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Selected aspects of the transformation of agriculture in the CEECs following the fall of the Eastern Bloc

Jerzy Bański 

Polish Academy of Sciences

Institute of Geography and Spatial Organization

Twarda str. 51-55, 00-818 Warszawa, Poland

jbanski@twarda.pan.pl

Abstract. Over the last three decades, agriculture in Central and Eastern Europe has undergone very profound change. This first and foremost reflected the collapse of the communist system, as well as accession to the European Union in the case of most of the CEECs. The work detailed here has thus had as its cognitive goal the identification of trends regarding selected components of agriculture's spatial structure which have included agrarian structure, agricultural land use, and the structure of agricultural production. Attention has also been paid to what conditioned the transformation, as well as the spatial differences that characterised it. With a view to these objectives being achieved, 11 current EU Member States in the region were analysed, above all by reference to source materials from EUROSTAT and the FAO.

Keywords: Central and Eastern Europe, agriculture, transformation, ownership, agricultural land, crops.

Introduction

More than 30 years have now elapsed since the fall of the Eastern Bloc; and the CEECs' adoption of a new socioeconomic and political system. In the face of that fact, it is necessary to recall how, in the communist era, agriculture in these countries gained strong state support – through a period prolonged enough for a new, alternative model of the farm to take shape. Here it would be enough to recall the ownership structure, which was soon dominated by Cooperatives and State Farms. Similarly, when it came to accessing the means of production – and the market for what was produced – a decided preference was shown for the agriculture operating in the above context – which of course did much to limit the possibilities of development for alternative farming still in individual hands. Equally, the fall of the communist system in the 1990s gave rise to years of transformation in the agricultural sector that merged into the need to make ready for EU membership. In consequence, far-reaching changes in the characteristics of agriculture in the CEECs did take place.

The post-communist transformations of the last three decades have resulted in the privatisation of property and production, on-farm technical and technological modernisation, improvements in efficiency, increased output, and inclusion within the globally-competitive food-production system (Csaki and Lerman 2000; Rusu and Florian 2003; Bański

2004; Petrick and Weingarten 2004; Halamska 2013). The collapse of the hitherto-dominant state and so-called “socialised” sector of agriculture resulted in changes in land-ownership structure, the emphases where output and the distribution of food products are concerned, and conditions on the labour market (Burger 2001; Doucha et al. 2005; Bański and Bednarek 2008).

Meanwhile, the accession of the CEECs to the EU; and the opportunities to benefit from direct payments, Structural Funds and special funding programmes addressed to farming all ensured that transformations in the sector comprising the agricultural economy gathered pace (*Rural Development... 2008*). And they proceeded in line with similar principles and mechanisms arising to an ever-greater degree out of EU agricultural policy that was itself tending to leave behind mass production by way of industrial methods in the direction of diversity, production of a more environment-friendly nature and a tendency for what was produced to want to draw benefit from local specifics (local food products and traditional food production methods).

All this has also denoted changes in the nature of farms, whose adoption of multi-functional principles has ensured the supplementation of food production with activity in services, commerce, craftsmanship and/or manufacturing. In the face of this, it would seem to be worth identifying and assessing social and economic processes ongoing today in the agriculture sector in the CEECs. And, while the literature on this subject is actually very extensive already, work has nearly always related to very specific topics (e.g. Dumitru et al. 2004; Ducha et al. 2005; Bański 2014), and/or to just certain selected parts of the region in question (e.g. Spišiak 1997; Burger 2001; Orłowski 2001; Kovacs 2003; Csaki and Kray 2005). The primary cognitive aim of the work summarised here has therefore been to achieve a broader (full-regional) identification of directions of change characterising selected components of agriculture’s spatial structure, including agrarian structure, the use of land in agriculture, and production structure (in relation to both plants and animals). Attention has been paid to the conditioning of these transformations, and to the spatial differentiation typical for them. The region under study is assumed to comprise formerly communist countries accepted into the EU, i.e. Estonia, Latvia, Lithuania, Poland, the Czech Republic, Slovakia, Hungary, Romania, Croatia, Slovenia and Bulgaria. The source materials used have derived first and foremost from *Eurostat* and the FAO.

Ownership change in the agriculture sector

The ownership changes achieved in the CEECs post-1989 were of various types and dynamics – depending first and foremost on how much the aforesaid “socialised” sector (mainly of Cooperatives and State Farms) had taken into its possession, as well as on the system adopted many years later to restore rights of ownership of agricultural land and other assets.

In 1991, Bulgaria passed its Act on the ownership and use of arable land, which provided for the return of property that had previously been taken over (Zadura 2005). Former owners or their heirs could obtain land or a compensatory voucher for land lost. However, this agricultural reform did not receive the proper backing of state policy, and thus commenced without adequate initial preparations. The lack of cohesion – and of a clear programme by which to achieve structural reform – combined with a privatisation plan

designed with built-in protection of certain interests in mind to influence farming and farmers in a quite negative way (Bencheva 2005). Unfavourable results included extensification of agricultural production (Moteva et al. 2014), as well as far-reaching fragmentation of cultivated fields; plus an increase in numbers of small farms (Bencheva 2005). At the beginning of the 2000s there were an estimated 8.7 million plots owned by 5.1 million citizens of Bulgaria, which is to say 65% of the entire population (Kopeva 2003). The Agricultural Census run in 2003 thus revealed very marked polarisation of farms, with a large group of small examples covering less than 2 ha each (and altogether accounting for less than 10% of the country's farmland), as well as a few very large agricultural enterprises and Cooperatives having more than 70% of all agricultural land at their disposal.

While Croatia adopted its Act on the restitution of property as early as in 1990, the Balkan War ensured that the actual process of return was suspended through to 1996. Even then, the privatisation only proceeded slowly, and was unstable and surrounded by an aura of mistrust. This reflected widespread corruption and cronyism that saw many state enterprises sold at below market prices. Such a situation did little to favour either economic reform or foreign investment. Thus, as recently as in the late 1990s, some 70% of the largest enterprises in Croatia remained under state ownership (Benczes 2014). Likewise, a 2015 report found that family farms were still cultivating around 80% of all agricultural land, while the rest still came within the state sector (*The agriculture....* 2015).

In Czechia and Slovakia, the post-communist authorities recognised that the private ownership of land had been suspended across the entire 1948-1989 period – hence the legal basis for restitution. The return of plots (of up to 150 ha of farmland) could be applied for by residents of the then Czechoslovakia who had been owners of land back in 1948, or else were the heirs thereof. As a result of the process of privatisation, some 3.4 million ha of land found itself back in private hands, while the state had just 400,000 ha at its disposal (Bicik and Jelecek 2009). In Slovakia, the restitution of land was clearly obstructed by the consolidated nature of field distribution. In the first decade of the new state's existence, the right of ownership was conferred or restored in regard to about half of all farmland. Remaining land was administered by the Slovakian State Land Fund. Land under no particular ownership was nationalised and given over to the local authorities for their use. But despite far-reaching changes of ownership, a decided majority of agricultural land has in effect continued to be used by the old Cooperatives, even if the latter have formally transformed into commercial-law companies.

It was in 1991 that Estonia's Agricultural Reform Act was enacted to provide for the restitution of rights of land ownership. The following year a further Act appeared to close down collective farms. The initial phase of the process by which rights of ownership were reinstated had the effect of fragmenting agricultural land in a drastic way. Around 200,000 farms made their appearance in the Estonian countryside. However, a process of land consolidation then commenced very rapidly, thanks to credit extended by the World Bank, as well as support from the Government of The Netherlands. By 2016, only 17,000 agricultural entities remained.

Lithuania's Act on the restitution of rights of ownership of land was adopted in 1991. But such land could only be taken on by citizens of the country, who obtained a maximum of 50 ha of farmland (later 150 ha, but taken together with forest and waters). The recompense could take the form of land itself, or a compensatory payment. Moreover, given the difficult situation faced by Lithuania's rural population, the authorities gave the

green light for an action conferring 3 ha of land on each family of former *Kolkhoz* and *Sovkhoz* employees, as well as 2 ha for remaining village inhabitants. While being of benefit to the community, this solution generated a land fragmentation problem, as a large number of small farms came into existence, even as they lacked both capital and knowledge. Standing in marked contrast to these was a small number of very large farms (Daugaliene 2008).

Restitution of land in Latvia was likewise confined to citizens of that country, and was done with by 2001. The first phase of reform saw 800 large Collectives and State Farms converted into 200,000 private farms (Tisenkopfs 1999). However, the reinstatement of land ownership did not lead to the fragmentation of land holdings and farms. According to Zadura (2005), around 60% of the property recovered as a result of restitution comprised a single piece of land. Thus, as of 2016, the number of farms in Latvia amounted to 82,400, with an average area of 36 ha.

The privatisation of agricultural land in Poland took a different course and was concentrated mainly where the State Farms had been in operation (Bański 2007). Unlike in other countries of the region, returns of property were not widespread in Poland, merely occasional, and anyway characterised by lengthy legal processes. The concept that won through entailed a total shutdown and liquidation of the State Farms, and key consequences of that were increased unemployment, devastated agricultural infrastructure, the impoverishment and disintegration of local communities, limited access to cultural and educational infrastructure, and a considerable reduction in agricultural output on the formerly State-Farm land. The last of these institutions were closed down in 1994. In most cases they were loss-making, though there were also some that were – or would have been – able to cope in the new economic reality (Zgliński 1997).

The Romanian model for privatisation of agricultural land was based on the country's Land Fund Act of 1991, which provided for the return of up to 10 ha of land to former owners who had been forced to hand it to the communist resource used by the Cooperatives. Ownership change resulted in the return of more than 9 million ha of land. Almost 4 million tiny farms appeared, though the numbers soon declined, probably as land concentrated in larger units, albeit in a rather gradual manner.

Slovenian agriculture resembles that in Poland and Croatia in having remained largely private throughout the communist era. Around 90% of agricultural land belonged to private owners. Through to the early 2000s around half was taken for the “socialised” sector. Other state-owned land has been leased to private farmers or companies that arose to take the place of the State Farms.

Reprivatisation reform was pursued in Hungary in the years 1992-1996. It entailed compensation being awarded to the value of lost assets; as well as the ownership transformation of the Cooperatives, and privatisation of the State Farms. Overall, some 2.7 million ha were assigned to meet the needs of reprivatisation claims, with the remainder parcelled out between members of Cooperatives; or else sold off to private owners or the former personnel of the State Farms. It is estimated that some 1.5 million people in this way obtained land that had hitherto been under joint ownership, while 0.5 million had land returned to them, and a further 0.5 million received so-called “golden crown” land (Kovacs 2005). The result of the privatisation and restitution was a total change of ownership structure. By 2011, around 80% of agricultural land was already in private hands (Toth-Naar et al. 2014). Two main types of farm took shape, i.e. agricultural en-

terprises (Cooperatives and farm production companies) and farms in the more typical sense.

In most of the CEECs today, it is family farms that play a prevalent role, which is to say those managed and serviced mainly by members of a given farming household. This category of farms also represents the form most widespread in Western Europe. According to *Eurostat* data, as of 2016, the 10.4 million family farms in the EU as a whole included more than a third of the total (34.5%) located in Romania. A high share of such farms was also a feature of Poland (with 13.6% of the total accounted for by farms there).

In most of the region's states (Romania, Hungary, Bulgaria, Slovenia, Croatia and Poland), family farms belong to a group of small entities accounting for areas of less than 10 ha. However, this category is in fact seen to be a broad one, given that it includes small entities of limited commercial viability; as well as certain multifunctional entities of diversified economic activity gaining income from agriculture, services and processing; and also larger farms displaying a greater degree of specialisation and a market orientation. In general, though, the agrarian structure in the region under study is fragmented, and to a decidedly greater extent than in other countries of the EU. However, processes observable today are moving in a more favourable direction as the consolidation of farms continues.

Changes in selected components of agriculture's spatial structure

Agricultural land use

Among the countries in the region under study, at the start of the transformation period it was in Hungary that the share of all land still assigned to agriculture was largest (at around 70%). Further down the list were Romania (62%), Poland (60%) and the then Czechoslovakia (53%). In the subsequent 25-year period, it was in Hungary and Poland that the decline in this share proved to be greatest. Today it is possible to distinguish two groups of CEECs differing in the significance of agricultural land in the overall land-management structure. The first group comprises Romania, Hungary, the Czech Republic, Lithuania, Poland, Slovakia and Bulgaria – in which agricultural land represents that structure's main component and accounts for between 40 and nearly 60% of the entire country. In the remaining 4 countries (Estonia, Latvia, Slovenia and Croatia), a relatively large area of land is occupied by forest or "wasteland". Where the two Baltic States are concerned, this is a reflection of the unfavourable nature of both soil and climate. On the other hand, in the two Balkan states, the unfavourable conditions for farming are first and foremost a consequence of the mountainous relief.

While the loss of farmland has been a feature characteristic of the period following the collapse of the old Eastern Bloc (Fig. 1), the process has a far longer history, since it effectively began at the beginning of the last century – as a consequence of socio-economic development including the twin phenomena of urbanisation and industrialisation; as well as the development of the networks supplying technical and transport infrastructure. The largest areal changes in absolute terms were those affecting Poland and Romania – unsurprisingly given that these are by far the region's largest states, in which huge areas had been given over to agriculture.

Agricultural land is mainly being lost from areas close to large cities, where there is very dynamic development of single-family housing construction. A further reason has related to intensive development of the network of expressways and motorways; while an economic motivation has involved rationalisation of production in the food sector. Ultimately, areas with more-difficult natural conditions for farming or playing host to large groupings of farms of limited economic viability have been losing their agricultural functions, with what had been farmland either abandoned or deliberately reafforested.

Other than the Czech Republic (in which the share of all land that is agricultural is only declining very slowly), the region's largest countries have lost some 10% of their farmland since the fall of the Eastern Bloc. Moreover, the initial (1990s) changes were relatively limited on account of the crisis provoked by the collapse of the old system and only slow development of a market economy. It was not therefore until the turn of the century (and millennium) that a process of very dynamic transformation was set in train.

Generalising somewhat, it can be said that the phenomenon that is the loss of agricultural land intensified from the time our countries first began to make preparations for EU membership. At that point, both social and economic processes assumed a great deal more dynamism than they had had before.

The most marked decline in the share of land accounted for by agriculture was noted for Poland, with this having several explanations. A major one concerned increase in the territorial extents of towns and cities, mainly through a process by which housing development took place in suburbs, as well as satellite towns and villages. Agricultural land was also taken over for new developments in transport, above all the construction *de novo* of expressways plus a more-general upgrading of the transport network in metropolitan areas. On the other hand, the further pursuit of pro-environmental programmes saw low-quality farmland reafforested, given the lack of commercial viability of use in agriculture (Forest... 2015; Sulewski 2018). The loss of farmland can further be linked to unfavourable demographic processes, notably the ageing society problem most tangible of all in rural areas, given the migratory outflow of many young and active country-dwellers. Areas hit by such processes are failing to go on developing, and farms located there shut down. Many of the countries under study report similar phenomena (Bicik and Jelecek 2009; Gajdos 2005; Balteanu and Popovici 2010).

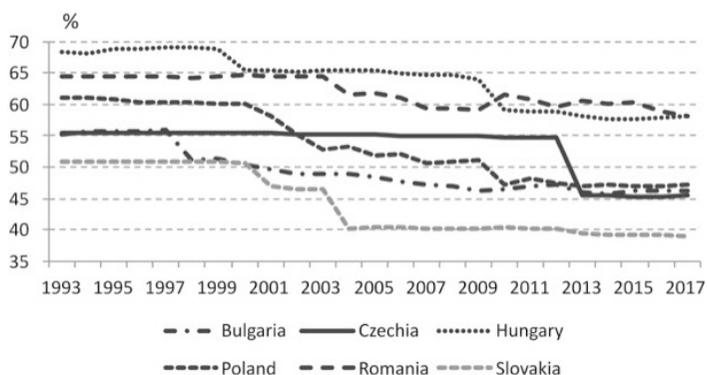


Fig. 1. Changes in the shares of agricultural land in the CECS
Source: author's own elaboration based on Eurostat data.

Crop production – above all the growing of cereals and industrial plants – plays a very important role in the agriculture of the CEECs; hence the prevalence of arable land among all kinds of farmland (Fig. 2). Remaining more-major components of the structure where agricultural land use is concerned are grasslands of different kinds; meaning that – in certain countries – areas of more-permanent agricultural cultivation are present in trace amounts only. In most of the region’s states, field crops account for more than 60% of the land assigned to agriculture. Only in the case of Croatia and Slovenia, where much of the land is mountainous, is there a lower share of farmland overall determined as arable. The latter two countries also support relatively large shares of more permanent cultivation, above all thanks to possibilities the climate affords for vines and olives to be grown. Such cultivation is also mainly feasible in the circumstances of an effective system of technical infrastructure above all involving irrigation in the drier areas and/or periods.

The loss of agricultural land in the CEECs was associated with changes in land-use structure that were far from homogeneous. Where the absolute areas are large (e.g. in the region’s largest countries – Poland and Romania), the structure referred to tended to remain rather stable, if with small fluctuations. It was nevertheless possible to note that, in Romania, for example, the share of farmland taken by meadows and pastures increased at the expense of areas under more permanent cultivation or used arably. On the other hand, in Poland it was above all the share of land under permanent crops that increased, in line with a growing interest in the orchard-based production of fruit and fruit products.

A noteworthy matter is the way in which most countries in the south of the region experienced a reduction in the importance of the aforementioned permanent cultivation – at least in terms of the area of land occupied. To a great extent it is vineyards and orchards that are involved, and change thus attest to an extensification of the production structure, as more highly-specialised forms of crop-growing tend to be resigned from (Takacs 2008). This has first and foremost been true of Romania, Slovakia and Bulgaria, as well as Hungary to a more limited degree. Most likely playing a role in the process are changes of ownership, and the associated resignation of small farmers from kinds of cultivation that are labour-intensive and require investments of their own money; as well

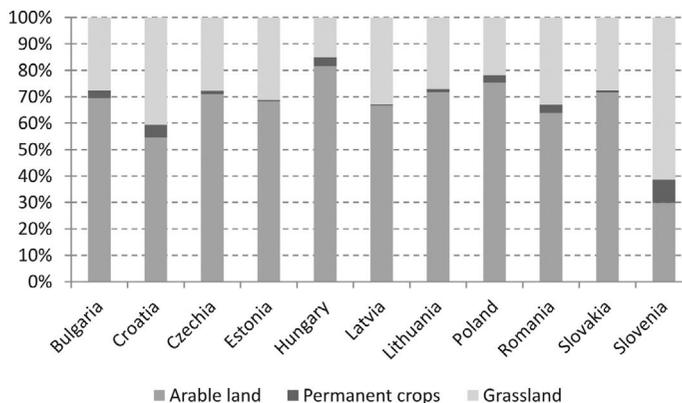


Fig. 2. The breakdown of land-use data by types of agricultural use in the CEECs as of 2017
Source: author’s own elaboration based on FAOSTAT data.

as modern technology and suitable technical infrastructure. In research on land use in Romania, phenomena of the latter kind were found to be at play (Popovici et al. 2013). The latter showed how the 1990-2000 period did indeed see farmers resign from intensive crop-growing. In turn, there were certain regions in which new owners of land abandoned its cultivation altogether, on account of a lack of funds or necessary professionalism. Only in Slovenia, where agriculture faces a better economic situation than elsewhere in the region, has there been an increase in the significance of permanent cultivation.

Bulgaria witnessed a decline in the share of farmland taken by grasslands as well as more permanent forms of cultivation, hence the increase noted in the share of cultivated fields. Such a trend would seem to have its justifications, given that more than 53% of the agricultural land in the country has very fertile soils. Currently, the leading role in the crop structure there is played by wheat and maize, which are regarded as strategic food crops (Moteva et al. 2014). An increase in the significance of industrial crops has also been noted, above all species yielding oil that can be converted into biofuels.

In Croatia it was again the areal role of field cultivation that rose, again first and foremost in relation maize and wheat. The level of output in respect of these cereals suffices to meet the needs of the country in full. Maize also goes mainly on to the domestic market, though surpluses do arise and are then sold on to such neighbouring countries as Bosnia-Herzegovina, Macedonia and Montenegro. Farms growing maize have been in receipt of area payments since 1998 (these taking the place of the earlier production subsidies). In Czechia, it was mainly the share of grasslands that increased, *inter alia* thanks to the collapse of the State Farms in hilly or mountainous areas characterised by low-quality agroecological conditions. The lack of state support for the farming sector encouraged people to stop trying to grow crops of limited profitability on arable land, with the result that the latter was converted into meadows or pastureland, or else planted with forest. Moreover, a decline in levels of domestic consumption of beef, milk and cheese gave rise to change in techniques of cattle-raising. The closed system that had prevailed in the 1990s (and required fodder crops to be grown on arable land) gave way to grazing out on grasslands for 7-8 months of the year (Bicik and Jelecek 2009). In the Baltic States, the changes ongoing were varied in nature. While Estonia and Latvia experienced a marked increase in the share of grassland at the expense of arable land, in Lithuania just the opposite happened.

Farms' agrarian structure and the market for land

As of 2016, the 11 analysed CEECs gathered more than 5.9 million farms making use of agricultural land. However, it remains easy to note major spatial differences where their numbers are concerned (Fig. 3). The numbers of farms in the Czech Republic and in Slovakia are relatively small, while in Romania, Poland and Hungary there are a great many of them (Table 1). In the latter three countries, the total number of farms (at around 5.2 million) is greater than the total for all remaining countries in the EU. These differences are also reflected in a marked disproportion in farm sizes. While in Czechia the average farm has more than 130 ha of agricultural land at its disposal, in Romania that figure is of just 3.6 ha.

In the 1990s, the privatisation and restitution of land ensured an abrupt increase in numbers of individual users of farmland, above all in Hungary, Bulgaria and Romania.

Table 1. Numbers of entities making use of agricultural land in selected CEECs

Country/Year	2005	2007	2010	2013	2016
Czech Republic	41,180	38,490	22,580	25,950	26,530
Hungary	662,370	565,950	534,020	453,090	430,000
Poland	2,465,830	2,380,120	1,498,660	1,421,560	1,410,000
Romania	4,121,250	3,851,790	3,724,330	3,563,770	3,422,030
Slovakia	66,360	66,520	23,720	22,050	25,660

Source: author's own elaboration based on Eurostat data.

The reforms pursued helped shape a polarised model for farm-size structure whereby a small number of large farms contrast with a huge number of very small ones. A similarly unfavourable agrarian structure characterises farms in Croatia. There is a prevalence there of family farms of average area 5.6 ha that together utilise around 76% of the country's agricultural land. That leaves large state-owned agricultural enterprises (Svrznjak and Franic 2012; *The Agriculture ...* 2015). Elsewhere in the region (other than in Poland), it was also possible to note an increase (if only a rather small increase) in numbers of individually-owned farms.

While mid-1990s Hungary had in excess of 1.4 million farms (Hartsa et al. 1998), that number has declined in the period since. The years 1990-2000 are believed to have brought a ca. 30% decline in numbers, with the figure being 50% for 2000-2010. This situation had several causes like low profitability of production, many small farms' self-supplying role and nature, the simultaneous employment of owners of small "farms" in other sectors of the economy, and population ageing (Sadowski and Takacs-György 2005; Toth-Naar et al. 2014). At the same time, there has been a steady increase in numbers of large agricultural enterprises. The current agrarian structure in Hungary is a dual one. On the one hand there are a very large number of small farms, while on the other there are relatively many corporate farms of areas greater than 300 ha.

In the case of Romania, the number of farms rose abruptly in the first period of transformation, with only a slow reduction thereafter. A negative impact of the restitution of rights of ownership was a divide-up into small plots of the land formerly administered by the communist-era Cooperatives. The number of users of farmland thus soared to around 4 million (Benedek 2000). However, after a brief period of stabilisation, the number of Romanian farms declined – on a more permanent basis to around 3.5 million by 2016. Agrarian fragmentation in Romania following on from the process of reprivatization was more far-reaching than in any of the CEECs. Some 2.8 million farms there (71% of the national total) cover less than 1 ha; yet account for 5 million ha in total, i.e. 35% of all farmland.

From among the countries studied it is possible to distinguish three groups with similar characteristics when it comes to farm-size structure (Fig. 4). The first group comprises Bulgaria, Romania and Hungary – with their very large numbers of tiny farms (accounting for around 70% of the total). The land these have at their disposal is already transferring to larger farms, and that trend is likely to be maintained. Indeed, it is very common for these farms to actually be little more than statistical artefacts, given that their land is already being used by economic entities that are larger and stronger. A second group made

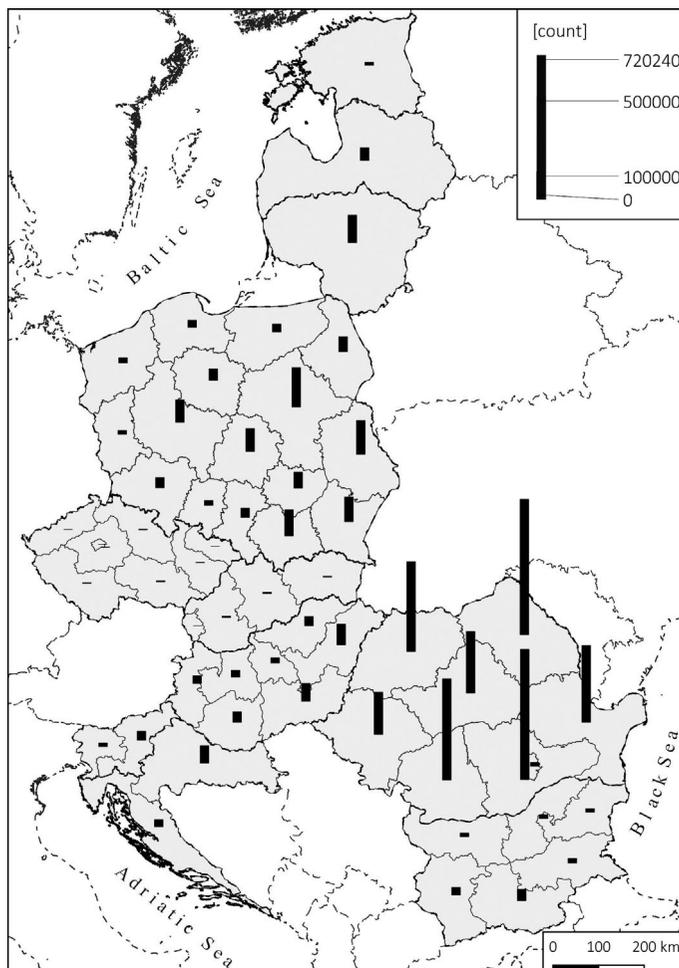


Fig. 3. Numbers of farms by region as of 2016
Source: author's own elaboration based on FAOSTAT.

up of Croatia, Lithuania, Poland and Slovenia has a prevalence of farms covering less than 10 ha when it comes to the size structure; while a third group (formed by the Czech Republic, Slovakia, Latvia and Estonia) is specific in that there are once again rather a lot of small farms, even as the crucial category comprises medium-sized and large farms. The transformation in the farming sector of the Czech lands and Slovakia left the size structure of farms largely undisturbed, as it was mainly the legal and administrative form of activity that changed. On the other hand, in Hungary and Romania, property underwent a major fragmentation of land ownership the result of which was not necessarily favourable.

Separate remarks may be addressed to land leasing – consideration of which can go a long way to explaining the real-life structure characterising the use of land. However, leasing often occurs by virtue of agreements lacking formal status, hence the difficulty with finding reliable data for analysis. Among the CEECs, it is this form of administering

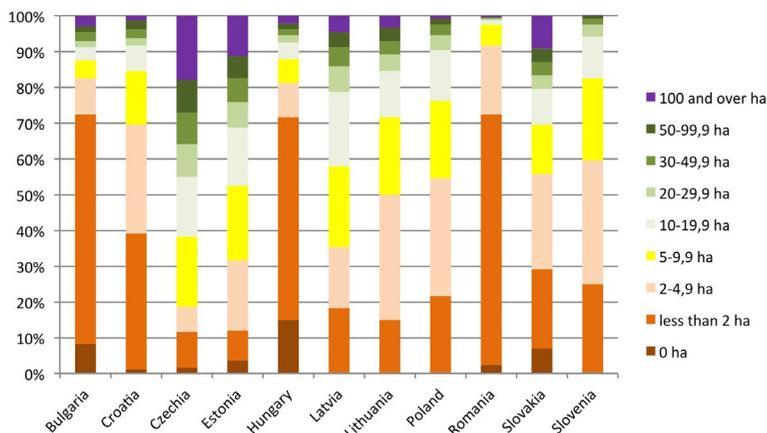


Fig. 4. The size structure of farms in 2016
Source: author's own elaboration based on Eurostat data.

land that has proved most popular in Czechia, Slovakia and Hungary. In the first of these countries, the situation at the beginning of the century was one in which around 90% of agricultural land was subject to leasing (Doucha et al. 2005). As a decided majority of landowners were not actually engaging in farming, their land is leased to production companies or small groups of individual farms.

In Poland, every fifth hectare of farmland is estimated to be the subject of leasehold, though data are again lacking, given the aforementioned informal arrangements whereby rates are agreed verbally alone. According to information from *Statistics Poland (GUS)* referring to 2017, the cost of leasing is around 200 euro/ha. Where land is leased from the Treasury, the amount to be paid is usually determined on market terms, with tendering having taken place. The basis concerns current and averaged prices of wheat announced by GUS.

Privatisation and the restitution of ownership increase possibilities for land to be traded in. However, at the beginning of the period of transformation, the market in agricultural land was in a state of dormancy, with this having a series of causes showing a high level of differentiation spatially and reflecting both the specifics of the different solutions arrived at by different states in their law, as well as the CEECs' overall economic situation. Compared with those in countries further west, the prices of agricultural land in the CEECs remain very low, though they have been increasing steadily in the whole period since 1989. According to *Eurostat* data, the average price of agricultural land in Czechia increased in the years 2000-2009 from 1555 to 2249 euros per ha. The corresponding rise in Slovakia was from 895 to 1256 euros, while in Romania the years from 2000 to 2005 brought an increase from 351 to 879 euros per 1 ha. Thereafter, land prices continued to rise, at different rates in different countries, and also very much in line with agroenvironmental conditions and the locations of pieces of land.

In 2011, prices of agricultural land in Czechia varied across the 260-5500 euro/ha range (assuming that 100 CZK = 3.7 euros), with an average figure at around 2000 euro/ha (Strelecek et al. 2011). In 2007, the average price for small plots of up to 1 ha (mainly with non-agricultural designations) equated to 59,000 euro/ha, and had risen by as much

as 73% after 2000. In turn, the price of pieces of land over 5 ha (with agricultural designations) was of 1324 euro/ha on average; and in fact fell in the same period as above by around 15%. In Hungary, the increase in land prices was first and foremost a result of the anticipated EU accession and connected matters relating to the possible purchase of property by foreigners, as well as the opportunity for agricultural subsidies to be taken advantage of (Pop and Stauder 2003).

In Poland, the average price of 1 ha of agricultural land sold privately was 298 euros in 1992, as opposed to 9169 in 2016. Thus, through the whole period spent in market-economy conditions, it has been possible to observe a steady increase in average prices of farmland. Poland's EU accession in particular led to a dramatic leap in prices, as connected with limited supply, and the opportunities for EU farm payments to be received. Record prices came to characterise land close to large cities and the main transport routes, where purchasers had an end of farming in mind – i.e. a change of designation in local physical-development plans – in the direction of land for building or recreation (Bański 2017).

What is interesting in this scenario is that the most-marked increases in price (of even 20% in the course of a year) actually concerned land classed as least suitable for agriculture. This reflects the manner in which this kind of land is easy to take out of production, with changes of designation in local physical-development plans possible – typically and mainly to meet the needs of housing construction (Wasilewski and Krukowski 2004). Once its designation has been changed successfully, land can even experience a 10-20-fold increase in price. In this case, it can be divided into small plots for buildings and sold at very good prices. Examples might be the areas around Warsaw and Kraków, where values may even exceed 100 euros per m². The development of housing in rural areas adjacent to large agglomerations proved to be the key factor stimulating further increase in land prices (Mayer and Somerville 2000; Ihlanfeldt 2007).

Spatial differences and directions of change in crop structure

Differentiated structures when it comes to the use of land in the CEECs to grow crops are above all a reflection of geographical conditions, including factors of a climatic and hydrological nature. Overall, the crop-growing structure of land use is dominated by cereals (accounting for 60% of the arable land on which crops of all kinds are sown). Key among these crops in terms of the share is wheat (Fig. 5). The region's major producers of this kind of grain are Romania, Poland, Bulgaria and Hungary – together accounting for more than 72% of the total amount of wheat produced in the region. The share of remaining species is rather differentiated in spatial terms, but second place is taken by maize, with rape as the third most important crop.

In the Baltic States, high shares of the land sown with crops are taken, not only by wheat, but also by barley, oats and rape. In some contrast, cropping structure in Poland is diverse, in the sense that similar values are to be noted for the shares taken by several species like barley, rape and rye (with lower figures noted for maize, oats and potatoes), even as wheat is the most major component. Where the structure in Czechia is concerned, the shares of wheat, barley and rape are high, while the relatively high figure for sugar beet there is noteworthy. The latter also plays a major role within the overall structure of crops sown in Croatia, Poland and Slovakia. Trends towards specialisation similar

to those noted in Czech agriculture also apply to crops in neighbouring Slovakia, albeit with maize and sunflowers even more significant there. In turn, Hungarian crop-growing is dominated by the three species maize, wheat and sunflowers (as listed in terms of successively-lower areas of land occupied). The cultivation of rape and barley also plays its major role. Features characteristic for Slovenia and Croatia can be said to involve the very high shares of cropland devoted to maize grown for its grain. Other than that, Slovenia only records high shares for wheat and barley. On the other hand, the analysed structure in Croatia is very diversified, with features – other than the major share taken by wheat – reflecting the major importance of the cultivation of barley, rape, sunflowers and the aforementioned sugar beet. In terms of its structure, Romanian agriculture stands out rather, in its similarly high share of maize and wheat, as well as the lesser significance of sunflowers, rape and barley. Finally, crop structure in Bulgaria is seen to be specific, given the high shares accounted for by wheat on the one hand and sunflowers on the other.

In the region as a whole, the key trends characterising the structure of crop-growing are those involving rising shares of rape and wheat, as well as declines affecting potatoes and barley. Beyond that, it is easy to detect the increase in the significance of sunflowers and maize, as well as the decline to be noted for the share of rye. Wheat plays a leading role in farming in all of the CEECs, as a reflection of its high-yielding character and very widespread application in the feeding of both people and livestock. In the case of rape, the level of production over the last three decades has increased markedly, even as the rise has been characterised by major variation in line with differing levels of business interest shown in the commodity. Price fluctuations can explain major changes from year to year in the areas of land assigned to this particular oil crop. Equally, a marked growth of interest did appear, once the CEECs had acceded to EU structures. The CAP made rape-growing a paying proposition, as it generated increased demand for the crop in the production of biofuels. Currently, this region supplies around 40% of all the EUs rape, with the major producers being Poland, Romania and the Czech Republic. In contrast, in recent decades most countries in the region have reduced their growing of potatoes steadily.

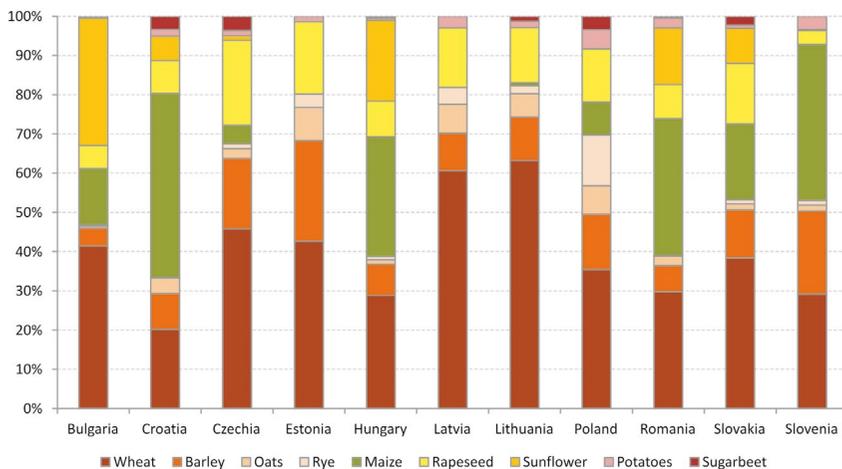


Fig. 5. The arable-land structure characterising the main crops in the CEECs as of 2017
 Source: author's own elaboration based on FAOSTAT data.

This in part reflects the replacement of this species by other root crops when it comes to fodder for animals. According to the Institute of Agriculture and Food Economics, National Research Institute, the reduction in potato production is due to the low profitability of animal production with potato base fodder (Dzwonkowski et al. 2018). Likewise as food for people, other vegetables are tending to take the place of potatoes – which anyway constitute a labour-intensive crop whose cultivation has been associated with rising costs. Since 1990 there has also been something of a decline in the area set aside for barley, which therefore means that the rise in production certain countries were able to achieve has mainly been a reflection of increased yields.

Changes in areas planted with all cereals, as well as several key representative species of that group, were seen to vary from country to country – making the identification of the main relevant trends difficult (Table 2). Where cereals overall are concerned, it is possible to refer either to declines in area or stabilisations. Beyond that, a further gradual decline in area may be anticipated, in connection with the overall loss of land from agricultural management. Given that there is also a decline in area even where the structure characterising all crops is concerned, it may be concluded that new varieties of the different cereal species allow for higher yields, thereby increasing production overall. This may in turn lead to problems of overproduction, perhaps making the growing of cereals a less viable proposition.

The area of land on which cereals are grown is relatively stable in the Baltic States (Estonia, Lithuania and Latvia), even as there are certain fluctuations from time to time. Among the cereals, wheat has clearly grown in significance, with the area under it increasing above the CEEC regional average level in all three countries. As elsewhere, there was an increase in the area of land on which rape and agrimony is grown, albeit with this rise being relatively larger than in other countries of the region. In contrast, there was a decline in the shares accounted for by other analysed categories of crop plant.

Table 2. Changes in the area sown with selected crops in the CEECs (11 EU Member States)

Kind of crop	1995	2000	2005	2010	2015
Apples	370,373	361,175	353,775	305,822	311,215
Barley	4,189,437	3,490,541	3,599,995	3,037,796	2,782,646
Maize	5,222,415	5,210,057	5,059,883	4,444,136	5,498,522
Oats	1,148,451	1,130,886	1,091,427	1,063,538	922,122
Potatoes	2,321,964	1,993,601	1,136,263	810,931	624,387
Rapeseed	1,010,404	1,145,236	1,391,064	2,954,558	2,535,638
Rye	2,884,417	2,503,956	1,658,450	1,264,783	905,120
Sugarbeet	838,574	600,080	541,851	355,163	327,426
Sunflower	1,877,644	1,757,151	2,283,869	2,154,107	2,557,198
Wheat	9,116,795	8,760,172	8,910,834	8,733,826	9,465,768
Cereals Primary	24,843,275	23,663,131	23,553,049	21,590,300	22,581,158
Fruit Primary	1,618,393	1,525,101	1,366,029	1,201,490	1,138,547
Vegetables Primary	939,040	839,290	668,782	590,744	589,922

Source: author's own elaboration based on FAOSTAT data.

The agriculture of Poland mainly differs from that in other countries of the region in the increase in areas of land assigned to fruit-growing. The difference in comparison with the rest of the region is clear. Also noteworthy are a stabilisation noted in the area under wheat, as well as an increase in the significance of maize. Similar changes have been characterising agriculture in Romania, though there it is the extensification of crop-growing that has been noted. There is stability when it comes to the area of land sown with cereals (including wheat and maize), as well as the same trend towards increased planting of oil crops as may be noted right across the region. The area of land accounted for by crops in other categories has gone down. Trends very similar to those noted for Romania have been taking place in Slovakia, albeit with a more rapid increase in the area assigned to maize.

Bulgarian agriculture has only featured an increase above average for the region when it comes to the area given over to plants from which oil can be pressed (rape and sunflowers equally). While an increase has also been noted for maize, this is merely in line with the average level of change in the region. The growing of other crops has tended to be curbed. Changes in Croatian agriculture have been rather varied, but can be seen as more favourable than those affecting farming in Bulgaria. Alongside the oil crops, barley and vegetables were the subjects of increases in areas planted that were above the average for the region as a whole. Meanwhile, the area under sugar beet remained steady. In turn, in Czechia, it is possible to speak of extensification of production, as linked with an increase in the areas of cereals grown in large fields as monocultures. This has gone hand in hand with a reduction in the growing of crops subject to intensified cultivation, or requiring greater outlays of labour. Czech agriculture has seen an increase in the areas planted with wheat and maize, as well as crops grown to produce oil. However, in the case of the latter the changes in area were more limited when set against the average situation in the region. Other crops under analysis (barley, potatoes, sugar beet, vegetables and fruit) came to be planted over smaller areas.

It was probably in the agriculture practised in Slovenia that the trend for crop structure proved most favourable from the point of view of potential farm income. This is due to the intensification that took place, as well as the focus on more income-generating crops. The area of the country sown with cereals has remained stable, but *inter alia* at the expense of wheat on average there has been a clear increase in the area under barley cultivation. Apart from an increase in the area of land planted with oil crops, there were no more major changes when it came to the growing of vegetables and fruit – something of an exceptional situation in the region under study. In turn, in Hungary it has been possible to observe more of an extensification of crop structure. In the face of a stable situation as regards the area of land under cereals, there are visible changes internally in terms of structure, with the area sown with barley and maize growing at the expense of wheat. Apart from the usual increase in the share accounted for by oil crops, shares of remaining crops (sugar beet, vegetables, potatoes and fruit) underwent declines.

The structure characterising livestock-rearing

Livestock-rearing in the region supplies meat and milk first and foremost, as well as eggs, skins and honey. Cattle account for almost half of all livestock animals and represent by far the most important component of the overall “herd” of animals kept (Fig. 6). Hungary is

the region's only state in which there are more pigs (expressed in terms of livestock units¹) than there are cattle. The shares cattle account for in Poland, Bulgaria and Croatia are all close to the average level for the region as a whole, while in the remaining countries (including all of the Baltic States), well over half of all livestock units are present in the form of cattle.

In second place where structure in terms of the sizes of national herds and flocks of livestock are concerned are pigs, which account for almost ¼ of all livestock units. The share for these animals proves to be lowest in Slovenia, while being high in our region's central part, most especially in Hungary, Croatia and Poland. Taking third place in the structure when converted into livestock units are the CEECs' poultry. The role played by this kind of farm animal is relatively even from one country of the region to another. Nevertheless, somewhat higher shares are noted in Poland, Slovakia, Hungary and Bulgaria, with Slovenia and Estonia at the bottom of the table.

The distribution of other kinds of livestock is very uneven. For example, the share of all livestock accounted for by sheep is high in the south of the region, i.e. Romania (18%), Bulgaria (13%) and Croatia (6.5%). On the other hand, in Poland and Czechia their number of head converted to livestock units does not exceed 1%.

A feature characteristic for livestock structure in the CEECs is the still-tangible share of livestock (e.g. horses, donkeys and mules) kept on farms to pull machinery or farm implements. Their abundance in the region is more than 50% greater than in other countries of the EU. However, it needs to be noted that this is above all a reflection of the situation in the south of our region. There, large numbers of small, economically-weak farms on often-varied terrain obstructing machinery ensure limited progress with mechanisation. A share of livestock available for traction purposes that is above the average for the CEECs overall characterises Romania, Bulgaria and Slovenia.

The share of all livestock taken by goats is far lower currently than several decades ago, having fallen below 1%. Differences from country to country resemble those noted in the case of sheep, with proportionally the fewest goats being in Poland (the level being just 0.05%), and the most in the south-east of the region, in Romania and Bulgaria. The least

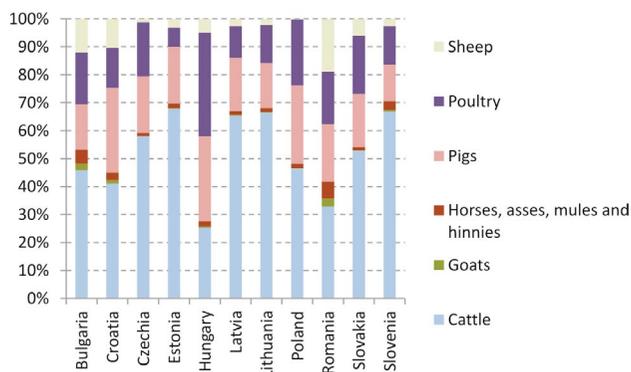


Fig. 6. Structure in terms of the number of head of the main livestock species in livestock units in the CEECs as of 2016
Source: author's own elaboration based on Eurostat data.

¹ The livestock unit (LU), means a standard measurement unit that allows the aggregation of the various categories of livestock in order to enable them to be compared.

abundant of all the livestock considered here are rabbits (of which the highest shares are to be noted in Croatia on the one hand ... and in Latvia on the other).

Livestock production has been steadily withdrawn from by smaller farms that are usually of limited commercial viability and always lose out in competition with those who specialise in raising animals for food. In connection with this, both the region as a whole and particular countries within it have experienced declines in numbers of certain species over the last three decades. The effect has been a stagnation or actual decline in production (table 3). For example, in the analysed period as a whole there was a decline in the level of production of milk and pork, even as the trend was upward on the scale of the EU as whole. Still-greater declines characterised beef and lamb. In turn, in the case of poultry, the trend was for an above-average increase in production.

Falls in the number of head of the main livestock species were large enough in certain countries of the region that improved efficiency could not compensate. In Czechia, for example, the decline in maintained population of pigs and cattle ensured that the country ceased to be self-sufficient in terms of meat production, needing to commence with the importation of meat (Svatos and Smutka, 2012). The cause of the decline nevertheless lay in low levels of profitability. A contributory factor with pigs was the rising cost of food, as augmented by fluctuations in market prices and low costs of imported pork. On the other hand, shortfalls in amounts of beef produced reflected the decline in the numbers of beef cattle, as well as favourable prices on the international market that in this case encouraged farmers to seek to export more cattle and calves for slaughter abroad.

Numbers of livestock units per 100 ha of agricultural land have proved to be varied from one area to another, if always lower than the figures obtained for Western Europe. While in the CEECs there are 47 livestock units per 100 ha of farmland, the average for the EU 17 is at the level of 88. According to Faostat data values above the regional average are noted for Slovenia (105), Poland (66), Hungary (52), Czechia (51) and Croatia (48).

Table 3. Changes in livestock populations in the CEECs (11 EU Member States)

Animal species	1995	2000	2005	2010	2015
Cattle (head)	18,374,130	15,352,290	13,958,384	13,604,378	13,588,739
Chicken (1000 heads)	226,488	221,065	311,303	346,151	328,003
Goats (head)	1,992,095	2,195,885	1,848,248	1,637,634	2,037,651
Horses (head)	1,798,043	1,775,216	1,495,572	1,294,141	972,351
Pigs (head)	44,387,612	38,485,553	37,212,003	30,980,281	25,441,863
Sheep (head)	17,186,579	13,060,128	12,307,187	13,567,580	13,911,919

Source: author's own elaboration based on FAOSTAT data.

Means of production in agriculture

The technical equipping of farms in the CEECs proves to be very varied, reflecting not only different countries' levels of economic development but also the effectiveness of agriculture's transformation. Where farm mechanisation is concerned, it may be stated unambiguously that there are countries (e.g. Romania, Bulgaria and Hungary) in which fragmentation was the trend, with the emergence of a large number of new farms whose

level of equipping in machinery and other equipment is very low. Thus Bulgaria's 2010 Agricultural Census revealed that some 370,000 farms there lacked farm machinery altogether. On the other hand, in countries (like the Czech Republic and Slovakia) where the agrarian structure had been maintained without more major change, mechanisation proves to be on a relatively high level – comparable with that noted in Western Europe.

From the point of view of farms' equipping with tractors, the most favourable situations characterise Slovenia and the Czech Republic. However, the agrarian structure in these two countries differs, with the former having much upland terrain and a high share of small farms, while the latter is dominated by large or very large entities. It is the agrarian structure that determines the numbers of tractors, as well as their sizes expressed in terms of horsepower. Czechia has the highest-powered tractors, to which large machines can be attached and huge fields then worked on. In contrast, tractors in Slovenia will tend to be small, and well-adapted to work in areas of diverse relief, sometimes with steep slopes. The small number of large farms in Czechia require a relatively small number of powerful tractors. In turn, the large numbers of small individually-owned farms in Slovenia require many tractors of far-smaller size.

Use of mineral fertilisers varies greatly from place to place. However, in those regions where use is more limited, a relatively greater amount of (animal) manure is applied. Nevertheless, the use of artificial fertilisers is a key recognised indicator of the level of development farming has reached, with greater use of fertiliser generally attesting to intensive, modern methods of management.

It is nitrogenous fertilisers that gain the most widespread use – with the greatest amounts applied per ha of arable land noted in Czechia and Slovenia. Analysis of changes in levels of use of such fertiliser over the last two decades points to a clear intensification of production in every country in the region. Nevertheless, this change has been taking place at various different rates. A major factor deciding on the use of artificial fertilisers is of course price (and the influence on costs of production). According to *Eurostat* data, the years 2004-2010 saw average prices for farm produce globally at levels around 50% higher than in the 1986-2003 period. In contrast, across the same interval of time, fertilisers increased in price by 150% – mainly as a reflection of rising costs of the raw materials used in both manufacture and transport (i.e. crude oil and natural gas above all) (*Agriculture ...* 2017).

Plant protection agents continued to be used to a limited degree in the CEECs, as opposed to in Western Europe. Expressed per ha of arable land, the highest level of use of fungicides and bactericides is noted for Slovenia, where over 4 kg of pesticides are assigned to this role. Successive places in the ranking are taken by Hungary – though there the level of use of plant protection agents in this category is only a quarter as high. Indeed, Slovenia's relatively high level of application of the chemicals reflects its relatively large area of land under more permanent cultivation (which is not taken account of in the calculation, given that level of use is expressed specifically in line with the area of arable land). Areas of land like vineyards are in fact notorious for needing to be dosed with large amounts of pesticides. Indeed, the use of biocides in the herbicide (weedkiller) category is found to differ far less across the region under analysis.

The lack of regular precipitation and ever-more-frequent weather anomalies linked with prolonged periods without rain represent a major challenge for agriculture, especially in the southern and central parts of our region. This is why the cultivated fields there are in need of constant irrigation. It therefore comes as no surprise that the highest

shares of irrigated land are present in Bulgaria and Hungary, while figures only slightly lower are to be noted for Romania, Croatia and Slovakia. In contrast, low percentages of irrigated land characterise Poland and Latvia, while Estonia and Latvia basically have no such land whatsoever.

In countries located in the southern and central parts of the region under study, it is possible to observe an increase in the share of all land that is irrigated. However, it needs to be made clear that, in the cases of Romania and Bulgaria, the irrigation system worked better in the communist era than it does now. The small farms that took their place as a result of privatisation lacked the means to maintain the well-developed irrigation system. Moreover, the lack of necessary skill among new owners of farms ensured a steady decapitalisation of infrastructure, and ultimately its destruction and loss.

The largest problems with the supply of water to agriculture arise in Bulgaria, where the annual level of access to water per inhabitant is only half that noted on average among the CEECs. Especially tangible are the deficits arising in the north-east of the country, in which cereal-growing prevails. The existing melioration systems and installations are generally now facing a critical situation, and basically do not work. And, as water becomes more and more expensive, this forces farmers to resign from irrigation services. Areas mostly better-off for water are to be found in the mountains in the south of the country, though the areas of plains and hills in which crop-growing is concentrated also face constant shortages of water (Mondeshka et al. 2006).

The irrigation system constructed in Bulgaria during the communist era was adapted to the large-sized Cooperatives, and therefore proved unsuitable for the supply of water to individual farms. All scenarios relating to climate change in the country assume a prolongation of dry periods, and hence the emergence of protracted drought on the Bulgarian plains – most especially at the peak of the growing season. This is why it also became necessary to redevelop efficient irrigation systems capable of ensuring appropriate levels of soil humidity. At the same time, new developments as regards irrigation are now vanishingly limited, probably on account of the fragmentation of land ownership and a lack of necessary capital on farms of limited commercial viability. The systems of irrigation channels constructed in the 1980s are now in a ruined state, and cannot adequately serve their intended purpose. At the start of this century's second decade, only around 9% of the country's farmland was potentially able to receive irrigation water (Moteva et al. 2014). The crops earmarked to receive irrigation were first and foremost cereals and vegetables, though of course water was also dispersed to land on which permanent crops were present. However, as of 2012, genuine irrigation only encompassed about 1.5% of the country's area of arable land (Velikov 2013).

Changes in agricultural output in the CEECs as set against the EU as a whole

Between 2005 and 2017, the share of the value of overall agricultural output in the EU that the CEECs were responsible for rose from 15%² to 17%. Production in the region's two

² The analysis in this part of the study related primarily to the period from 2005 onwards, in which a majority of the region's states had become Member States of the European Union (the 2004 accessions being of the Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia and Hungary, while 2007 saw Bulgaria and Romania join, and 2013 Croatia).

largest economies, i.e. Poland and Romania, accounts for as much as 60% of the overall value of agricultural output in the region. Furthermore, this level has risen by about 2.5% since 2005. Above all, this result reflected major progress in Poland, whose analogous share rose from around 32% to more than 37%. At the same time, Romania's share of the overall value of agricultural output generated in the region declined from 26 to 23%. Croatia was the only CEEC to experience – in comparison with 2005 – both a decline in the values of production and a simultaneous fall in the share of production in the region it could account for (from 5.2 to 3.0%). This probably reflects the way in which, over most of the analysed period, the country in question was not a major recipient of food-sector support within the EU's CAP framework.

In 2005, the production structure in different countries was more stabilised than it is at present. In areas where animal production was a matter of major significance, the share in the production structure was either maintained at a steady level or increased. On the other hand, in countries characterised by a limited role for animal production, the significance of plant production continued to rise. In the north of the region, the share of animal production is higher – its value exceeding 50% in the countries that lead from this point of view, i.e. Estonia and Poland. In turn, in the southern part of the region (Bulgaria and Romania), it was possible to observe the most rapid rate of decline in the share accounted for by livestock production, with a result that the ratio vis-à-vis plant production is now at 1:3.

Where the EU28 are concerned, the structure as regards the value of output in 2005 saw vegetables account for the highest share, alongside garden plants, and as followed in the ranking by cereals (table 4). In our region, in contrast, it is cereals that play the major role, accounting for almost 34% of the overall value of plant production (Fig. 7). On the scale of the EU as a whole their share was slightly over 20%. In turn, vegetables

Table 4. Produce generated by the CEECs in 1989 and 2017, as set against the situation in the EU-28

Produce	Share of EU output (%)		Change in level of production 1989-2017 (%)	
	1989	2017	CEECs	EU
Wheat	30.6	31.4	+34.1	+31.0
Barley	23.0	20.1	-24.9	-14.0
Triticale	71.3	57.0	+167.5	+234.6
Rye	60.7	43.2	-58.8	-42.1
Oats	29.1	33.2	-14.4	-24.9
Potatoes	50.9	24.0	-69.0	-34.3
Apples	31.0	36.2	-11.4	-24.1
Sugar beets	24.0	19.7	-25.1	-8.8
Rape	28.0	39.1	+290.6	+179.7
Cows' milk	23.4	17.8	-18.3	+7.3
Pork	27.5	15.2	-32.6	+21.6
Beef	19.8	12.0	-49.4	-16.6
Lamb and mutton	16.2	11.5	-50.3	-30.0
Poultry meat	23.5	28.3	+134.3	+94.5

Source: author's own elaboration based on FAOSTAT data.

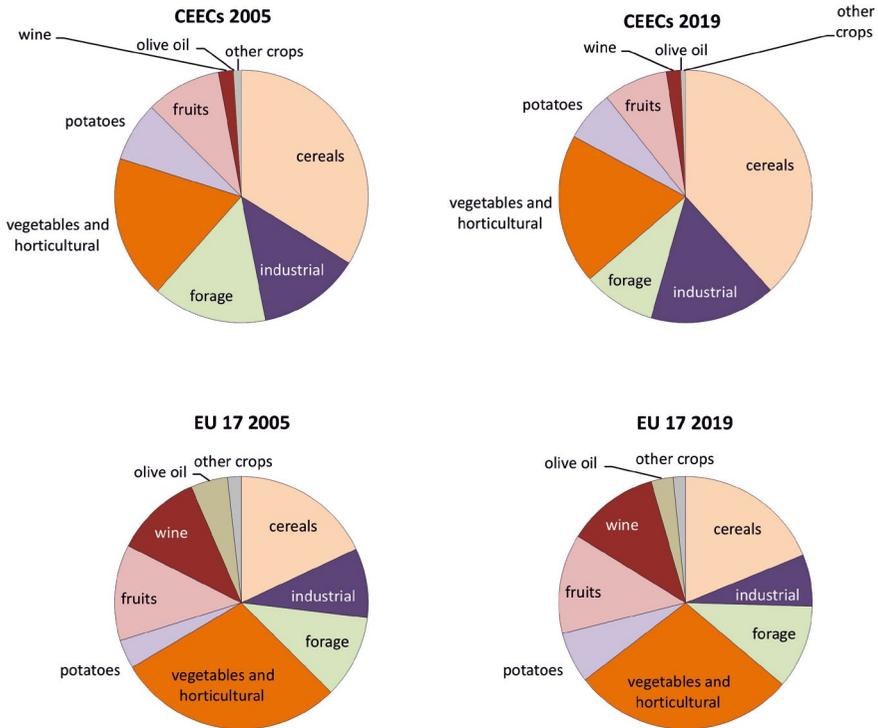


Fig. 7. Structure as regards the value of plant production achieved in the EU overall and the CEECs in the years 2005-2019

Source: author's own elaboration based on Eurostat data.

and garden plants in the CEECs taken together take an 18% share (cf. over 27% in the EU overall). This example attests to the far-greater intensification of crop production in the countries of Western Europe. Over the last decade, the structure in terms of the value of plant production in Central and Eastern Europe was characterised by an increase in the shares of industrial crops and cereals, with a simultaneous decline in the role of fruit and potatoes. The most major decline to be noted in the region relates to the share of fodder crops. Currently, wheat and industrial crops account for some 57% of the overall value of plant production in the region.

There are predominant components to the structure where the value of livestock production in the CEECs' agriculture is concerned, i.e. milk, and pig and poultry products (Fig. 8). Milk is the leading animal-derived product. In Estonia, Latvia and Czechia, it is the value of the milk produced that accounts for the greater part of the entire value of animal products. In turn, the share taken by pigs and pork products in the region's overall figure for livestock production was above the EU average in 2005. However, after that time, the absolute value attributable to this category remained steady, meaning that its share in the overall structure fell – to the point where it is currently below the average figure for the whole EU. Major declines in this regard were noted in Poland, Slovakia, Slovenia, Czechia, Latvia, Estonia and Hungary. In the CEECs, poultry is of above-average significance when it comes to the structure of livestock-raising, hence a share of production greater than

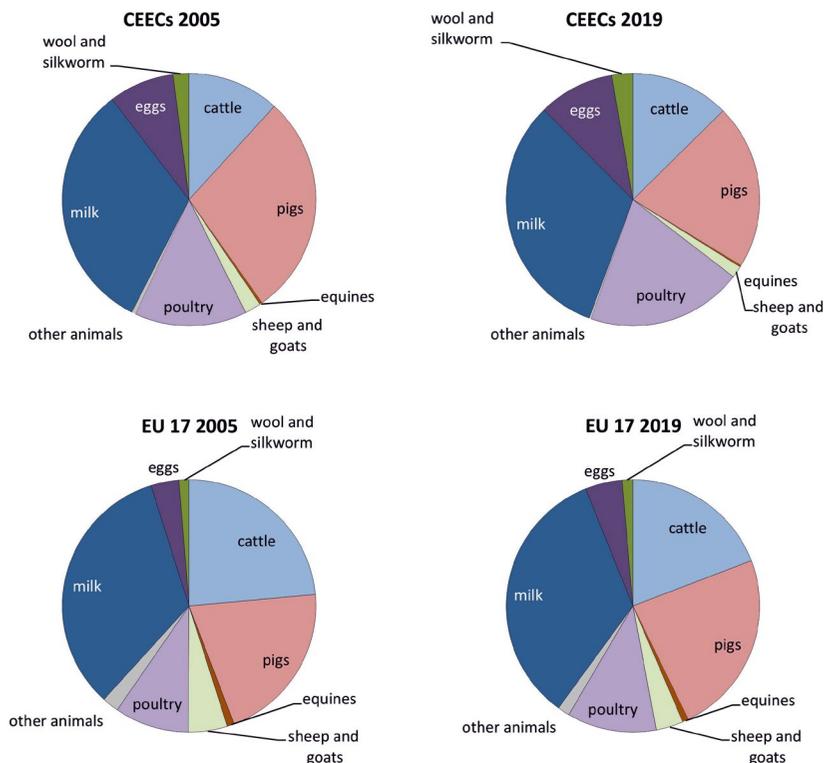


Fig. 8. Structure as regards the value of livestock production achieved in the EU overall and the CEECs in the years 2005-2019

Source: author's own elaboration based on Eurostat data.

in the EU as a whole for poultry products (first and foremost meat). The production of poultry meat shows the highest dynamic to be noted for any products of animal origin. The most dynamic increases of all when it comes to the structure of animal production were those taking place in Poland, Lithuania and Latvia, as well as in Slovenia and Hungary. The value of other animal products (including those deriving from sheep and goats) is so low that the role played is limited, albeit the most concentrated in spatial terms. For products derived from sheep and goats (excluding wool) are of by far the greatest current significance to Bulgaria and Romania.

Discussion and summary

Over the last three decades agriculture in the CEECs has been through a process of profound change. This above all reflected the fall of the old communist system, which had a dominant role to play in the sector in most of the region's states. The changeover to a free-market system *inter alia* entailed the return of land that had been grabbed, privatisation, and the freeing-up of prices for both produce/products and means of production. A second, equally important phenomenon shaping the depiction of agriculture

in the CEECs entailed their accession to the EU, as preceded by several years of preparation for membership. Farms were transformed in a very dynamic way in line with the need for them to adjust to EU requirements, as well as conditions under which to achieve competitiveness on both internal and European markets. Some were unable to meet these requirements and so collapsed, or are in the process of closing down even now. Equally, a large group of farms seized the chances newly available for development, and are now engaging successfully in productive activity under the new conditions.

The period of transformation also had its negative phenomena in countries where the forms of agriculture typical for the communist system had held sway previously. Thus there was a deindustrialisation of rural areas, processes of the closures of Cooperatives and State Farms that were not thought through properly and achieved too much in haste, a lack of success with some of the efforts to ensure the restitution of land (with fragmentation being among the consequences), and the devastation of certain kinds of technical infrastructure, above all that associated with irrigation in the southern part of the region.

In turn, both the CEECs' period of preparation for EU membership and that immediately following accession were associated with the appearance of negative phenomena reflecting the need to compete with the better-organised and more strongly-backed businesses of Western Europe. Then there was the lack of safeguarding of borders against imports of agricultural products, as well as support under the CAP that was not always targeted appropriately, and shortfalls when it came to countries' agricultural policy pursued domestically.

However, notwithstanding this list of negative phenomena arising during the period of transformation of the CEEC economies, the overall balance is certainly a positive one. Efficiency of production in farming has increased, while the agrarian structure has improved – as has (most) farms' economic condition. Levels of specialisation on farms are likewise higher, and there has been a widening of the market when it comes to potential customers for the food produced.

Recent years have also been characterised by relative stability of employment in agriculture, especially in the cases of Czechia, Slovakia, Lithuania, Latvia, Estonia and Bulgaria. This is probably a sign that agriculture in these countries has reached optimal levels of employment, which should prove possible to maintain at the same level. In contrast, in Poland, Croatia, Slovenia and Romania, values for this indicator are still the subject of major ongoing change, with this helping sustain the conclusion that these countries still have excess employment in farming. And the quantitative changes characterising people who work in agriculture are accompanied by changes in its age structure that are a reflection of demographic trends to be noted across Europe. *Eurostat* data show how, in the CEECs, more than one in four farm owners are of the 65+ age group. This is not a favourable feature when one considers the future of the agriculture sector in this region.

Analysis of change regarding agricultural land-use reveals how this had been multi-directional, and differentiated from one area to another. However, other than the Czech Republic (where the share of all land accounted for by agriculture declined only slowly), the region's largest countries have so far been through a ca. 10% fall in this area in the time since the Eastern Bloc fell. Equally, the part of this change occurring in the 1990s was mostly limited – thanks to the crisis arising as the old system fell; as well as the associated slow rate at which a functioning market economy took shape. Only at the turn of the century did a very dynamic transformation take hold. In general, the intensity with

which the phenomenon of agricultural land-loss took place only increased from the time countries began to prepare for their EU membership, and a variety of social and economic processes began to gather pace.

The processes involved in privatisation were indirectly responsible for declines in the area of farmland. On small farms, new owners abandoned their cultivation on account of low profitability, a lack of funding for investment, or the existence of other, more lucrative, activity. Excessive fragmentation of holdings of land generates extra costs – as well as extra inputs of time needed to reach plots. It also makes it impossible for large items of machinery to be used, and hinders work in the fields; while also extending the area taken by boundary strips between plots, which have to be excluded from use. A dense network of access roads and tracks has to develop, while land registration is rendered more complicated – with conflicts between owners sometimes even breaking out.

Analysis of change in the areas sown with the main cultivated plant species through the CEECs provides for the identification of certain trends for the region as a whole, as well as its individual countries. Foremost here is a consistent trend (characterising all of the region's states) towards a decline in the area of land growing potatoes. It is basically only in Romania that the fall in the area planted with potatoes is smaller than the average for the region as a whole. A counter-trend is in turn for areas under oil crops (rape and agrimony, as well as sunflowers) to increase. In certain countries, the 1990-2015 period under study was characterised by several-fold (or even 10-20-fold) increases in areas planted with these crops. However, this was not a steady trend in all cases, as there were also periods in which areas under oil crops went down.

The CEECs differ from other parts of Europe when it comes the specifics of agricultural production. This difference relates, not only to its lower level of intensification, but also to structural features. What is generally lower is the number of head of livestock as expressed per unit area of agricultural land, as well as the share accounted for by livestock-rearing. Where the region's crop-production structure is concerned, markedly greater shares than in Western Europe are to be noted for cereals and industrial crops; even as the shares taken by vegetables and fruit are clearly smaller. In turn, structure when it comes to livestock is more varied than in the countries of Western Europe. The two main elements – i.e. cattle and pigs – take lower shares, while the share accounted for by poultry is greater.

Given the considerable latitudinal extent of the region, it is far from homogeneous from the point of view of production structure. This fact is decided by the range of climatic and edaphic conditions, and relief, that are present. In the north of the region, it is the growing of cereals and fodder crops that is of greater significance, with the production of vegetables and fruit much less so, and of course none of the produce characteristic for sub-tropical conditions, such as wine and olives. Moreover, the region's northern part has a greater number of head of livestock, and – within that – greater shares accounted for by cattle, as well as lower shares taken by poultry, sheep, goats and animals capable of the traction of implements and machinery used in field work.

In recent decades, major challenges for agriculture have been posed by climate change, which impacts upon other elements of the natural environment, including hydrological conditions in particular (Bański and Błażejczyk 2006, Kozyra and Górski 2004). Agriculture resembles no other branch of the economy in the degree to which it is dependent on cli-

mate and atmospheric phenomena. In this sector, even the most minor anomalies of climate or sudden weather phenomena may have serious consequences. Current trends are for a steady and ongoing increase in air temperature, as well as a greater frequency of occurrence of extreme weather phenomena (heatwaves, violent storms, floods, droughts, cyclones and so on), with this especially able to influence change in types of land management and the selection of optimal or “safe” crops. However, some climatologists suggest that the phenomena of lengthening growing seasons and a shift in agroclimatic zones will be associated with a curtailment in size of the most-productive areas – above all on account of shortages of water. Warming will probably then induce spatial polarisation when it comes to the amounts and types of food produced.

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