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The Impact of EU Accession on Hungarian Agricultural Production – 20 Years of Experience

A 2004. május 1-jei EU-csatlakozás az elmúlt évtizedek egyik legjelentősebb eseménye volt Magyarország számára. A 20. évforduló lehetőséget ad arra, hogy átfogóbb perspektívából visszatekintsünk és értékeljük a csatlakozás mezőgazdaságra és vidékfejlesztésre gyakorolt hatásait. Magyarországon is nagy várakozás előzte meg a csatlakozást, különösen a mezőgazdaság terén, mivel Magyarország az egyik erős mezőgazdasági potenciállal rendelkező ország. Ez a tanulmány egy átfogó kutatási projekt része, amelynek célja a 2004-ben csatlakozott országok mezőgazdasági és vidékpolitikájával kapcsolatos tapasztalatok és tanulságok áttekintése és összegzése. A tanulmány célja, hogy rávilágítson arra, hogy az EU-csatlakozás milyen mértékben volt képes irányítani az országot a rendszerváltás utáni negatív folyamatokon keresztül, és milyen mértékben határozták meg a kezdeti feltételek a későbbi fejlődési pályát.

Kulcsszavak: *mezőgazdaság, EU, KAP, vidékfejlesztés, agrárpolitika*

The Impact of EU Accession on Hungarian Agricultural Production – 20 Years of Experience

The accession to the EU on 1 May 2004 was one of the most significant events for Hungary in recent decades. The 20th anniversary gives us the opportunity to reflect and assess the impacts of the accession on agriculture and rural development from a broader perspective. In Hungary, too, accession was awaited with great anticipation, especially in the case of agriculture, as Hungary is one of the countries with strong agricultural potential. This study is part of a comprehensive research project which aims to review and summarise the experiences and lessons learned on the agricultural and rural policy in the countries that joined the EU in 2004. The aim of this study is to shed light on the extent to which the EU accession was able to steer the country through the negative processes of the post-transition years and to what extent the initial conditions have determined the subsequent development path.

Keywords: *agriculture, EU, CAP, rural development, agricultural policy*

Introduction

For centuries, Hungary was characterized as a traditional agricultural nation. As the sector with the longest established history and traditions, it holds great significance, and maintaining its competitiveness remains a key focus. The country is abundant in natural resources, presenting both immense opportunities and substantial responsibilities for their management and utilization.

Prosperous and long-lasting agriculture is not only contingent upon suitable soil, climate, and water management, but also on the efficient utilization of land resources and their preservation. Effective land management in agriculture must have a solid legal underpinning, and knowledge of the natural resources and existing infrastructure that aid in agricultural production is crucial.

Hungary's accession to the European Union (EU) is a significant event of recent decades. The accession process leading up to 1 May 2004 took several years, beginning with the conclusion of the Association Agreement on 16 December 1991 and the entry into force of its trade chapter on 1 March 1992, and continuing until Hungary's accession on 1 May 2004. The implementation of common agricultural policy measures and European integration have since had a profound impact on the direction and dynamics of change in agriculture (Losoncz, 2014).

At the time of our accession to the EU, Hungary's agricultural economy was facing a period of weakness, primarily as a result of the so-called transition crisis that occurred in the decade following the political regime change. Prior to accession, a significant amount of resources were dedicated to the implementation of legislation and the development of institutions. The EU was also providing support during this time, and its impact was beginning to be felt at the turn of the millennium. Consequently, the Hungarian agricultural sector was poised for development.

The EU's agricultural support policy has played a significant role in modernizing Hungarian agriculture and boosting its competitiveness. While the income of agricultural enterprises remains heavily dependent on income, subsidies have provided a stability in income. Subsidies have enabled farmers to withstand the challenges posed by adverse market conditions and contributed to their survival during difficult years.

Hungarian agriculture has experienced increased competition following the country's accession to the EU, which has resulted in domestic farmers facing stronger competition from both domestic and international markets. However, the internal market has also presented opportunities for growth in agricultural product demand and the EU Member States have emerged as the largest export destination for Hungarian agricultural products. Although competition is becoming increasingly fierce, it may also serve as a source of motivation for

future growth and development in the sector.

The EU's extensive agricultural policy has enabled Hungarian agriculture and farmers to be more competitive on the market and to be able to develop for the future. This chapter aims to give an overview of the experiences and lessons learned from the Hungarian agricultural accession. A brief overview of the conditions and trends of the Hungarian agricultural economy in the pre-accession period is given. This is followed by the characteristics and challenges of the Hungarian pre-accession period, and then by the difficulties and bottlenecks of the achievements of the two decades following accession.

1. Pre-accession period and lessons learned

1.1. Hungarian Agriculture Before the EU accession

In order to examine the impact of EU accession on Hungarian agriculture, it is first necessary to understand the baseline situation, i.e. the state of Hungarian agriculture in the years preceding accession and at the time of accession.

During the 1990s, Hungary underwent major political, economic and social changes. These changes accelerated after 1989, during a period of political transition. Rural life became the scene of fateful processes. The most pressing economic and socio-political issue was the privatisation of property that had been forcibly nationalised under socialism, and agriculture was no exception. At the end of the 1980s, 31.8% of Hungary's arable land was cultivated by state farms, 61% by collective farms and 7.2% by small farms. Of the land used, 3.8% was owned by the state, 61.1% by the cooperatives and the rest was owned on paper by the members of the cooperative (Schlett, 2023).

In the early 1990s, privatisation fundamentally changed land ownership, resulting in private ownership of land and agricultural assets. The process, which was based on laws that came into force in different years, took several years to complete. The Transformation Act split the privatisation of land and other assets into two parts. The delay in the transfer of land ownership has had a lasting impact on the ownership situation of farmers.

In general, privatisation has significantly fragmented the land tenure structure, leading to a growing disconnect between land ownership and use. One of the main consequences of the structural change that accompanied the change of ownership was the increasing separation of land ownership and use. The data shows that in the 1-5 hectare category, 76% of the land was owned, while in the 50 hectare and over category, this number dropped to a mere 23-26%. Furthermore, holdings of less than 10 hectares owned more than half of the land cultivated on individual farms. By 1995, 62.5% of arable land was

being rented (Harcsa & Kovách, 1996). The 1990s saw a tripling of agricultural holdings, while the number of individual holdings decreased by 400,000. Many converted cooperatives were privatised by management and transformed into partnerships. Those who continued to cooperate also converted into some form of partnership, such as a limited liability company, joint stock company, or limited partnership. Farms have experienced a polarisation in land use, resulting in a dual structure. The trend towards an increase in rented land was accompanied by a rise in production. At the time of EU accession, a mere 0.32% of producers were utilising 56.7% of the arable land. Farms that cultivated 50 hectares or more (2% of all farms) were responsible for 78% of the arable land, while farms using less than one hectare accounted for almost two-thirds of all farms (Kovách, 2012).

The regime change brought about significant changes in ownership and agriculture structure, resulting in a notable loss of markets, including a substantial portion of the Soviet market. Despite minimal Hungarian exports to the West at the time, they were unable to compensate for the loss of the Eastern market. The agricultural crisis was further intensified by intensified competition and low levels of state support. Farms were forced to decrease production and sell their stocks, even at a loss (KSH, 2008).

The potential for agricultural production is influenced by both the availability of means of production and the position of producers within the agro-vertical system. The agro-vertical system consists of three distinct yet interdependent segments: agricultural production, food processing, and trade. During the reviewed period, the three interdependent structures and the vertical and horizontal links between them were significantly influenced by several factors.

The food sector faced many challenges in the aftermath of the transition. Demand for its products fell dramatically, and there was no money, no time and often no modern expertise to build new markets. In the agri-vertical system that developed under socialism, the operation of a single food company or distribution network had an impact on the life of entire regions, both in terms of production and consumption. Producers were provided with information, guaranteed purchase of their products, and often pre-financed production.

Vertical relations, and through them the localities, were fundamentally affected by the fact that the transition itself took place at a time when food processing and the internationalisation of food markets were the defining features of the transition. International capitalist groups sought to gain ever greater market dominance, and the Hungarian food industry became one of their main targets.

The problems of dual land ownership created by the privatisation and reparcelling process were exacerbated by the privatisation of the food industry. After the change of regime, the government saw a solution to modernisation

and immediate revenue generation in rapid, sales-based privatisation. It was clearly in the interests of foreign investors that the buyer should not be allowed to impose conditions, such as employment, that would deter them from buying. It soon became clear that this was a serious technical and economic strategic mistake.

The new agricultural structure was accompanied by an internal restructuring of agricultural production. The process of production specialisation continued, with the number of farms devoted exclusively to crop production rising by 30% and the number of mixed farms falling by a third by the turn of the century. Agriculture shifted increasingly towards intensive cereal production (Laczka, 2007). At the same time, indicators of rural economic inactivity increased dramatically and labour-intensive crops declined. With the loss of rural jobs, the sustainability of the rural economy and population continued to deteriorate and depopulation increased dramatically. Traditional agricultural areas have become permanent territorial and occupational enclaves, areas of crisis, where unemployment and associated social problems have become permanent. The transformation of the decade following the change of regime has thus further fragmented and deformed local communities, their culture and the remaining institutional structures of belonging (Schlett, 2023).

Another effect of the regime change was the separation of crop and livestock production and a sharp decline in livestock production (KSH, 2008). This is probably due to the fact that the income from livestock production is essentially realised over a longer period of time and also involves a number of costs which, due to a lack of capital, were unfavourable to farmers in the economic situation at the time and they were unable to finance and maintain livestock production and farming.

The combined effect of the above processes led to the crisis in the agricultural sector and the impact of the crisis on production was clearly negative. Agricultural production reached its lowest point in 1993, when output was well below the 1990 level. A slow recovery followed, especially in crop production (Laczka, 2007). From the mid-1990s (1995), production began to rise slowly. This positive change was mainly due to the improvement of the internal market and the fact that the Western markets became somewhat more accessible to Hungary. However, it was not until 2001 and 2004 that a more significant increase was observed, and it was still well below the levels recorded in 1990 (KSH, 2008). Hungary acceded to the European Union with the ‚decline' in agriculture described above, which was so severe that it raised the question of whether Hungarian agriculture would be able to survive in the market.

1.2. Preparing for the accession

The EU accession was influenced by macroeconomic, institutional, and social issues. In particular, the candidate countries had a lower level of economic development and significant structural setbacks, particularly in the agricultural sector. This was compounded by a larger share of agriculture in both employment and income generation (Vásáry, 2008). It can therefore be concluded that the EU (the Community) had a major task in ensuring that the new Member States could and would comply with the regulatory environment and that the support system could be adapted, for example by setting up the appropriate institutional framework. It appears that Hungarian agricultural accession in 2004 encountered these two main issues or bottlenecks in the short-term (Halmai, 2004).

Joining the European Union and the CAP required a long period of preparation on the part of the Hungarian State, while Hungarian farmers had to prepare themselves. Although accession to the European Union has brought many benefits, these benefits have not been „ for free „. Joining the CAP also meant that Hungarian agriculture, and in particular production, had to comply with EU rules and standards. Although Hungary was granted derogations and exemptions from some requirements during the accession process, farmers' production still had to meet a number of obligations.

The process of fulfilling the requirements for accession to the European Union at different political, social, and economic levels had already started years before the accession in 2004. EU membership has had an impact on legislation, including legislation of rural areas. These changes led to changes in the structure of agricultural holdings and land use patterns, as well as accelerated development of the agricultural real estate market.

The main objective of the pre-accession period was to familiarise the applicant countries with the structures and forms of assistance available in the European Union and to prepare them to receive aid. In order to support the applicant countries in their preparation for accession, the European Union established and expanded the Pre-Accession Fund (Buday-Sántha, 2001). The EU provided support for the preparation of pre-accession assistance through three programmes: the PHARE programme, the ISPA programme and the SAPARD programme.

Before the accession to the EU, Hungary's most important trading partner was the EEC/EU. Member states accounted for around half of our exports and 60-70% of our imports. Additionally, based on data from 2001-2002, four-fifths of our exports were already exempt from customs duties (Pete, 2000). However, the growth of agricultural product turnover was slower than that of other goods due to competitiveness issues and marketing deficiencies.

The Support for Pre-Accession Measures for Agriculture and Rural Development (SAPARD) Programme was designed to help Central and Eastern European countries prepare for EU accession, focusing on agriculture and rural development. The programme aimed to align candidate countries with EU agricultural standards, enhance the competitiveness of the agricultural sector, and promote sustainable practices (SAPARD AVOP NVT, n.d.). In Hungary, SAPARD provided in the order of €38 million annually to support rural development objectives, with the programme's implementation delayed due to the establishment of necessary institutions. The Hungarian SAPARD plan was approved in 2001, and the SAPARD Agency became fully operational by the end of 2002, allowing farmers to receive aid from 2003.

The SAPARD Programme implemented various measures in the field of agriculture, including support for the development of agricultural structures, investment in agricultural enterprises, and the development of processing and marketing of agricultural and fishery products. Rural development measures included village development, protection and conservation of rural heritage, and the development and improvement of rural infrastructure. The programme was co-financed by the Hungarian state, with the total annual budget including Hungary's co-financing obligation being approximately HUF 12.5 billion. The programme's implementation was complex, with many projects experiencing delays, but it ultimately proved to be effective in supporting the preparation and implementation of projects that emerged after the change of regime (A magyarországi SAPARD Program Időközi értékelése, 2003).

The SAPARD Programme played a significant role in Hungary's agricultural and rural development, contributing to the socio-economic development of rural areas and the consolidation of the socio-economic situation. By the end of the programme in 2006, SAPARD had financed 4005 projects in Hungary, totaling HUF 58.9 billion in community support. The programme's impact was substantial, with investments made in agricultural holdings, product processing, vocational training, rural infrastructure, and information systems development (Lehmann & Nyers, 2009). The SAPARD Programme's legacy continues to influence Hungary's agricultural and rural sectors, demonstrating the importance of such initiatives in facilitating EU accession and promoting sustainable development.

1.3. Experiences

The agricultural sector in Hungary faced significant challenges following the change of regime in the 1990s. The sector's performance was characterised by a loss of markets, disorganised production and land tenure structure, and low levels of productive investment. Agricultural production fell dramatically, and

the proportion of uncultivated land increased significantly. The sector became permanently loss-making, with falling incomes and rising rural unemployment. The country was unable to take advantage of the opening of Western markets, and Western European countries seized former socialist markets. The lack of effective import protection and high foreign debt burden further exacerbated the situation (Antal, 2005).

The privatisation of land led to a dual land tenure structure with large-scale farms and small, often unviable, farms. Land ownership and land use separated, although the optimal situation is for land to be owned by those who work in agriculture. The agricultural economy of each locality varied depending on its production, environment, regional employment, and socio-economic tasks (Kulcsár, 2020). Hungary's economic policy aimed to attract foreign direct investment in the food industry and capital from abroad to modernise the economy and address employment issues. However, the focus on Western orientation was part of the modernisation paradigm, and the use of working capital was intended to help Hungary catch up with the West technologically. Transnational corporations aimed to increase their capacity and access new markets by acquiring production capacity in post-Soviet countries. The SAPARD Programme played a crucial role in supporting the agricultural sector in Hungary.

The SAPARD programme was the first in Hungary to be implemented according to EU rules, remaining valid after accession. Participation was based on the Ministry of Agriculture's decision schedule and application procedure. Initially, only model areas were to be supported, but all suitable applicant regions received some aid. The short application timeline posed a challenge for micro-regions, but rural communities responded strongly despite being unprepared (Farkas, 2000).

During the accession negotiations, the EU's position prevailed, but Hungary also achieved concessions. Direct payments reached 100% by 2013 after a nine-year transition, with a 30% domestic top-up allowing a six-year individual/farm transition. The EU maintained quotas but made a positive departure on the beef cattle production baseline. Hungary obtained temporary exemptions, including a ban on foreign agricultural land buyers and an exemption for Tokaj wines.

EU accession highlighted the importance of information and knowledge for efficiency in rapidly changing market conditions. However, agricultural actors were not adequately prepared, facing competitiveness challenges due to insufficient organization, outdated technology, and logistics issues (Popp et al., 2018).

2. The Impacts of the EU Membership on Hungarian Agriculture

Since 1 May 2004, Hungary has benefited from European integration, the single market and Community policies, including the European Union's Common Agricultural Policy (CAP), which has been affecting the daily lives of European farmers, market operators and consumers for almost 60 years. The CAP is the EU's most sensitive and complex policy area and one of the most influential in terms of its economic and political impact. It provides farmers with the means to produce and earn a satisfactory income and consumers with a high quality food supply, in accordance with the principles set out in the Treaty of Rome, and lays down detailed rules on production, processing, marketing and data requirements. By complying with the rules, farmers can receive substantial support under the CAP to supplement their income (Pete, 2000).

Full membership was also a long way off from the formal application in 1994. Accession negotiations started on 31 March 1998. Following the structure of the acquis communautaire, the negotiating parties discussed the relevant issues in 31 chapters. The first phase lasted one and a half years, but the question of payments was not settled until the end of 2002 in Copenhagen.

2.1. The Pillars of the CAP

The European Union's Common Agricultural Policy (CAP) utilizes a two-pillar structure to address the needs of farmers and rural areas. The First Pillar focuses on direct income support for farmers, with payments based on farmed area or livestock holdings. New member states received simplified schemes like the Single Area Payment Scheme (SAPS) to ease their transition. Additionally, market measures aim to stabilise food prices.

The Second Pillar tackles long-term sustainability through rural development funding. The European Agricultural Fund for Rural Development (EAFRD) supports initiatives across six key areas, including innovation, environmental practices, and economic development in rural communities. Hungary's Rural Development Programme (RDP) exemplifies this approach by promoting technological advancements, environmentally conscious agriculture, and local initiatives through the LEADER programme.

2.2. Programming Periods

The 2007-2013 Programming Period: During this period, direct payments to Hungarian farmers were gradually phased in, starting at 25% in 2004 and reaching 100% by 2013. The Copenhagen Accord allowed for complementary direct payments from national budgets, up to 30%. The European Agricultural

Guidance and Guarantee Fund (EAGGF) was replaced by the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). The strategic guidelines for rural development during this period focused on improving agricultural competitiveness, environmental sustainability, and rural population support. Key support areas included setting up young farmers, enhancing farming practices in Natura 2000 areas, and preserving rural heritage. The New Hungary Rural Development Programme (UMVP) was approved on September 19, 2007, and it organised rural development support around four main axes: improving the competitiveness of agriculture and forestry, supporting young farmers and producer groups, enhancing the environment and the countryside, and developing rural economies and quality of life through initiatives like LEADER.

The CAP Reform of 2013: The 2013 CAP reform aimed to modernise and simplify the policy, with a focus on environmental sustainability. New measures included the „greening" of payments by introducing environmentally friendly farming practices such as crop diversification and maintaining permanent grassland. The reform also aimed to make payments fairer by reducing payments to the largest farms and better targeting support to those most in need, including young farmers and those in disadvantaged areas. The reform's objectives included combating climate change, protecting the environment, and promoting biodiversity, alongside modernizing the agricultural sector and balancing power in the food chain.

CAP 2023-2027: The CAP for 2023-2027 is based on Hungary's Strategic Plan, which aligns with EU requirements and emphasises sustainability more than before. The Hungarian government has aimed to balance environmental concerns with competitiveness by increasing the national co-financing rate. The reformed policy focuses on transitioning to a modern agricultural sector, with funding distributed more evenly between farmers, particularly favouring small and medium-sized farms and young farmers. The Basic Income Support for Sustainability (BISS) replaces the SAPS and greening support, providing predictable income support per hectare.

Hungary's strategic plan commits to allocating 38% of its rural development budget to agri-environmental measures, 8% to organic farming, and around 5% to protecting Natura 2000 sites. These measures emphasise environmental protection and digitization. The long-term impact and results of the current reform period will be assessed at its conclusion.

2.3. Experience and lessons learned

Hungary's accession to the EU has had positive effects on various aspects, including the self-confidence of the Hungarian population, the economy, the

balance of foreign trade, and the country's position. This is due to the fact that the EU countries remain our most important trading partners, with almost 75% of agricultural exports going to them.

At the individual organisation and producer level, however, the picture is more complex. Among farmers, well-organised crop producers have been the winners of the accession. This also confirms that those regions that were already part of a more organised cooperation were able to submit more successful applications.

It should be noted that, despite the initial administrative, procedural, and organizational challenges (which also hindered the uptake of funds), the structure has been established and is currently functioning well. However, there is still room for improvement in terms of simplification, transparency, and ease of operation for farmers. To fully realize its potential, successful export and marketing activities must be strengthened and professionally managed. As a result of the accession, similar to the EU15, the proportion of GDP derived from agriculture has decreased, the number of people employed in agriculture is declining, average income levels are rising, and the average size of farms is increasing. Low capitalisation and mechanisation remain problems, and there is a need to increase efficiency. The challenges posed by the digitalisation of agriculture and the GMO issue are significant.

2.3.1. Changes in the structure of production

Gross agricultural production was the highest in the year of the EU accession. The gross output value of agriculture was HUF 1,650 billion in 2004, which was significantly higher than the gross output value in the years preceding the accession. In the years following the accession, there was a slight decline compared to 2004 until 2007, after which the gross output value of agriculture increased steadily, with some fluctuations (KSH, 2023).

However, production efficiency has lagged behind the EU-15, as the value of output per hectare of agricultural area is about half the average value of output of the previously acceded Member States. The main reason for this was the distorted production structure and the lack of technological development (Vásáry, 2020).

After the accession, the share of crop production increased sharply, so the distortion of the agricultural sector continued in favour of crop production. In contrast, the share of livestock farming continued to decline. This change is due to the favourable common market measures, mainly direct aids and intervention measures. However, the role of the sector in the national economy and the share of agriculture in GDP did not change significantly since the EU accession (Popp et al, 2018).

2.3.2. Impact on crop production

Arable crop production in Hungary has traditionally been dominated by cereals. After the accession, the production of cereals and industrial crops, including oilseeds, has increased. This increase is linked to the obligation to grow arable crops, which is linked to area payments. It can be concluded that the ratio between cereals and industrial crops has not changed significantly after the EU accession. The area share of cereals is close to two thirds.

Two changes in the structure of arable crop production were observed after the EU accession: (i) the share of cereals in the crop structure decreased slightly, while that of oilseeds increased steadily, (ii) among the cereals, the share of cereals in the crop structure decreased slightly, while that of maize increased. The increase in maize production may have been made possible by the CAP safety net (Vásáry, 2020). According to the 2022 statistics, 60% of the arable land was used for cereals and 24% for industrial crops (KSH, 2022; KSH 2023 a).

However, it can be said that the yields of the two main crops dominating the Hungarian agricultural sector, wheat and maize, were higher after accession than in the years before the accession, but the quantities harvested fluctuated (Kapronczai, 2010). It is worth noting that Hungarian sugar beet production was strongly affected by the EU accession. After the EU sugar reform, only a minimal area of sugar beet was cultivated in Hungary (Kapronczai, 2010).

During the period under review, labour-intensive crops such as fruit and vegetables were drastically reduced. The main reason for this is that less efficient and more expensive production has been replaced by foreign agricultural producers able to take advantage of the EU's liberalised agricultural trade. Whole sectors of production have been lost, sectors for which domestic agro-climatic conditions are favourable, as well as the basic geographical conditions for market access. These negative trends are made more depressing by the fact that the largest job-creating sector in agriculture is the fruit and vegetable sector, which plays a central role in rural development as they are labour intensive and can sustain rural areas.

The main causes of the decline are the lack of physical infrastructure (warehouses, cold stores, sorting, grading, packaging, quality control points and processors) and the lack of commercial-financial infrastructure (buyers, creditors). For increased market access, it would be essential to concentrate the processing sector.

The measures of the Garden-Hungary („Kert-Magyarország" in Hungarian) Action Programme of the Hungarian Fruit and Vegetable Sector Strategy (2012-2020), as set out in the National Rural Strategy, are intended to reverse these negative trends. Their aim is to promote the development of viable farms into competitive farms and the growth of small businesses into medium-sized enterprises.

2.3.3. Impact on animal husbandry

The livestock sector experienced several changes: the ownership structure changed after the change of regime, the structure of production and the market conditions changed, consumer behaviour and social attitudes also changed. Our main findings in relation to the sector are that the changes that folloed the EU accession – e.g., the Common Agricultural Policy's practice of giving little preference to the the livestock sectors, the boom in imports as a result of market opening - tended to strengthen the crop sector, while at the same time further reduced the number of livestock (Vásáry, 2020).

After the accession, the size of the poultry population has fluctuated moderately, but the number of laying hens shown a downward trend. The number of turkeys increased steadily until 2007, after which it fell sharply (Kapronczai, 2010).

In Hungary, pig farming was one of the most important areas of livestock production until 1999, but after that it declined due to unpredictable market conditions. On the positive side, however, the quality of pigs has improved, which was the result of the EU's preference for quality commercial pig production (Kapronczai, 2010; KSH, 2022).

Cattle farming was a dominant sector before the change of regime and was largely an export-oriented activity. However, the change of regime had a negative impact on cattle farming, which declined due to inefficiency and profitability issues. The decline in the cattle population continued until 2006, when the number of cattle stabilised at around 700,000 head. The EU support scheme was instrumental in this stabilisation (Kapronczai, 2010; KSH, 2022).

As already mentioned, the number of animals gradually decreased in the post-accession period. However, the decline continued until 2013, after which the sector showed signs of stagnation and minimal growth (KSH, 2022). The sector was affected by market conditions, but the strict and cost-intensive animal husbandry requirements imposed by the EU also contributed to the decline. The CAP market regime and the direct support system determine the decisions of crop producers and, in order to achieve a secure income, they either abandon livestock production, which is very costly and generates income in the long term, or they minimise their livestock production. The increasing price of feed and the cost of proper manure management also discourage livestock production. The combination of these factors and the lack of capital was forcing some farmers to abandon the sector (Vásáry, 2020).

The continuing negative effects on the sector and the CAP policy have led to a specific separation between livestock and crop production in Hungary. This separation significantly contributed to the deterioration of the sector and exacerbated the distortion of the crop-livestock ratio.

2.3.4. Changes in farmers' income

Income from agricultural production is affected by a number of forces, including both natural and market forces, which have a negative and a positive impact on income.

Weather has to be mentioned in particular as a negative force. Weather conditions are the main cause of the unpredictability of the agricultural sector and this factor makes agriculture such a high-risk sector. In some cases, the lack of rain, in other cases high rainfall, or even extreme weather events such as hail or drought, reduce the sector's output. The weather is beyond human control, although today's technologies can provide protection in some cases. One such technological protective system is the irrigation system, which can help in the event of drought.

The second most important factor influencing the income from agricultural production is agricultural subsidies. In the new Member States (including Hungary), between 1998 and 2005, the income of the factors of production realised by producers increasingly came from subsidies. In the old Member States the increase was much more moderate. Moreover, in 2005 the new Member States were already ahead of the old Member States with 43% of the income from factors of production coming from subsidies, although it should be noted that the level of income was much lower. An increase in the share of subsidies was already noticeable before the accession, at least partly due to the EU pre-accession aid (SAPARD). However, the increase became faster after the accession (Szabó, 2007).

The income indicators of the Member States fluctuated more before the accession than after the accession and more than the income indicators of the old EU Member States. This was probably due to the lack of higher agricultural subsidies. It can therefore be concluded that agricultural subsidies and a stable and predictable support system have reduced the uncertainty in the profitability of production, mainly due to the weather conditions (Szabó, 2007).

The income of agricultural holdings comes from several sources. The main sources of farm income are sales and non-product-related subsidies (area payments and rural development payments). Although farm income is still highly dependent on crop yields and producer prices and fluctuates with them, this dependence was much greater in the years before the accession. The reason for the reduction in this dependence is the introduction of a stabilising element in income, namely the subsidies (Popp et al., 2018).

The Farm Accountancy Data System shows that the share of subsidies in the income of agricultural holdings increased after 2004. Since, as mentioned above, agriculture is highly dependent on the weather, and since this factor has a strong influence on the output of the sector, it also has an impact on the

income patterns. In ‚good years', i.e. when yields are high, the role of subsidies in the income structure decreases, while in ‚bad years', when farmers are unable to achieve high yields due to bad weather or market conditions, farm income decreases. In bad years, therefore, subsidies play an important role in the farm income (Popp et al., 2018; KSH, 2023 b).

The third important factor affecting farm income is the market situation, which is mentioned for the sake of completeness but is not discussed in detail in this chapter.

2.3.5. Investments

The efficiency of the agricultural sector depends largely on the means of production and modern technology. Hungary was (and still is) lagging far behind in this respect. With the accession to the EU and the subsequent increase in the competitiveness of the sector, it has become increasingly important to stabilise the sector and increase its competitiveness. Low-quality technology hindered the stabilisation and development of Hungarian agriculture. Investments that could improve the efficiency and competitiveness of the sector were therefore essential for technological improvements. It is noticable that the tangible fixed assets of agricultural holdings increased significantly in the year preceding the EU accession. By 2004, the value of tangible fixed assets had almost doubled compared with 2002. By contrast, the rate of growth in asset value declined after EU accession, with the stock of assets per hectare increasing by less than 10% in 2010 compared to 2004 (Kapronczai, 2011).

Investment in agriculture is characterised by the fact that the size of the investment is related to the availability of subsidies. Fixed assets (e.g. buildings, machinery and equipment) of agricultural holdings were at a high level in 2003, the year before the EU accession, as a result of investment aids. This decline was due to the fact that investment aids no longer played such a significant role in the new support scheme, and also to the slow start of the payment of EU rural development support (Kapronczai, 2011).

2.3.6. Changes in Agricultural Trade

The transformation of the 1990s, the loss of internal and external markets, privatisation and the EU accession together resulted in the opening up of the Hungarian markets to foreign products, the increase in imports, the transfer of manufacturing industries to foreign ownership, and then their downsizing and closure, and the reduction of production capacity.

EU membership has enabled Hungarian agricultural producers to have free access to the single market. This has brought significant benefits to

Hungarian agricultural exports, as the EU market is one of the largest and most in-demand in the world.

With increased market opportunities, Hungary expected the EU accession to bring significant export growth for agriculture. Hungarian farmers were confident that the accession would bring a significant increase in agricultural production, as the increase in producer prices, catching up with EU levels and the production incentives of direct payments would increase the volume of goods that could be exported. The Hungarian agricultural community also hoped that market conditions would improve with access to the internal market. However, these expectations were not fully met (Hegedüs & Kiss, 2015).

The study, conducted by Hegedüs & Kiss (2015), looked at Hungarian trade in agricultural products between 2003 and 2013. Hungary's trade with the EU increased significantly since 2004. Their study shows that Hungarian exports to the EU-27 grew 1.9 times between 2003 and 2013. Imports from EU-27 increased by 1.6 times. It was found that the growth of trade with the EU was less dynamic than the total trade flows. This can be explained by the fact that the accession did not lead to a substantial market expansion, as the Association Agreement signed before the accession already made 92% of the EU market available to Hungary, therefore the accession did not have a strong export-generating effect. For agricultural products, external trade with the EU has been much more dynamic, with both Hungarian agricultural exports to the EU and agricultural imports from the EU growing by 3.3% between 2003 and 2013. The implication of this trend is that the previously signed Association Agreement was not able to remove all the barriers to trade in agricultural products and could only be implemented through the accession. The increasing importance of the internal market is shown by the fact that 83.3% of domestic agricultural exports went to member states in 2013, compared to 72.0 % before accession, while 91.6 % of Hungarian agricultural imports came from the EU, compared to 83.4% in 2003 (Hegedűs & Kiss, 2015).

2.3.7. Information and communication technologies in Hungarian agriculture

The spread of information and communication technologies (ICT) has had a significant impact on the agricultural sector, providing potential benefits such as increased productivity, efficient resource use, and improved market competitiveness. The development of smart agriculture is highly supported by EU regulation, as the European Union's new CAP for 2023-2027 emphasizes the digital transition, and Hungary's Strategic Plan includes funding for the digital transition starting in December 2024. Overcoming the barriers to adoption, such as access to financing and improving farmers' knowledge, will be crucial for Hungary to capitalise on the benefits of smart agriculture and remain competitive in the EU market.

The use of digital farm management systems will be able to enhance economic efficiency by providing a competitive advantage, reducing costs, and leading to more efficient and sustainable production. Farmers can utilize mobile apps and software to access up-to-date data on crop conditions, market prices, and weather, enabling better decision-making. These tools allow for detailed planning of agricultural processes, from crop rotation to yield forecasting (Nagy & Lakatos, 2022; Bazsik et al., 2022).

However, the adoption of digital and precision farming tools in Hungary has been relatively low, with only 38% of farms using digital tools, mostly for e-banking and e-government (KSH, 2020). The 2020 agricultural census revealed that the use of precision tools is highest among crop farms, but still only 5.6% use the most common precision tool (KSH, 2020). Reasons for the low adoption include high investment costs, lack of knowledge (Bazsik et al., 2022), and the perception that these tools are not needed (KSH, 2020).

Summary

The changes brought about by EU accession - the practice of the Common Agricultural Policy of giving little preference to the granivores sectors and the boom in imports as a result of market opening - tended to strengthen the crop sector, while at the same time further reduced livestock numbers. The share of crop production increased sharply, so that the distortion of the agricultural sector in favour of crop production has continued. On the other hand, the share of animal production continued to fall. This change is due to the favourable common market measures, mainly direct aids and intervention measures.

During the period under review, labour-intensive agricultural crops such as fruit and vegetable production declined dramatically. This is largely due to less efficient and more expensive production being supplanted by foreign agricultural producers taking advantage of liberalised EU agricultural trade. There was a loss of entire production crops, crops for which domestic agro-climatic conditions are favourable, as are the basic geographical conditions for market access. The fact that the fruit and vegetable sector is the largest job-creating sector in agriculture and plays a central role in rural development due to its high manual labour requirements and its ability to sustain production makes these negative trends particularly depressing.

References

A magyarországi SAPARD Program Időközi értékelése (2000—2003) (Záró jelentés 03-4180-00002–0304). (2003). AGRICONSULTING EUROPE S.A. https://sapard-avop-nvt.kormany.hu/download/0/1a/10000/SAPARD.idok%C3%B6zi.%C3%A9rt%C3%A9kel%C3%A9se.(2000-2003).HU.pdf

Antal G. (2005). *A NAGY PÉNZESZSÁK. Agrártámogatások a WTO és az Európai Unió tükrében*. Publikon Kiadó.

Bazsik I., Bujdosó Z., & Koncz G. (2022). A magyar gazdák helyzete a mezőgazdaság 3.0 és 4.0 korában = The Situation of Hungarian Farmers in the Age of Agriculture 3.0 and 4.0. *ACTA CAROLUS ROBERTUS*, *12*(2), Article 2. https://doi.org/10.33032/acr.2907

Buday-Sántha A. (2001). Agrárpolitika - Vidékpolitika (A magyar agrárgazdaság és az EU). Dialóg Campus.

Farkas T. (2000). „SAPARD kistérségek". *Tér és Társadalom*, *14*(2–3), 209–217. https://doi.org/10.17649/TET.14.2-3.588

Halmai P. (2004). Az agrárgazdaság EU-adaptációja: Várható feszültségek, gazdaságés társadalompolitikai kihívások. *Politikatudományi Szemle*, *13*(1–2), Article 1–2.

Harcsa I. & Kovách I. (1996). Farmerek és mezőgazdasági vállalkozók. *Társadalmi Riport*, *4*(1), 104–134.

Hegedüs Z., & Kiss J. (2015). A magyar EU-csatlakozás agrárkereskedelmi mérlege. *KÜLGAZDASÁG*, *59*(3–4), Article 3–4.

Kapronczai, I. (2010). A magyar agrárgazdaság az adatok tükrében az EU csatlakozás után. *AKI Agrárközgazdasági Intézet*, *Agrárgazdasági információk*(12). file:///C:/Users/Acer/Desktop/ai_2010_12.pdf

Kapronczai, I. (Ed.). (2011). A magyar agrárgazdaság napjainkban. *GAZDÁLKODÁS: Scientific Journal on Agricultural Economics*. https://doi.org/10.22004/ag.econ.119939

Kovách I. (2012). *A VIDÉK AZ EZREDFORDULÓN*. Argumentum - MTA szociológiai Kutatóintézet. https://real.mtak.hu/9296/

KSH. (2008). *A mezőgazdaság fejlettségének regionális különbségei*. KSH. https://www.ksh.hu/docs/hun/xftp/idoszaki/regiok/orsz/mgfejlettsege.pdf

KSH. (2022a). *19.1.1.27. Szarvasmarha-, sertés-, ló- , juh-, bivaly-, szamár-, öszvér- és kecskeállomány* [dataset]. https://www.ksh.hu/stadat_files/mez/hu/mez0027.html

KSH. (2022b, június). *A fontosabb növények vetésterülete*. https://www.ksh.hu/s/kiadvanyok/a-fontosabb-novenyek-vetesterulete-2022-junius-1/

KSH. (2023a). *19.1.1.1. A mezőgazdaság összefoglaló adatai* [dataset]. https://www.ksh.hu/stadat_files/mez/hu/mez0001.html

KSH. (2023b). *19.1.1.2. Mezőgazdasági számlák rendszere, folyó alapáron* [dataset].

https://www.ksh.hu/stadat_files/mez/hu/mez0002.html
KSH. (2023c). *19.1.1.12. Fontosabb szántóföldi növények betakarított területe* [dataset]. https://www.ksh.hu/stadat_files/mez/hu/mez0012.html
Kulcsár L. I. (2020). Vidékfejlesztés Magyarországon: Mérföldkövek egy göröngyös úton. *Tér és Társadalom*, *34*(4), Article 4. https://doi.org/10.17649/TET.34.4.3325
Laczka É. (2007). A magyar mezőgazdaság az EU-csatlakozás körüli években, 2000-2005. *Statisztikai Szemle*, *83*(1), 5–20.
Lehmann K., & Nyers J. (2009.). Az Európai Unió fejlesztési forrásainak felhasználása. *Statisztikai Szemle*, *87*(2), 134–155.
Losoncz M. (2014). Magyarország tíz éve az EU-ban—Mekkora volt a mozgástér? *KÖZGAZDASÁGI SZEMLE*, *61*(4), Article 4.
Nagy S., & Lakatos V. (2022). Az IKT eszközök és a kontrolling jelentősége a mezőgazdaságban, különös tekintettel a szoftverekre és mobil applikációkra. *Jelenkori Társadalmi és Gazdasági Folyamatok*, *17*(1–2), Article 1–2. https://doi.org/10.14232/jtgf.2022.1-2.93-108
Pete N. (2000). *A magyar mezőgazdaság és az Európai Unió.* Magyar Köztársaság Külügyminisztériuma.
Popp J., Szenderák J., Fróna D., Felföldi J., Oláh J., & Harangi-Rákos M. (2018). A magyar mezőgazdaság teljesítménye 2004-2017 között. *Jelenkori Társadalmi és Gazdasági Folyamatok*, *13*(3–4), Article 3–4. https://doi.org/10.14232/jtgf.2018.3-4.9-20
SAPARD AVOP NVT. (n.d.). Vidékfejlesztési Minisztérium. Retrieved 11 February 2024, from https://sapard-avop-nvt.kormany.hu/sapard-program
Schlett A. (2023). Szempontok a földkárpótlás helyi folyamatainak vizsgálatához a rendszerváltás időszakában. In „A Föld nem tud futni" (pp. 35–53). Nemzeti Emlékezet Bizottsága. https://m2.mtmt.hu/api/publication/34411679
Szabó, P. (2007). Az EU-csatlakozás hatása a mezôgazdasági jövedelemre. *Statisztikai Szemle*, *85*(1), 22–35.
Vásáry, M. (2008). *Az agrártámogatási rendszer adaptációja.* Agroinform Kiadó.
Vásáry, M. (2020). A Közös Agrárpolitika átvétele az új tagállamokban. In *A Közös Agrárpolitika rendszere* (pp. 137–185). Dialóg Campus Kiadó.