ensure business continuity. However, the authors try to find certain interrelationships between the premises of rural development programmes and the funds directed their way, and the changes in the agricultural sector for each of the economies.

The paper uses Eurostat and FADN[2] database data for representative farms. The time scale begins with 2005, two years before the 2007-2013 budgetary period, and ends with the last year of this financial outlook (in the case of the FADN database, the data was supplemented with the years 2014-2015). In this way, it can be seen how the rural development programme for 2007-2013 influenced the changes in the agricultural sector relative to the years directly preceding that period.

A review of rural development programmes for 2007-2013 for the Czech Republic, Hungary, Poland, and Romania

The rural development strategies for 2007-2013 adopted by the countries under study resulted from a review of the strong and weak points of the agricultural and food sectors and the environment, followed by establishing the necessary directions of change. At the same time, the primary objectives of the RDP had to take into consideration the structure of activities, specified at the level of the European Union, divided into four axes. These included increasing the competitiveness of agribusiness, programmes for the protection of the natural environment, improving the quality of life in rural areas and activity diversification, and the LEADER axis[3] (complemented by so-called technical assistance[4]). The countries' emphasis on individual activities varied, which was reflected in a different expense structure within the second pillar (cf. Table 1).

In the case of Hungary, Poland, and Romania, the key position in the budget belonged to the activities of axis I, and one of the main elements was funds for the modernisation of farms. In Hungary, as many as 62% of axis I funds were allocated for that purpose, and the subsequent activities involved much less money: the highest allocation was related

[2] FADN (*Farm Accountancy Data Network*) is a European system of collecting accountancy data from farms. The field of observation of the European FADN system includes commercial farms which produce about 90% of the value of Standard Output within a given region or country. The minimum economic size of a farm participating in the system is determined at country level (e.g. in Poland, it is SO EUR 4,000). The representativeness of the sample involved in the study is determined based on three criteria: location, economic size, and type of farming. Because the FADN system excludes the smallest farms from analysis, study results may be related to those included in the system.

[3] Through the LEADER axis, support is directed to local activity groups, whose task is to implement local development strategies. Thus, the activities within this axis are grass-roots activities in nature and serve the accomplishment of the objectives for axes I, II, and III.

[4] The aim of the Technical assistance is to finance the preparation, management, monitoring, evaluation, information and control activities of programme assistance.

to infrastructure support for the development of agriculture and increasing added value in the agricultural sector (9% and 8% of the budget for axis I respectively) [Ministry of Agriculture of Hungary 2007].

In Poland, another important activity within the framework of axis I was structural pensions, which were supposed to facilitate the handing over of farms owned by older people to younger farmers. In total, more than 60% of the Polish RDP funds were allotted for these two activities – modernisation and pensions (31% and 30% respectively). The following activities occupied the subsequent positions: increasing the added value of agricultural and forestry production (11% of the RDP budget) and facilitating young farmers' start in life (10%) (Ministry of Agriculture and Rural Development of Poland 2015). Moreover, the *ex post* assessment of Programme execution shows that the manner of allocating the available funds was very effective – by the end of December 2015, 100% of the axis I budget had been used (by comparison, in Romania, this index oscillated around 85%).

Table 1. The budget of the rural development programme 2007-2013 (in million EUR) and the share of the individual axes in the RDP budget for the selected EU countries

Axis of RDP for 2007-2013	**Czech Republic**		**Hungary**		**Poland**		**Romania**	
	Sum	**Share**	**Sum**	**Share**	**Sum**	**Share**	**Sum**	**Share**
Axis I: Competitiveness of agriculture and forestry	840	23.2%	2 366	45.9%	7 188	41.7%	3 967	42.5%
Axis II: Improvement of natural evnironment	1 945	53.8%	1 627	31.5%	5 546	32.2%	2 293	24.5%
Axis III: Quality of life in rural ares	635	17.6%	691	13.4%	3430	19.9%	2473	26.5%
Axis IV: LEADER	175	4.8%	272	5.3%	788	4.6%	235	2.5%
Technical assistance	18	0.5%	203	3.9%	267	1.6%	376	4.0%
Totally	3 615	100%	5 159	100%	17 218	100%	9 344	100%
The share of EU funds	78%	-	74%	-	77%		81%	-

Source: European Commission 2007a; European Commission 2007b; European Commission 2007c; European Commission 2008.

In Romania, apart from farm modernisation (32% of the RDP budget), the share of the activity involving increasing the added value of agricultural and forestry production (37%) was also high. There was, however, no task similar to the Polish structural pensions, in spite of the high percentage of people employed in agriculture (32% at the beginning of the programme period 2007-2013) (Ministry of Agriculture and Rural Development of Romania 2017). In Hungary, expenditure for farmers' early retirement pensions was planned, yet with the amount of 1% of the entire axis budget, it is difficult to expect clear effects. Despite a large number of small entities in the structure of farms in all three countries, a small portion of the funds was allocated for the support of semi-subsistence farms – in Romania, it was 7.5% of the

axis I budget, in Poland 6.3% (additionally, these expenses regarded the obligations from 2004-2006), while in Hungary – less than 1% (Ministry of Agriculture and Rural Development of Poland 2015; European Commission 2008; Ministry of Agriculture of Hungary 2007). The above-mentioned data shows that within the RDP, the priority for the countries in question was to support the farms in developing competitiveness, whereas help for smaller producers was temporary in nature, as in the long term, their number was to be limited.

In the Czech Republic, the expenditure structure within the second pillar was different, as more than half the budget was allotted for axis II, related to the improvement of the natural environment. Such a division of funds may have resulted from the fact that, in comparison with the three previously described countries, Czech agriculture is more similar to the agriculture of Western European countries. This means that farms are on average much larger than in Poland, Romania or Hungary, the scale of production is higher, and they achieve better labour and land productivity indices. On the other hand, the Czech Republic is a largely mountainous country, it has many valuable natural areas. This is why the objectives related to the natural environment dominated those concerning increasing the competitiveness of the agricultural sector [European Commission 2013, pp. 302-303; Dudzińska i Kocur-Bera 2014, pp. 49-64]. Thus, the Czech Republic is closer to the group of countries such as Finland, Sweden, the UK or Ireland (in Ireland and the UK as much as 80% of the entire RDP budget is allocated for pro-environmental objectives). It can also be concluded that countries with more fragmented agrarian structures allocate relatively more money to activities related to improving the competitiveness of the food sector (apart from Hungary, Poland, and Romania, this also applies to Spain, Portugal, Greece, and Italy).

Within the budget of axis II of the Czech RDP, agri-environmental payments (56%) and subsidies for less-favoured areas (41%), with mountainous areas constituting more than half, made up the highest share. Although by definition, they were environmental subsidies, in fact, they influenced the increase in farm income, and so indirectly also of investment. They may therefore be treated as complementary to the first pillar's programmes, increasing the competitiveness of the agricultural sector. As to the first pillar, it included three core activities: farm modernisation (42% of axis I budget), land consolidation and forest infrastructure (22%), and increasing the added value of agricultural products and provision of technical equipment (13%).

Apart from the RDP budgetary structure, the absolute amount of money allocated for these tasks is important. On account of the total agricultural area and the number of farms, the largest amount of funds went to Poland. However, we can obtain a more clear-cut picture of the

scale of support by expressing the total amount per farm and hectare of AA. From this perspective, the highest level of budget on average per farm was clearly present in the Czech Republic. Hungary and Poland had similar values, while in Romania, it was nearly four times lower than in these two countries (cf. table 2). In turn, in relation to agricultural area, the amount for the Czech Republic, Hungary, and Poland was similar, while Romania was some way behind. With reference to axis I, the order changes in the case of the amount of support per hectare of AA. Here, Hungary came first, followed by Poland. The amount for Romania was nearly twice as low, whereas for the Czech Republic it was more than twice as low. Certainly, these numbers do not reflect the actual average allocation of RDP funds per producer and unit of area, but they show the potential that the programme generates for creating changes in the agricultural sector. The higher the budget, the larger the number of its beneficiaries, the larger the average rate of payments, and the larger the agricultural area covered by the activity.

Table 2. Total RDP budget and budget of Axis I for 2007-2013 on average per farm and hectare of AA (in EUR) in the selected EU countries

Specification	Czech Republic	Hungary	Poland	Romania
RDP budget per farm	122 529	9 134	9 697	2 455
RDP budget per hectare of AA	1 034	1 140	1 165	699
Budget of Axis I per farm	28 471	4 189	4 048	2 455
Budget of Axis I per hectare of AA	240	523	486	297

Source: Eurostat 2018a and data for table 1.

Structural changes in the agriculture of the selected countries

Integration with the European Union posed a challenge, and at the same time provided an opportunity for more dynamic development of the agricultural sector of the countries of East-Central Europe. The challenges included joining the European Single Market and the need to compete with Western European countries, and adjusting national legislation to EU legislation in terms of quality, environmental and health standards, whereas when it comes to new opportunities, the most important one was undoubtedly the possibility to take advantage of EU funds, primarily including the Common Agricultural Policy. The latter particularly impacts on the transformation processes in the agricultural sector, because it is the only economic policy of community character based on uniform EU regulations and financed from the EU budget [Sadowski, Baer-Nawrocka and Poczta 2013, p. 7]. It can be assumed that the support itself creates favourable conditions for concentration processes in agriculture (both of

land and production itself). Moreover, through the funding of investment activities, it leads to the improvement of farming indices. On the other hand, in certain conditions, some CAP instruments may consolidate existing agricultural structures. This may be the case for subsidies for small farms, for which they constitute a relatively easy to obtain and important element of their income. Another example may be the modernisation programmes with an established upper limit of support, which might lead to the artificial division of farms in order to obtain funds [Czubak and Sadowski 2011, pp. 138-155]. Still, structural changes in the agriculture of the discussed countries are a fact, evidenced by the data provided below.

One of the manifestations of the concentration processes taking place in the agricultural sector is the decrease in the number of farms combined with the increase in their average size. In 2005-2013, in relative terms, the highest decline in the number of farms was recorded in Poland (–42%), and the lowest in Romania (–15%), although when it comes to the largest total number of farms in absolute terms, the decrease in their number in Romania came to more than 600,000, i.e. more than in Hungary and the Czech Republic (in Poland, the number dropped by over 1 million). With the decrease in the number of farms and minimal changes in the total agricultural area[5], the farms' average surface area increased in all the analysed countries, and in the case of the Czech Republic and Hungary, there was an increase of ca. 60%, while in Poland it was even as high as 70%. The process was the slowest in Romania, where the average surface area increased by 10% (cf. Table 3). It should be noted, however, that compared to the remaining three economies, Romania joined the EU three years later, hence the adjustments in the agricultural market were delayed.

Table 3. Total number of farms and average agricultural land in hectares

	Number of farms				
	2005	**2007**	**2010**	**2013**	**Change 2013/2005**
Czech Republic	42 250	39 400	22 860	26 250	-37.9%
Hungary	714 790	626 320	576 810	491 330	-31.3%
Poland	2 476 470	2 390 960	1 506 620	1 429 010	-42.3%
Romania	4 256 150	3 931 350	3 859 040	3 629 660	-14.7%

[5] In the Czech Republic and Poland, total agricultural area decreased by 2%, while in Romania it fell by 6%. The main reason for this decrease was changes in the use of agricultural land for other purposes (recreational, residential), mainly in peri-urban areas. Hungary was an exception, with agricultural area having increased by 9% due to the increase in the surface area of meadows and pastures.

	Average area of agricultural land (in hectares)				
	2005	**2007**	**2010**	**2013**	**Change 2013/2005**
Czech Republic	84.2	89.3	152.4	133.0	58.0%
Hungary	6.0	6.8	8.1	9.5	58.8%
Poland	6.0	6.5	9.6	10.1	69.2%
Romania	3.3	3.5	3.4	3.6	10.1%

Source: Eurostat 2018a.

What attracts attention is the much higher average agricultural area in the Czech Republic. This means that the transformation of the agricultural sector in this country was different in nature. The Czech authorities (just like in Slovakia) concluded that private ownership titles to land in their country were only suspended in the period from 1948-1989, which formed the legal basis for their restitution. Then, market-oriented production cooperatives and former state agricultural farms were transformed into commercial companies and partnerships, leasing agricultural land from their owners at the time. As a result, several-hundred- or even several-thousand-hectare farms operate over the vast majority of land, although their share in the total number of farms is relatively low. In turn, in Poland, Romania, and Hungary, as a result of the political transformations, most of the large state-owned farm enterprises collapsed or were closed down, and the direction of reforms created favourable conditions for the establishment of small farms. In the extreme case of Romania, in the early 1990s, 4.2 million farms with an average size of 2.4 ha were created as a result of the restoration of the right to land [Zadura 2009, p. 248-255]. Such activities have resulted in a diverse area structure of farms in the countries under study to this day (cf. Table 4). For instance, in 2013, more than ¼ of all the farms in the Czech Republic belonged to the “above 50 ha” area group and operated over ca. 90% of the total agricultural area. In the same period, in Romania, farms with an area above 50 ha constituted only 0.6%, although they owned more than 50% of the land.

Table 4. Area structure and share of agricultural area in the individual area groups of farms in the selected EU countries

	Area structure of farms					
	2005			**2007**		
	<10 ha	**10-50 ha**	**>50 ha**	**<10 ha**	**10-50 ha**	**>50 ha**
Czech Republic	64.1%	20.7%	15.2%	61.8%	21.5%	16.7%
Hungary	93.8%	4.6%	1.6%	93.3%	4.7%	1.9%
Poland	85.6%	13.5%	0.8%	84.8%	14.2%	1.0%
Romania	97.7%	1.9%	0.3%	97.4%	2.2%	0.4%
	2010			**2013**		
	<10 ha	**10-50 ha**	**>50 ha**	**<10 ha**	**10-50 ha**	**>50 ha**
Czech Republic	33.7%	36.4%	29.9%	37.4%	35.6%	27.0%
Hungary	91.6%	6.0%	2.4%	89.8%	7.3%	2.9%
Poland	77.4%	20.8%	1.8%	76.0%	21.8%	2.2%
Romania	97.9%	1.6%	0.5%	97.6%	1.9%	0.6%
	Share of agricultural area					
	2005			**2007**		
Czech Republic	1.9%	5.6%	92.6%	1.7%	5.6%	92.7%
Hungary	13.0%	15.9%	71.0%	10.7%	14.5%	74.7%
Poland	35.4%	41.0%	23.5%	35.5%	40.2%	24.3%
Romania	50.5%	9.5%	40.0%	49.8%	10.2%	40.0%
	2010			**2013**		
Czech Republic	1.0%	5.6%	93.4%	1.2%	6.1%	92.7%
Hungary	9.9%	15.8%	74.3%	9.2%	16.5%	74.3%
Poland	30.4%	40.1%	29.5%	28.2%	41.0%	30.8%
Romania	38.8%	8.4%	52.8%	38.5%	9.4%	52.1%

Source: Eurostat 2018 (a).

At the same time, in Poland, Romania, and Hungary a slow decrease in the share of the smallest farms up to 10 ha of AL can be observed, along with an increase in the share of those from the “above 50%” group. In the Czech Republic, this process took place from 2005-2010,

but already three years later, the share of small entities increased at the expense of the decrease of the large ones' share (moreover, over 2010-2013 the total number of farms increased). This situation – different to that in the other countries – is a result of the relatively fast growth in the number of small farms oriented at direct sales or production for their own needs (which is reflected in the twofold increase of the share of farms with more than 50% of production retained for their own needs, cf. Fig. 1). Interest in this type of activity results from the growing consumer demand for traditional, higher quality, less processed food. With each year, the network of farmer-consumer links is developing, as part of the so-called community-supported agriculture [Havlová and Hnutí 2018]. Certified organic farms, the number of which is successively growing, have a large share in this type of relationship [De Potter and Matějková 2015].

The average size of farms in terms of their area translates into their economic strength, which can be expressed in Standard Output (SO) units. Standard Output is a mean value of the production of specific plant- or animal-related activity over 5 years per hectare or per animal in 1 year, in the average conditions for the given region [Bocian, Cholewa and Tarasiuk 2014, p. 8]. The data concerning this parameter indicates a clear relationship between the farms' area structure and the place of production. In the Czech Republic, in 2013, more than 80% of SO was produced by farms above 50 ha in size, whereas in Poland they created 25%, and 31% in Romania. On the other hand, farms with an area below 10 ha produced only 12% of SO in the Czech Republic and as much as 60% in Romania (cf. Table 5). It can also be observed that from 2005-2013 the share of Standard Output created in the group of the smallest farms was decreasing, while it increased in the group of the large ones, with the reservation that for the Czech Republic this applied to the 2005-2010 period.

Table 5. Standard Output (SO) structure in the individual area groups of farms in the selected EU countries

	2005			**2007**		
	<10 ha	**10-50 ha**	**>50 ha**	**<10 ha**	**10-50 ha**	**>50 ha**
Czech Republic	13.3%	5.5%	81.2%	13.1%	6.0%	80.8%
Hungary	37.5%	13.3%	49.2%	35.1%	13.4%	51.6%
Poland	38.4%	42.8%	18.7%	37.4%	42.2%	20.3%
Romania	73.4%	8.1%	18.5%	71.3%	9.2%	19.5%

	2010			2013		
	<10 ha	**10-50 ha**	**>50 ha**	**<10 ha**	**10-50 ha**	**>50 ha**
Czech Republic	10.9%	5.1%	84.0%	12.1%	5.4%	82.5%
Hungary	33.4%	13.8%	52.9%	26.1%	15.2%	58.7%
Poland	33.4%	42.0%	24.5%	31.3%	43.4%	25.3%
Romania	64.8%	8.1%	27.2%	60.2%	9.3%	30.6%

Source: Eurostat 2018 (a).

In terms of the use of agricultural land, only slight changes occurred over the years under study. In 2013, arable land took up the largest part of the agricultural area – from 63% in Romania, up to 82% in Hungary, and compared with the 2005-2007 period, their share decreased on average by 1-2%. The primary crop plants included cereals, with a share of 57% of arable land in the Czech Republic, rising to 70% in Poland. The average 2-3% decrease in this plant species' share in the crop structure was compensated by an increase in the production of maize and rapeseed. Acreage growth also concerned permanent grassland (meadows and pastures) and, except for Poland, forested areas. In animal production, decreasing interest in this type of activity can be observed. This is manifested both in the reduction of livestock (in LSUs[6]) and – to an even greater extent – in the number of farms keeping animals (cf. Table 6). As a result, in spite of lower number of animals, the concentration of cattle and pig breeding, expressed as an average number of livestock heads per farm, increased in all the countries under study, although compared to leading Western European countries it is still low [Stępień 2015] (it is also worth noting that among the analysed countries, the Czech Republic stands out positively).

[6] LSU – Livestock Unit, it is a reference unit which facilitates the aggregation of livestock from various species and age as per convention, via the use of specific coefficients established initially on the basis of the nutritional or feed requirement of each type of animal (see website: http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Livestock_unit_(LSU)).

Table 6. Basic characteristics of animal production in the selected EU countries

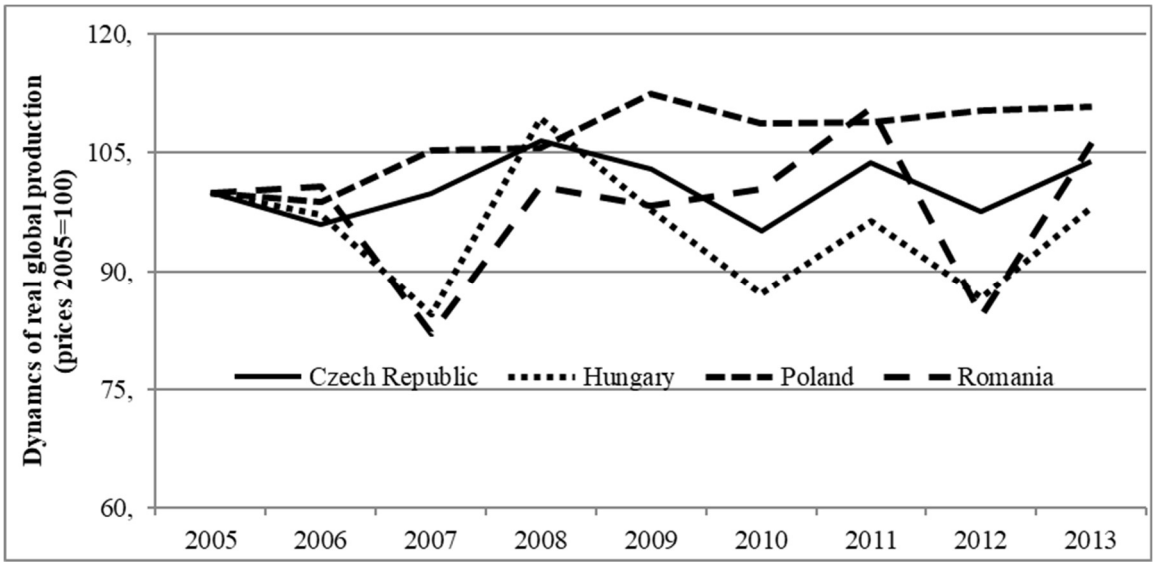
	2005	2007	2010	2013	2013/2005
	Number of farms with livestock (pcs.)				
Czech Republic	31 540	28 480	15 920	18 840	-40%
Hungary	501 910	439 910	381 650	312 430	-38%
Poland	1 547 480	1 539 380	918 870	797 750	-48%
Romania	3 453 010	3 333 490	2 836 640	2 727 720	-21%
	Number of animals in livestock unit (LSU) (pcs.)				
Czech Republic	2 074 380	2 052 810	1 722 460	1 728 360	-17%
Hungary	2 502 090	2 409 330	2 483 790	2 259 080	-10%
Poland	10 564 750	11 117 920	10 377 220	9 164 570	-13%
Romania	6 602 750	6 041 720	5 444 180	4 975 310	-25%
	Number of cattle per farm (pcs.)				
Czech Republic	93	102	132	119	27%
Hungary	28	36	37	42	48%
Poland	7	8	11	14	98%
Romania	2	3	3	3	36%
	Number of pigs per farm (pcs.)				
Czech Republic	207	252	477	312	51%
Hungary	12	14	18	21	75%
Poland	25	28	39	41	61%
Romania	3	3	3	3	17%

Source: Eurostat 2018 (b).

Structural transformations in the agricultural sector determine the achieved production results by changing effects and outlays and the mutual relationship between the two. One of the basic measures used for the assessment of the economic situation in agriculture is output value. It is a derivative of the size of plant and animal production created, and raw material prices for a given period. Taking this perspective into consideration, from 2005-2013, an increase was recorded in all the countries under study: 44% for the Czech Republic, 31% for Hungary, 58% for Poland, and 35% for Romania. In turn in order to demonstrate real changes in the production

volume, constant prices from 2005 were used. This way, the results were adjusted by the influence of prices, which made it possible to obtain a more clear-cut picture of the functioning of the sector. As we can see in Figure 1, a relatively high increase (over 10%) in real agricultural production occurred only in Poland, whereas in the remaining countries cyclical fluctuations, typical of the sector, were recorded, with no evident growth trend. However, it has to be taken into consideration that within the same period, the number of farms and their employees decreased considerably, which clearly improved labour productivity.

Fig. 1. Agricultural production dynamics for 2005-2013 for values expressed in the national currency in constant prices from 2005 in the selected EU countries.



Source: Eurostat 2018 (c).

Table 7 presents selected economic indices for farms. The size of standard output (SO) per farm increased in all the analysed countries, with the highest increase (as much as 135%) recorded in Poland, followed by the Czech Republic, Hungary, and Romania. In turn, the relation of standard output to the annual work unit (AWU)[1] improved most clearly in Romania, followed by the Czech Republic, Poland, and Hungary. In these three countries – the Czech Republic, Hungary, and Poland – the improvement of the productivity index was higher when the farm criterion was used, whereas in Romania the index increased more when AWU was used. This results from the fact that in Romania the decrease in employment (expressed in AWU) was higher in the 2005-2013 period than the decrease in the number of farms, while in the other countries the situation was the reverse. This is confirmed by another index –

[1] The annual work unit (AWU) corresponds to the work performed by one person who is occupied on a farm on a full-time basis. Full-time means the minimum hours required by the relevant national provisions governing contracts of employment. If the national provisions do not indicate the number of hours, then 1 800 hours are taken to be the minimum annual working hours: equivalent to 225 working days of eight hours each.

employment in AWU per farm. While in the Czech Republic, Poland, and Hungary this index increased in the period under study, in Romania it decreased. The last of the indices discussed is the level of labour force used (AWU) per 100 ha of AA. In this case, improvement occurred in all the countries, to the greatest extent in Romania and the Czech Republic.

Table 7. Selected economic indices of farms in the EU countries under study

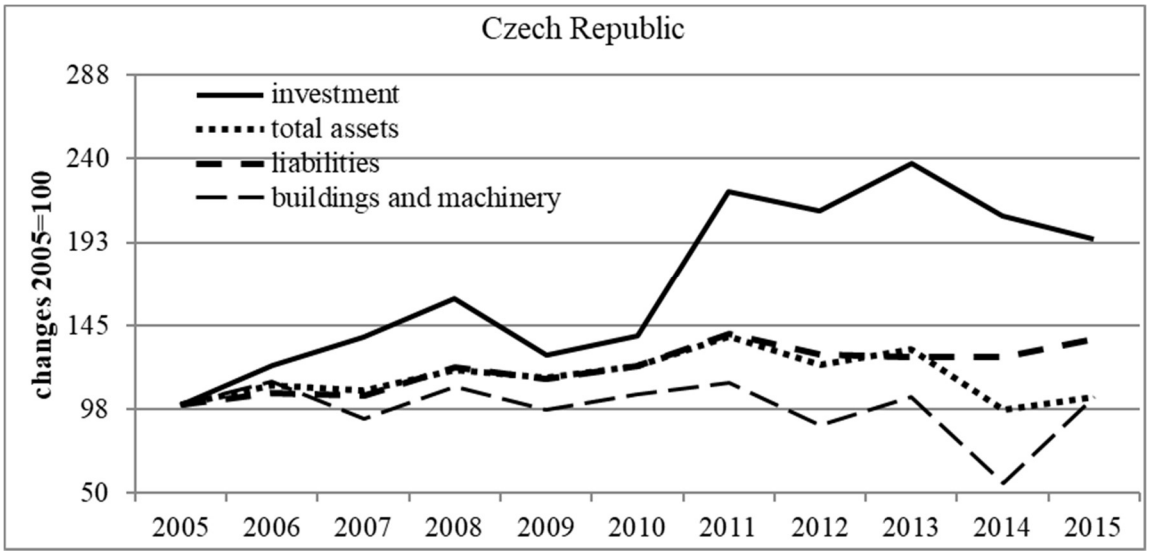
	Standard Output SO in thous. euro per farm					**Standard Output SO in thous. euro per Annual Work Unit AWU**				
	2005	**2007**	**2010**	**2013**	**2013/ 2005**	**2005**	**2007**	**2010**	**2013**	**2013/ 2005**
Czech Republic	86.5	91.2	168.5	169.4	96%	24.0	26.2	35.7	42.3	76%
Hungary	6.9	7.4	9.1	11.4	65%	10.6	11.5	12.4	12.9	21%
Poland	6.5	7.1	12.6	15.3	135%	7.1	7.5	10.0	11.4	61%
Romania	2.5	2.6	2.6	3.3	34%	4.0	4.6	6.1	7.7	91%
	Annual Work Units AWU per farm					**Annual Work Units AWU per 100 ha of agricultural area AA**				
	2005	**2007**	**2010**	**2013**	**2013/ 2005**	**2005**	**2007**	**2010**	**2013**	**2013/ 2005**
Czech Republic	3.6	3.5	4.7	4.0	11%	4.3	3.9	3.1	3.0	-30%
Hungary	0.6	0.6	0.7	0.9	36%	10.8	9.5	9.0	9.3	-14%
Poland	0.9	0.9	1.3	1.3	46%	15.4	14.6	13.1	13.3	-14%
Romania	0.6	0.6	0.4	0.4	-30%	18.7	16.0	12.1	11.9	-36%

Source: Eurostat 2018 (a).

Investment and farm asset dynamics

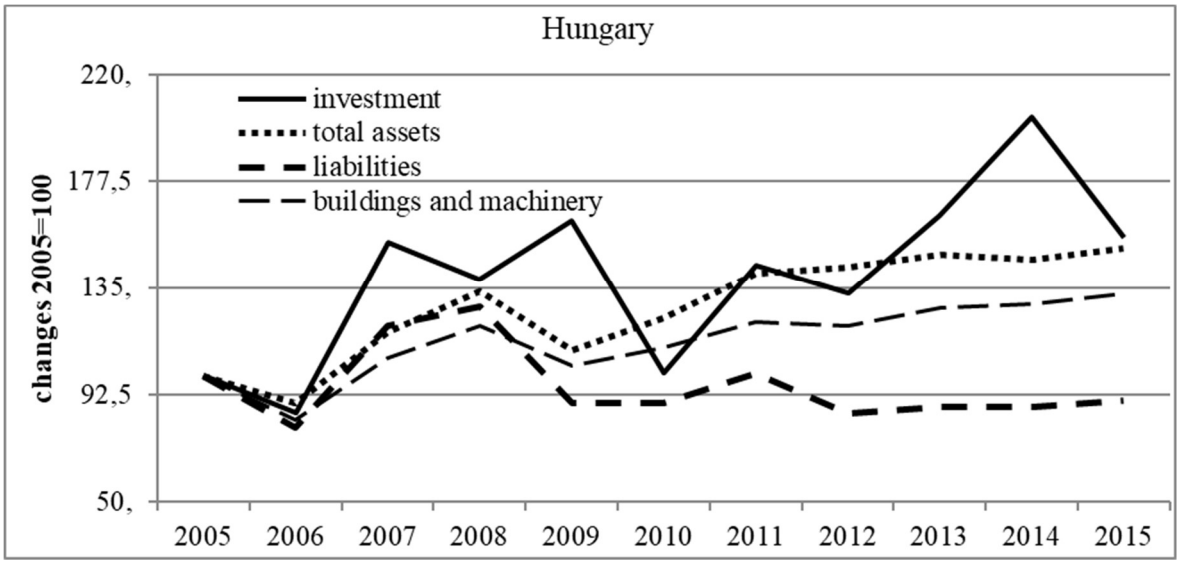
As the primary aim of the paper is to demonstrate the investment-oriented role of the second pillar of CAP in the transformations in the agricultural sector, it is important to specify the changes in investments and farm assets. Due to the lack of such information in the Eurostat database, this part of the work uses farm accountancy data provided by FADN (for 2005-2015, in Romania for 2007-2015). Based on the analysis of source data, it may be concluded that in the Czech Republic, Hungary, and Poland the level of investment expenses of an average representative farm in 2013, compared to 2005, was higher by 137%, 64%, and 40% respectively (cf. Fig. 2, 3 and 4).

Fig. 2. Gross investment, asset value and total liabilities dynamics in the Czech Republic in 2005-2015



Source: FADN 2018.

Fig. 3. Gross investment, asset value and total liabilities dynamics in Hungary in 2005-2015



Source: FADN 2018.

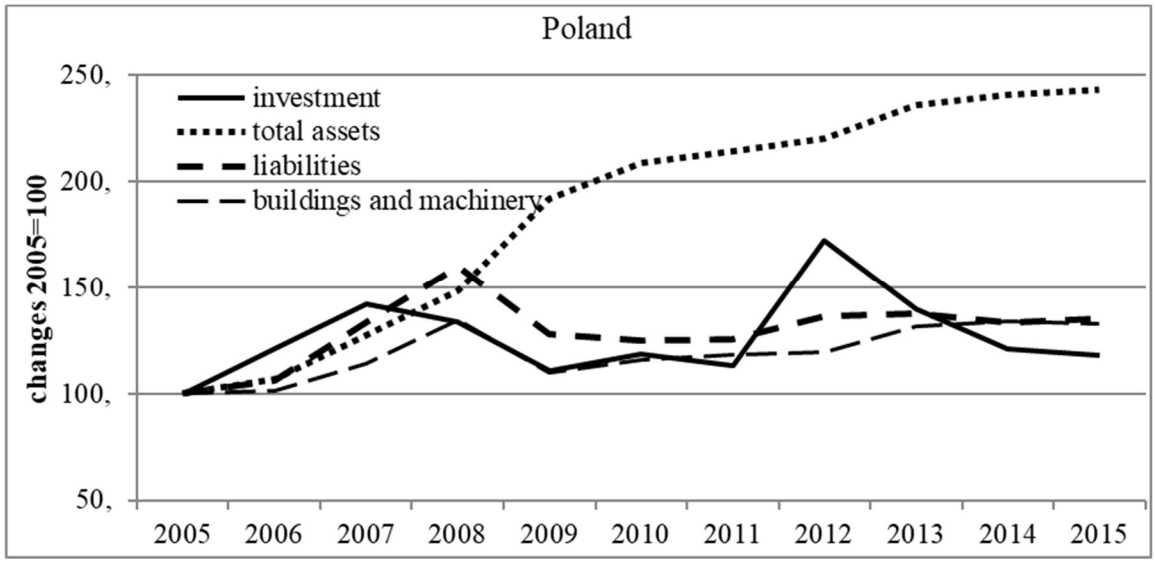
Over the following years, however, investments were characterised by clear fluctuations, reaching as high as several dozen percent (e.g. in the Czech Republic investment growth in 2010-2011 was as high as 60%). Thus, a statistically significant growth trend cannot be demonstrated, but we can talk about a general increase in investment expenses in these countries. The diverse scales of investment in the consecutive periods resulted from the schedule of activities adopted in the rural development programmes (the pool of funds for investment purposes was different in individual years). In turn, in Romania, in spite of including Common Agricultural Policy funds in the economy, the level of investment in all of the 2008-

2013 period (apart from 2009), relative to 2007, was lower (cf. Fig. 5).Thus, the accomplishment of the investment-oriented objectives of the second pillar of CAP was the least evident in this case. This may be a result of the lowest investment subsidies, compared with the other countries, obtained on average per farm. For 2007-2013, on average they amounted to EUR 15, whereas in the Czech Republic it was nearly EUR 4,200, in Hungary EUR 850, and in Poland EUR 234. Even if we take into consideration the remaining support for rural areas, such as payments for less-favoured areas and agri-environmental payments (which could also indirectly be allocated for investment purposes), the disparities remain very high. This disproportion once again reveals the diverse area structure of farms. The predominance of small farms in Romania was the decisive factor in making the average help for a single entity much lower than, for example, in the case of the Czech Republic[2].

The growing scale of investment expenses should in practice translate into higher asset values. If we look at the countries under study, the most evident increase in this respect occurred in Poland. Moreover, the assets grew each subsequent year (on average by 9%) and, as a result, in 2013 they were higher by 136% compared to 2005. Closer analysis allows us to understand this process better. It turns out that the main growth factor for the total value of farm assets in Poland was the increase in the value of land, resulting from higher prices. The value of buildings, machines and equipment alone increased by 31%, and the directions of changes were not always the same (cf. Fig. 4). In the remaining countries, the directions of changes in total asset values resulted above all from the direction of changes in the value of buildings, machines, and equipment, although the value of land also increased the total increase in asset value (cf. Fig. 2, 3, 5). And so in the case of Hungary, total asset growth came to 48% (including buildings, machines, and equipment 27%), and in the case of the Czech Republic 32% (and 4% respectively). The low increase in the value of the "buildings, machines, and equipment" group in the Czech Republic is a result of the large scale of farm building rental in this country, whereas FADN data only includes assets constituting the property of the farm. In Romania, between 2008 and 2013, the total value of assets, as well as buildings, machines, and equipment decreased only slightly. In this case, the small level of gross investment expenses made it impossible to expand the production potential.

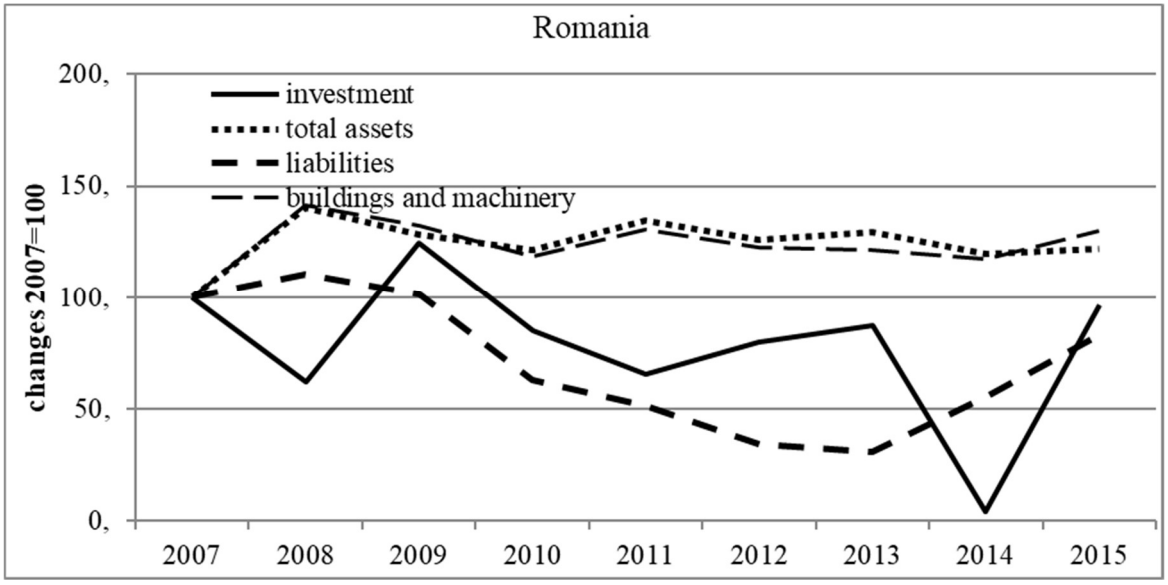
[2] Total annual average support for a FADN farm under rural development programme 2007-2013 was EUR 22 591 in the Czech Republic, EUR 3 509 in Hungary, EUR 1 342 in Poland and only EUR 126 in Romania.

Fig. 4. Gross investment, asset value and total liabilities dynamics in Poland for 2005-2015



Source: FADN 2018.

Fig. 5. Gross investment, asset value and total liabilities dynamics in Romania for 2007-2015



Source: FADN 2018.

Analysis of the data concerning assets also makes it possible to conclude that, in comparison with the dynamics of investment expenses, the changes in their value were more stable (the annual fluctuation amplitude usually amounted to anything from several to around a dozen percent). This means that with a high increase or decrease in investment expenses, the value of assets does not change rapidly. In order to execute agricultural production it is essential to guarantee the appropriate potential, regardless of whether we make an investment in a given year or limit them. Moreover, a surge of investment in fixed assets (e.g. farm buildings) increases the assets not only in the given fiscal year, but also in the subsequent years. Figures2-

5 also show the change in the level of farms' liabilities, because the execution of investments, also within the programmes of the CAP second pillar, often involves the need to obtain external funding. And so, in the case of the Czech Republic and Poland, the value of liabilities in 2013 was higher than in 2005 (by 27% and 37% respectively), which means that in these two countries investment expenses were financed to a relatively large extent from external capital. In Hungary, after initial growth, the level of obligations towards the end of the period was lower by 12%, which may mean a higher share of financing with the farms' own funds. In Romania, from 2007-2013, the decrease came to as much as 70%, but in this case it may result from a lower scale of investment [cf. P. Avramia 2013, pp. 721-729].

Finally, a couple of remarks on the years 2014-2015. This was a transition period – the beginning of the 2014-2020 budget period, and so also the beginning of the implementation of new rural development programmes. In the context of investment expenses, the data indicates a decrease in the Czech Republic and in Poland in 2014 and 2015, and in Romania in 2014 (in the Czech Republic and Romania combined with a decrease in asset value in 2014). This may signify exhaustion of funds for investment towards the end of the previous budget outlook for 2007-2013 and/or delays in terms of objective preparation and implementation of investment activities for the current outlook. If we take a closer look at the numbers included in Table 8, a large decrease in investment subsidies can actually be observed in the Czech Republic in 2013-2014 and in Romania in 2012-2013. In Poland, the average amount of support for farm investments remained at a similar level after 2010, but in 2015 a considerable decrease in the total support within the second pillar of CAP was recorded (and as mentioned before, the remaining funds may indirectly influence the amount of investment expenses). Hungary was the only country in which increased funding for 2014 was planned (both for investment and generally for the second pillar), although a year later. The amount of subsidies dropped.

Table 8. Investment subsidies and total support within the CAP second pillar (in EUR) on average per one FADN farm in the selected EU countries

	Czech Republic		Hungary		Poland		Romania	
Years	Investment subsidies	Pillar II total	Investment subsidies	Pillar II total	Investment subsidies	Pillar II total	Investment subsidies	Pillar II total
2004	641	8318	498	531	0	34	-	-
2005	1173	11573	665	1920	18	451	-	-
2006	1263	16898	268	1420	43	1261	-	-

2007	1829	16581	690	2492	157	1176	30	30
2008	2202	22897	913	3295	240	1602	24	37
2009	3845	22747	1504	3552	182	1281	26	46
2010	4398	22959	809	3662	255	1451	6	58
2011	8598	28973	725	4356	254	1346	12	199
2012	5536	23670	463	3459	269	1216	2	191
2013	2979	20312	843	3746	279	1321	5	318
2014	2782	18455	1662	4568	294	1263	131	188
2015	5957	20844	994	2159	272	705	77	104

Source: FADN 2018.

Conclusions and recommendations

The second pillar of the Common Agricultural Policy for 2007-2013 was undoubtedly an important element of support for rural areas in the countries of East-Central Europe. Its significance resulted from the need to improve agriculture's agrarian structure, increase the competitiveness of agricultural producers, transform the employment structure, needs in the area of infrastructure development, and finally, the accomplish tasks related to the protection of the natural environment [Czyżewski and Stępień 2017, pp. 37-54]. The accumulated effects of the support led to a considerable improvement of the income situation of agricultural producers and to structural changes at farm level [Wilkin 2016, pp. 120-124]. The creation of rural development programmes triggered the multiplier effect of investment expenses. Axis I activities, such as "farm modernisation" or "increase in added value", increased the scale of investment and led to the growth of fixed assets in the Czech Republic, Hungary, and Poland. Thanks to that, business activity results in improved standard output per farm and increased AWU. An increase in real output was also recorded in Poland. It was only in Romania, on account of the decidedly lowest level of subsidies among all the studied countries, that the investments and fixed assets decreased within the analysed period, and standard output per farm increased to the lowest extent. On the other hand, the higher level of investment in Poland and the Czech Republic resulted in an increase in these countries' liabilities, which may have consequences for their financial liquidity in subsequent periods.

Agrarian structure improved in all of the countries under study – the number of farms decreased, thanks to which an increase in their average surface area was recorded and the share of entities sised above 50 ha of AL increased, while the share of entities below 10 ha of AL decreased. The largest decrease in the number of farms, in absolute and relative terms, occurred

in Poland, and the structural pension programme, as an element of RDP axis I, may have contributed to that. The process was the slowest in Romania, where no such programme was launched and where support in the form of area subsidies ossified small farm agriculture. Maintaining a large number of small farms made it possible to limit unit labour inputs (AWU), thanks to which the productivity indices of this production factor improved. In the remaining three countries, the increase in the average farm surface area and the growth of production scale required a higher use of labour force (AWU). Another common characteristic of the four economies was the decreased interest in animal breeding. Farmers preferred plant production, partly supported by supplementary payments in the CAP first pillar, and its second pillar did not include any special programmes for the animal sector. Still, due to the limitation of the number of producers, herd concentrations increased, although the distance between Hungary, Poland, and Romania and the EU's leading livestock producers in this respect remains large.

Taking into account previous experience, the key issue is to keep a relatively high level of funding for the second pillar of CAP for EU-12 countries after 2020. This will allow them to continue along the path of structural transformations and strengthen the competitiveness of the agricultural sector in this region. As the growth of production potential will primarily concern large households, by investment programmes, it is important to guarantee appropriate support programmes for small farms, as well as activities related to supporting entrepreneurship in rural areas and for the labour market (subsidies for non-agricultural activities, professional activation), support for the education system and increasing access to information technologies.

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