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# AKIS Country Report HUNGARY

Hungarian Chamber of Agriculture
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# AKIS country report HUNGARY

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## SUMMARY

The study contains the general characteristics of the Hungarian agricultural and forestry sector and AKIS as well as the historical development of the advisory system. The organizations providing advisory services, policy issues, methods of knowledge transfer as well as the advisory organizations that make up the FAS and their operation are presented in detail.

The authors define AKIS as a system that connects people and institutions to promote mutual learning and to produce, share and use technologies, knowledge and information related to agriculture. The system integrates farmers, advisors, educators in agricultural education, researchers and other actors who generate, share and use knowledge and information from different sources to operate and develop the agricultural sector. This relationship system is shown in the AKIS diagram.

The Hungarian AKIS has a rather heterogeneous structure. In addition to the various ministries, actors in the advisory system, participants in education and research, professional chambers, advocacy organizations, farmers' organizations, media and information channels, NGOs and various EU networks play a decisive role. The Hungarian Chamber of Agriculture plays a key role in AKIS, especially in the field of protection of farmers' interests, as well as in the generation and dissemination of information. Advisory services, which are brought together by the National Advisory Centre (OSzK), have a prominent role in the transfer of knowledge and the practical application and dissemination of innovations. OSzK plays a coordinating, recording and controlling role within the framework of the Hungarian Farm Advisory System, among its tasks and actors.

According to the register, 1,100 advisors provide advisory services in Hungary, and it is important to note that the Hungarian Chamber of Agriculture employs 610 village agronomists, who, among other things, provide information and help chamber members regarding issues related to their activities. Agricultural advisory activity has a long tradition in Hungary and the quality and methodology of knowledge transfer has developed dynamically in recent years as well. The advisory system has undergone significant changes in recent decades.



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# 1. MAIN CHARACTERISTICS OF THE HUNGARIAN AGRICULTURAL AND FORESTRY SECTOR

## GENERAL INFORMATION ABOUT HUNGARY

Hungary is located in Central Europe, in the middle of the Carpathian Basin. It is bordered on the north by Slovakia, on the northeast by Ukraine, on the east and southeast by Romania, on the south by Serbia and Croatia, on the southwest by Slovenia and on the west by Austria. It covers an area of 93,030 square kilometres and has a population of 9.937 million, making it one of the medium-sized and medium-populated Member States of the European Union. Its capital and most populous city is Budapest with 1.794 million people (KSH, 2018). Hungary is home to the world's largest thermal water supply, the world's second largest thermal lake (Lake Hévíz), the largest lake in Central Europe (Lake Balaton) and the largest grassy plain in Central Europe (Hortobágy). The most important natural treasure of the country is arable land. 70% of its area is suitable for agricultural use, of which 72% is arable land. Hungary belongs to the Danube catchment area, the axis of its water network is the Danube River, the total length of which is 2,850 km, of which the length of its main branch in Hungary is 417 km. The climatic areas of Hungary are eastern wet continental, western oceanic, northern arctic, and south-southwest Mediterranean. According to the 2018 data of the Central Statistical Office (KSH, 2019), the average annual temperature is 8-11 °C, with relatively high fluctuations of 20-25 °C. The number of hours of sunshine per year is between 1,750 and 2,200. The average annual rainfall is 500-900 mm. 20% of the country's territory is covered by forests. To protect the flora and fauna, 10 national parks, 38 landscape protection areas, 142 national nature reserves, a natural monument and 1,125 nature reserves protected by local governments have been established in the country so far, on a total of 816,008 hectares.

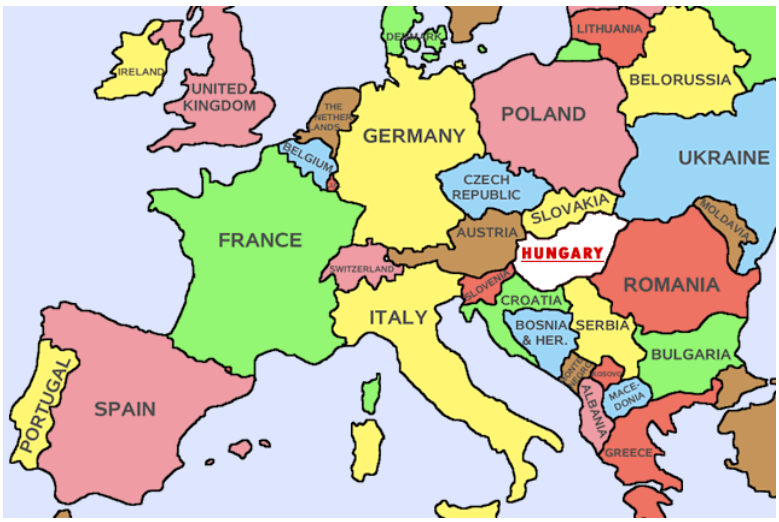


Figure 1. The geopolitical location of Hungary. Source: Europe map study (2020)

**Economic performance, investment:** According to the 2020 publication of KSH, in the two years following the economic crisis, the Hungarian economy was characterized by a small, basically export-led recovery. This came to a halt as a result of the 2012 European recession, but in 2013-2019 the performance of the economy grew at a rate exceeding the EU-28 average. Domestic demand played a significant role in this, given that the financial situation of households improved significantly, consumption picked up and the number of investments increased dynamically. On the production side, market-based services have become the driver of growth. In addition, in 2019, the performance of industry and construction also contributed significantly to the GDP growth of 4.9% which is outstanding at EU level. GDP per capita was USD 16,148 in 2019 (56$^{th}$ in the world). After several years of decline and stagnation, the volume of investments has expanded significantly since 2013, despite the temporary decline in 2016, and in 2019 it rose to its highest level ever.

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**Digital society:** In Hungary, 86% of the population aged 16-74 has already used the Internet during their lives. The Internet access of Hungarian households, which is similar to that of the Visegrad countries, is constantly rising, but is still below the EU average. In 2019, only 45% of households in the lower income quarter were able to connect to the World Wide Web, which was well below the EU average. In the upper quarter, there was little difference between the domestic and EU averages (96% and 99%, respectively).

**Education:** In Hungary, in the 2019/2020 academic year, 1.7 million people took part in full-time training in public education and higher education at different levels (this represents a decrease of 0.2% compared to 2018 and 13% compared to 2010). The number of pre-school children and higher education students increased, while that of primary school and secondary school students decreased. The participation rate of the 3–22 age group in full-time public and higher education has stagnated in recent years, in 2019 it was 81%.

**Labour market:** The number of employees increased steadily between 2011 and 2018, exceeding 4.5 million in 2019. Among those aged 15-64, the employment rate rose to 70.1% and the unemployment rate fell to 3.5%.

Increasing investment in **research, innovation**, infrastructure and skills is important for improving productivity and long-term growth that benefits society as a whole. The ratio of public and private investment to GDP is high, but its composition could be better targeted at increasing productivity. Research and innovation capacities need to be expanded to improve moderate innovation performance. Territorial inequalities could be alleviated by improving infrastructure and public services in disadvantaged areas. In Hungary, investment in skills, education and training is essential in order to boost future economic growth (assessment under Regulation (EU) No 1176/2011, 2019 Country Report - Hungary).

## PRESENTATION OF THE HUNGARIAN AGRICULTURAL SECTOR

Agriculture is an extremely important sector of the national economy in terms of food supply for the population, which has been further strengthened by the restrictive measures caused by the COVID 19 pandemic. In Hungary, the proportion of agricultural areas, and especially that of arable land, is high in international comparison too. According to the data of KSH, 58% of the country's territory, i.e. 5.3 million hectares, is under agricultural cultivation. The Hungarian agriculture has been steadily accounting for about 2% of EU agricultural output and value added for years, while its share of factor income is higher, at 2.3-2.4%. The country's agriculture has developed significantly since the EU accession (2004), and its efficiency, competitiveness and profitability have begun to catch up with those of the old Member States.

According to the statements of KSH, the growth of agricultural output, which has been going on since 2010, continued in 2019, reaching another record with HUF 2,789 billion. The volume of gross value added decreased by 1.6%, but at current prices it was 3% higher than in the previous year. The profitability of agriculture at the sector level has also improved, with factor income rising by 2.9% in 2019. Foreign trade in agricultural and food products contributes greatly to the positive balance of the national economy year by year, therefore, its macroeconomic significance is decisive. The assets of the national economy amounted to EUR 4,854.7 million, to which agricultural foreign trade contributed EUR 3,108.7 million in 2019. In 2019, the value of total national exports in euros increased by 3.9% and imports by 4.8% compared to the previous year. Agricultural exports increased by 8.2% and agricultural imports by 8.1% compared to 2018. The share of agricultural exports in the total exports of the national economy increased, mainly due to the increase in exports of cereals, oilseeds and processed feed.

Employment in agriculture (in line with the significant labour shortage and the ongoing transformation of the farm structure) declined in 2019. The number of people employed in agriculture, forestry and fishing was 210.7 thousand in 2019, representing a decrease of 2.0% compared to the previous year. Employment in the sector increased by 3.7% altogether between 2015 and 2019. The number of people employed in the food industry

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increased in 2019. Food enterprises employed 145.1 thousand people in 2019, which means 1.1 thousand people or 0.8% more than in 2018.

Due to the varied local conditions, field crop production is very diverse, but the role of cereals and oilseeds is decisive. The use of arable land in Hungary is concentrated, almost half of which is occupied by wheat and corn (2018), while farmers grow sunflower and rapeseed on 21.9% of the arable land. In 2018, the share of the main crops (wheat, corn, barley, sunflower, rapeseed) in the total arable land was 72.8%.

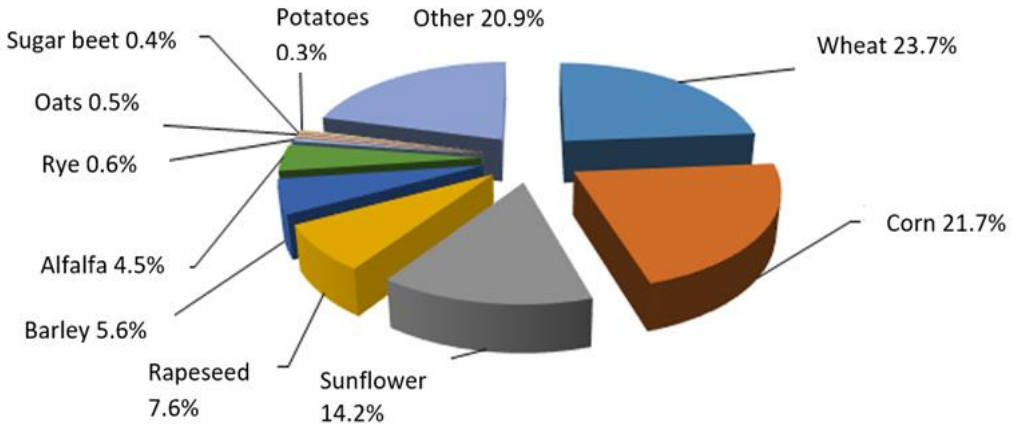


Figure 2. Ratio of the harvested area of some arable crops to arable land in 2018. Source: Central Statistical Office (2020)

Wheat yields exceeded 5 million tons for the seventh year in a row, amounting to 5.4 million tons in 2019. The yield of corn was very favourable at 8.1 million tons. The area and yield of sunflower (1.7 million tons) was 7% lower than in the previous year. The yield of rapeseed fell short of the record of 2018 with 896 thousand tons harvested in 2019.

Hungary has good conditions for feed production and animal husbandry, therefore, animal husbandry traditionally plays an important role in the Hungarian agriculture. The most important animal species are cattle, pigs, poultry and sheep. According to the data of the Central Statistical Office, the gross output of live animals and animal products at current basic prices was HUF 943 billion in 2018, their production accounted for 35.3% of agricultural output. In 2018, the volume of output was 5.7% higher than in the previous year. Output from poultry increased by 13%, from cattle, by 7% and from pigs, by 3%.
In 2018, the number of cattle was 884.8 thousand and that of cows was 402.8 thousand in Hungary. The former increased by 15 thousand and the latter by 8.1 thousand in one year. 51.7% of the cows were dairy cows, 40.7% were beef cows and 7.6% were dual-purpose breed. The increase is mainly due to the increase in the number of beef cattle. The majority of the cattle herd is kept by economic organizations but, in parallel with the expansion of the beef herd, the role of individual farms comes to the fore. In 2018, 58% of the cattle herd was kept by economic organizations and 42% by individual farms.
According to the data of KSH, the pig population amounted to 2.872 million individuals in 2018, which is practically the same as a year earlier. The decline in the number of sows stopped, the year-end survey of KSH counted 177.9 thousand individuals, i.e. 3.7% more than a year earlier. The emergence of African swine fever (ASF) in Hungary had a fundamental effect on foreign trade. The 31% share of the previously dominant Far

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Eastern countries in Hungarian pork exports in 2017 fell to 9% by 2018. At the same time, this was partially offset by the expansion of pork and live pig exports to European countries. The reorganization of markets moderated the decline in the purchase price of live pigs, which was 10% in 2018.

In December 2018 the poultry population decreased by 2.2% to 39.7 million compared to the previous year's survey (KSH). The number of hens, which make up 77% of the herd, fell to 30.7 million. The number of laying hens did not change significantly: 11 million individuals were counted in December 2018. The goose population increased by 12% to 1.3 million. The turkey herd fell by 2% to 2.8 million. The number of ducks (4.9 million) increased by 4.2%. The production of all poultry species increased in 2018, of which the increase in slaughter duck production was decisive. Poultry accounted for 54.3% of total slaughter animal production in 2018. Chickens accounted for nearly two-thirds of slaughter poultry production, ducks and turkeys for 17% each, and geese for 5% in 2018.

The number of sheep was 1.1 million and the number of ewes was 798 thousand in 2018. About two-thirds of the sheep population is located in the northern and southern regions of the Great Plain. The majority of the stock, i.e. 86%, was kept by individual farms. Production in the sheep sector expanded in 2018. Slaughter sheep production increased by 3.8% annually. Exports of live animals are dominant in the sector. The volume of live sheep exports increased by 13.6% compared to 2017. Italy remained Hungary's largest market, but its share of our total exports fell from 86% to 74%. In addition, Turkey (14%), Germany (5%) and Croatia (4%) were significant. In addition to live sheep exports, sheep meat exports also increased, mainly to Far Eastern markets. Domestic sheep consumption remains extremely low (0.2 kg/capita).

The fruit and vegetable sector contributed 10.7% to the total agricultural output (2019). According to the data of KSH, the value of fresh vegetable output was HUF 193.8 billion in Hungary in 2018 at current basic prices, which was 7.8% higher than a year earlier. Traditionally, sweet corn, green peas, and watermelons are the vegetables grown in the largest area which together occupied more than half of the vegetable area in 2018. Based on the production value, tomatoes, green peppers, sweet corn, green peas and watermelons were the most significant vegetables in 2018, together they accounted for 59.8% of the production value. Hungary has been a leading producer and exporter of sweet corn in the EU for years. Yields are stable year by year thanks to production based on a high degree of mechanization and modern technologies. The production of sweet corn for industrial purposes is subject to a buyer contract almost everywhere. The market of corn on the cob for fresh consumption is fully covered by domestic, mainly smaller farms.

In Hungary, the growth of areas under controlled organic cultivation was 4.9% in 2018. Organic farming thus accounts for 4% of domestic agricultural land. This is higher than the previous value of 2.5-3%, but still lags behind the 2017 EU average (7%). The number of organic enterprises also increased (4%), to which processors and importers also contributed, in addition to farmers representing the vast majority. In Hungary, more than half of the controlled ecological areas are meadows and pastures. This is followed by arable land with a one-third share, while the role of orchards and other perennial crops is significantly smaller. On almost half (46%) of the arable land cereals are produced and the share of industrial crops is also significant (15.4%).

## PRESENTATION OF THE HUNGARIAN FORESTRY SECTOR

According to the latest forestry sector report for 2018, 2,054 thousand hectares of forestry areas are registered in Hungary, of which 1,939 thousand hectares are areas covered with trees. 56% of forestry land is state-owned, 1% is community-owned, and 43% is privately owned. The ownership and management structure of private forests is extremely fragmented, and the majority of private forest owners and forest managers are not professionals, which reduces the efficiency and competitiveness of forest management. 40% of the forests are protected nature conservation areas or Natura 2000 forests, and the remaining forests are also home to many plant or animal species in need of protection. A significant proportion of forests also have other protective or public welfare purposes. In view of these, forest management in Hungary is subject to significant restrictions in the public interest. The coherence between the economic, protective and public welfare functions of the forest is ensured by district forest planning covering all forests that is repeated every ten years, as well as mandatory

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professional management and advisory services that can be used on a voluntary basis. Nearly half of the wooded area is covered by forests consisting mainly of native tree species. In these forests, especially in the case of those involved in nature conservation, nature-friendly forestry is carried out without clearcutting, if the conditions are met. Typically, conventional rotation forest management is practiced in planted forests and tree plantations meant for economic purposes. Logging is carried out on 7-10% of the wooded area in a year, about one-quarter of which is final harvesting and the rest is logging for silvicultural purposes. Only about 70% of the amount of wood (increment) produced in the Hungarian forests annually is logged, so the living tree stock is growing year by year.

The professionalism and sustainability of forestry is guaranteed by the network of forestry specialists. The Hungarian forestry regulations require the forest manager to employ specialists, the so-called forestry professionals, for the professional management of forestry. Larger forest managers typically provide this by employment, while smaller ones within the framework of an engagement contract. According to the register of the forestry authority, as of 27 September 2018, there are 3,477 full-time forestry professionals and 1,002 career entrants qualified as trainees in Hungary. Of the total staff, 3,173 forestry specialists have secondary and 1,306 have higher education (data source: Forestry Directorate of the National Food Chain Safety Office). Forestry professionals are obliged to monitor the condition of forests and the process of forest management, to lead the professional administration of forest management, and to countersign forest managers' reports and data submissions to the forestry authority. From 1 July 2020, only qualified enterprises, the so-called forestry management enterprises, may provide forestry management services. As of 1 November 2020, the forestry authority has so far registered 657 such enterprises (data source: Forestry Directorate of the National Land Centre, 2019, and NÉBIH Forestry Directorate, data provision to NAK on request, 2019).

Forestry management activities therefore mean the performance of mandatory tasks. The forestry advisory service operates separately from this, which is used by forest managers as an option according to their needs. Both activities are carried out by forestry specialists, with partial overlap.

The number of people employed in agriculture, forestry and fisheries was 210.7 thousand in 2019, of which the share of people working in forestry is approx. 10%. The number of employees in the forestry sector has shown an increasing trend in recent years (it increased by 6.9% between 2013 and 2018, and has been stagnating since 2015.) At the same time, in international comparison, employment of more than 10 people per hectare is outstanding, and within the European Union this indicator is the highest in Hungary. The labour-intensive nature of the forestry sector is also reflected by the fact that a permanently higher rate of 0.6-0.5% is achieved in employment compared to the 0.2% rate in gross value added (KSH, 2020).

Overall, it can be stated that the professionalism of sustainable, efficient forest management is ensured partly by those performing forest management activities and partly by forestry advisors. Both activities are carried out by forestry specialists, with partial overlap.

## 2. GENERAL CHARACTERISTICS OF THE HUNGARIAN AKIS

The central coordination of the Hungarian AKIS (Agricultural Knowledge Transfer and Innovation System (in Hungarian: ATIR)) is currently being developed, however, the identification and brainstorming of the actors of the system is already realized through the Agricultural Advisory System. As far as the future is concerned, coherence in cooperation will expectably strengthen given that there is a need and intention for it both from the governmental, professional and social sides.
The actors of AKIS: farmers/foresters/food producers, advisors, researchers, agricultural producer organizations as well as governmental and non-governmental organizations, in-school and out-of-school educational institutions, networks, media, other services, etc., i.e. all those who produce or transfer knowledge.

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At the governmental level, the Ministry of Agriculture (AM), the Ministry of Innovation and Technology (ITM) and the Ministry of Human Resources (EMMI) as well as the background institutions supporting the work of the ministries are the main AKIS actors. Horizontally, the operational tasks of research and innovation are performed by the National Office for Research, Development and Innovation (NKFIH); the sustainable development and international networking of the research infrastructure is supported by the National Research Infrastructure Committee (NKIB).
The following higher educational institutions play a relevant role in the efficient operation of AKIS: University of Veterinary Medicine, University of Debrecen, University of Nyíregyháza, University of Sopron, University of Szeged, Szent István University, and Széchenyi University. These institutions are maintained by the state or foundations.
Agricultural vocational schools covering the whole country and maintained by the Ministry of Agriculture, as well as institutions participating in adult education are also of paramount importance.
Other actors of the AKIS system are farmer and producer professional and inter-professional organizations and associations that unite the individual Hungarian agricultural and food supply chains (e.g. milk, poultry, pig, cereals, fruit and vegetables, sheep, herb, etc. sectors).
AKIS operates directly and/or indirectly from public, private and EU funding. In this respect, actors include financial institutions (financial and financing organizations, e.g. banks, credit institutions). It is also necessary to mention the EU-supported networks (Innovation Networks: EIP-AGRI OCS/FCS, LEADER, ENRD), the media, and other information channels (social sites, trade fairs, etc.), and the operation of non-governmental organizations (foundations, councils, associations).
One of the most important elements of knowledge dissemination is the media and other multimedia channels, be it online media, social networks or paper-based publications, but also national and international events and fairs, where AKIS actors can meet and talk to each other in person.
The role of NGOs primarily strengthens the relationship between consumers and producers through personal presence.
Horizontally, the interests of those active in all areas of the agri-food economy are represented by the Hungarian Chamber of Agriculture (NAK), from production through processing to trade, given that membership of the chamber is mandatory in Hungary. NAK also plays an important role in knowledge transfer by, inter alia, organizing the training and examination of advisors, carrying out coordination tasks related to advisory activities, and establishing, keeping and publishing a list of advisors and advisory organizations, keeping contact with agricultural and rural development advisory organizations of the EU Member States (Magyar Közlöny, 2019). In addition to NAK, two professional chambers also play a significant role in the field of knowledge transfer: one is the Hungarian Chamber of Professionals and Doctors of Plant Protection (MNMNK) and the other one is the Hungarian Veterinary Chamber(MÁOK).

MSzR operates within the framework set by law, with the coordination of the National Advisory Centre operating within the Hungarian Chamber of Agriculture. FAS basically means regulation and coordination related to advisory activities, but the National Agricultural Advisory Committee (NATaB) is part of the system. The Commission has the power to propose and give an opinion on the coordination of certain tasks related to agricultural and rural development advisory service.

The members of NATaB are appointed by the Minister of Agriculture on the proposal of NAK. The aim of the chamber's proposal was that all actors involved in the advisory system are represented in the committee, from the decision-making level, through agricultural higher education, research, professional and advocacy level to those involved in practice. Based on the composition of the membership, it can be said that NATaB practically covers the actors of AKIS.

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Figure 3. Composition of the National Agricultural Advisory Committee. Source: NAK (2020)

## ACTORS OF THE HUNGARIAN AKIS

The driver of innovation is research and development, in which both state and market participants are involved in Hungary. We would like to describe the actors of the Hungarian AKIS on the basis of the composition of NATaB, supplemented by the most important target group of AKIS, i.e. producers and food producers. The following section details the actors of AKIS (functions, tasks, impact on the system, etc.).

Agricultural producers (farmers/foresters, food producers)

According to the data of KSH, the number of people employed in agriculture, forestry and fishing was 210,700 in 2019, while the number of those employed in the food industry was 145,100 in the same year. According to the 2016 census of KSH, the age composition of those working in agriculture was as follows: the proportion of those over 65 was 31%, while the proportion of those under 35 was 6%. (In parallel with the decrease in the number of farms, the number of people aged 55-64 decreased by 20% altogether.) In terms of the number of farms, 416,000 individual farms and 9,000 organizations operated in 2016.

Government sector and its background institutions, authorities

The Ministry of Agriculture (AM) is responsible for agriculture, the food industry, fisheries, forestry, environmental and natural resources, and rural development. The main goal of the Ministry is knowledge-based sustainable and competitive agricultural management, stable food production, as well as the adoption and support of measures necessary for a liveable countryside.

The Ministry of Innovation and Technology (ITM) is responsible for industry, trade, innovation, research, climate change, and waste management, while the Ministry of Human Resources (EMMI) is responsible for higher education and vocational training (excluding agricultural vocational training).

The work of the ministries is supported by background institutions such as NAIK-Agricultural Research Institute (NAIK-AKI), etc. In addition, there are authorities that publish information booklets and organize information campaigns, and in this respect they are part of AKIS. For example, the National Food Chain Safety Office (NÉBIH, which belongs to the AM) also prepares information booklets and organizes campaigns for consumers, encouraging the public to make conscious and safe food choices.

In-school and out-of-school education: Secondary education (vocational schools), higher education (universities, colleges), adult education

Secondary education, the basis of secondary vocational training at the national level in agriculture and food processing is provided by agricultural vocational schools maintained by the Ministry of Agriculture. There is a need for further development in the quality of education. Institutions are underfunded and due to the low

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attractiveness of the sector, it is very difficult to find the right quality, highly qualified teachers for teaching (the number of students, teachers, and professional experts is low), which has also been recognized by the decision makers. As of 1 July 2020, the 47 agricultural vocational training schools that had operated until then were integrated into 5 agricultural vocational training centres: Central Hungarian Agricultural Vocational Training Centre, Alföld Agricultural Vocational Training Centre, Southern Agricultural Vocational Training Centre, Northern Agricultural Vocational Training Centre, and Kisalföld Agricultural Vocational Training Centre. In order to develop vocational training, they want to place significantly more emphasis on cooperation with the economic actors in the region, on the efficiency of farming, and on improving utilization.

In international comparison, Hungarian higher education is well represented in agriculture. Universities play an important role in AKIS, as they also function as knowledge transfer centres: they carry out research, education and advisory activities as well, thus playing a role in encouraging the young generation in the field of innovation. With the help of universities, there are demonstration farms (model farms) where students can get acquainted with new technologies and the latest research results. A good example of this is the model farm network of Széchenyi University (SZE), which consists of more than 60 model farms/model plants. The model farm network covers the entire agricultural production system and is an important tool for putting university research results into practice.

Several universities have recognized the importance of agricultural advisory service, so they also launch courses that place a strong emphasis on developing "soft skills". These types of skills play a key role in effective knowledge transfer and, therefore, they also play a fundamental role in advisory work. These universities generally seek to participate in cooperation and projects at EU level, thus emphasizing the importance of higher education training. (Both Széchenyi University (SZE) and Szent István University (SZIE) are recognized in this field.)

In the Hungarian agricultural higher education, the number of graduate students is declining, and the students who graduate do not necessarily start working within their field of specialization. There is a growing need for a well-organized higher education structure that meets local needs. This need has been recognized by the education system, so in 2020, the higher education sector has undergone a significant transformation, which puts the operation on a new funding basis. The goal to be achieved by this is more efficient and more modern education in the spirit of quality knowledge transfer. The founder's and maintainer's right of the model-changing institutions has been/will be transferred from direct state ownership to asset management foundations, thus renewing agricultural higher education. On August 1, 2020, Károly Róbert campus of Eszterházy Károly University in Gyöngyös and the Georgikon Faculty of the University of Pannonia merged into Szent István University, and the University of Kaposvár and Szent István University continue to operate in one organization. Not only universities but also agricultural research institutes have been involved in the integration, so that teachers and researchers have the opportunity to solve problems that arise in practice together. In the new group of institutions, the academic year 2020/2021 will continue with about 15,000 students, taking into account market needs and foreign trends.

In adult education, EMMI launched a new training system on 1 September 2020, which aims to respond to changes in the economy by launching training courses meeting new needs in the future, thus bringing about a complete structural change in the sector. The aim is to measure the quality of training, reduce administrative burdens and increase the number of people involved in training. One of the tools of the system is the introduction of the new Adult Education Reporting System (FAR).

Research centres, research institutes

Basic research related to agriculture is carried out by the Agricultural Research Centre (ATK) of the state-owned Hungarian Academy of Sciences (MTA), according to the information available on the MTA-ATK website. Due to its special situation, ATK has a strong basic research activity, and with its varieties and patents that can be used directly in practice, it provides biological bases for a significant part of the arable land of the Hungarian agriculture, thus having a decisive influence on the crop production sector. Measured at European level, it is a significant base for agricultural sciences and a major contributor to the transfer of professional and scientific

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knowledge. ATK coordinates the work of the Institute for Veterinary Medical Research, the Agricultural Institute, the Plant Protection Institute and the Institute for Soil Sciences and Agricultural Chemistry.
The Centre for Ecological Research (ÖK), whose main task is to provide high-quality research on biodiversity and ecosystems, including aquatic and terrestrial life, also belongs to the Hungarian Academy of Sciences. The institution is primarily home to ecological research, but a number of studies are related to the impact of agriculture and forestry on biodiversity.
The Szeged Biological Research Centre (SZBK) is a key institution in internationally recognized Hungarian research in life sciences. The research topics cover many areas of molecular and cell biology, ranging from the industrial utilization of bacteria through the controlled breeding of cultivated plants to the issue of human health and environment protection. SZBK is mainly the workshop for basic scientific research, but the researchers working there also play an initiating role in setting up and managing biotechnology companies, as well as in performing educational tasks.
All three above-mentioned organizations operate under the direction of Eötvös Loránd Research Network (ELKH).
The Hungarian National Scientific Bibliography (MTMT), which carries out its task with the help of the Library and Information Centre of the Hungarian Academy of Sciences according to the information on their website, is a well-functioning channel of knowledge transfer which, as a bibliographic database, is a repository of the scientific results of Hungarian researchers (even with full text content access).

Applied research is mainly concentrated in the nationwide National Agricultural Research and Innovation Centre (NAIK) (Research Institute of Agricultural Economics; Agro-Environmental Research Institute; Research Institute for Animal Breeding, Nutrition and Meat Science; Food Science Research Institute; Forest Research Institute; Research Institute for Fruit Growing and Ornamentals; Research Institute for Fisheries and Aquaculture; Agricultural Biotechnology Research Institute; Institute of Agricultural Engineering, Research Institute of Irrigation and Water Management; Research Institute for Viticulture and Oenology; Vegetable Crop Research Department; Department of Field Crops Research), and in other institutes belonging to the Ministry of Agriculture. The institutes carry out research, but are also involved in the transfer of knowledge to farmers, in the form of seminars, advisory services or visits to pilot stations. In addition to technological research, the Agricultural Research Institute (AKI), the leading state-funded research institute of the Hungarian agriculture, is also part of NAIK. One-third of AKI is engaged in research while the remaining part deals with data management and information analysis. Through these activities AKI assists the Hungarian government's work on practical research and provides scientific support to agricultural policy makers; at the same time, it also makes the results available to agricultural actors.

The National Research, Development and Innovation Office (NKFIH) is intended to ensure the coordination of domestic research and development and innovation at the governmental level and a stable institutional system for its predictable financing. The task of the Office is to establish a stable institutional system of governmental coordination and predictable financing of domestic research, development and innovation (RDI), ensuring the efficient, transparent and value-creating use of available resources. NKFIH deals with the renewal of the Hungarian RDI strategy for the future, and also manages the central research financing fund as the background institution of ITM. The objective of the NKFI is to strengthen the national innovation system, to encourage dynamic cooperation between research centres, companies and enterprises, and to create an attractive innovation environment. NKFIH prepares Hungary's scientific research, development and innovation strategy, manages the resources of the National Research, Development and Innovation Fund, and represents the Government of Hungary and the Hungarian RDI community in international and European RDI organizations.
Among the research institutes, it is important to mention the Research Institute of Organic Agriculture (ÖMKi), the only research institute in Hungary specializing in organic farming, with a strong non-profit background. Their research focuses on topics that provide significant and novel results for the practice of organic food production.

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It is of outstanding importance for Hungarian organic farmers that ÖMKi also provides advisory and research services.
Bay Zoltán Nonprofit Ltd. for Applied Research – with its partly agricultural profile – conducts research in the fields of agro-biotechnology, biomass-based economy and circular economy, among others, according to the website presentation. This organization founded the Hungarian Bioeconomy Cluster, which helps the Hungarian biomass-based economic sector.
Knowledge transfer and innovation are also supported by the Agricultural Information Technology Cluster, which aims to effectively represent the actors of the IT, agricultural and food industry sectors to decision-makers through its functioning network of contacts, as well as to facilitate communication between the parties. The National Office for the Circular Economy (KGNH) is part of ITM, but is mainly funded by private money (working for companies) and EU/national grants (submitting project proposals).

Overall, researchers and educators can also provide advisory services within public research institutes and universities, but there is in fact no public organization in the agricultural sector whose sole purpose is to provide advisory services.

Advisory services, advisors and advisory organizations

Advisory services play an outstanding role in the transfer of knowledge and the practical application and dissemination of innovations, which is brought together by the National Coordination Centre of Advisory Centres (OSzK). OSzK plays a coordinating, recording and controlling role within the framework of the Hungarian Farm Advisory System (FAS), which is advisory service eligible for EAFRD funding, among its tasks and actors. Its tasks are regulated by Decree 16/2019. (IV.29.) of the Ministry of Agriculture and Section 15/B of Act CXXVI of 2012 on the Hungarian Chamber of Agriculture, Food and Rural Development. Its operational tasks are performed within NAK's own organizational framework by the Advisory Group of the Vocational Training and Advisory Directorate. Among other things, the register of advisors and all the information concerning the training and examinations of advisors is available here and can be read on NAK's website. Until 2019, basically only the registration of advisors related to supported advisory services was the responsibility of OSzK, however, according to the above-mentioned legislation, registration is also mandatory for natural persons and organizations engaged in advisory activities in a field related to the sector. In this sense, not only independent advisors are parts of the system but also those performing advisory services for commercial interests.
According to the register, 1,100 advisors provide advisory services in Hungary, and they play a very important role in achieving Common Agricultural Policy (CAP) supports and in complying strictly with environmental and administrative requirements. There is a great need for this type of service, as farmers are not always familiar with performing administrative tasks, and due to the administrative burden, they would drop out of work, and there are areas in the country where farmers' IT skills also need to be improved. At the same time, advisors play a key role in the execution, writing and submission of rural development applications and project management from an administrative point of view. There is also a growing demand for technological advice (new technologies, precision farming tools, organic farming solutions, integrated pest management, improvement of irrigation). Advisors and advisory organizations operate in Hungary as a network farmers can really rely on. It is necessary to note here that medium-sized enterprises and larger farms have their own advisory organizations (their own employees).
Special technological advisory service is performed by some, usually foreign individuals or companies. These are used by medium- or large-scale special farms, ones that really need individual expertise (e.g. a French advisor for cheese-making, an Italian for winemaking, or a Dutch for strawberry production).
Companies producing agricultural raw materials (producers of input materials): they provide expert advice according to their individual interests, and so they are not impartial, but their presence and influence is significant in the Hungarian agricultural sector. They play a leading role in technology support and knowledge transfer. They are mainly engaged in the distribution of herbicides, fertilizers, seeds and agricultural machinery.

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Professional and inter-professional organizations

There are many farmers' organizations in Hungary that focus on a given sector (e.g. arable farming, forestry, horticulture, sheep farming, etc.), but there are organizations that represent the interests of all farmers and thus act as umbrella organizations for other sectoral organizations. Such is the Hungarian Chamber of Agriculture (NAK), an agricultural advocacy organization founded in 2013 for farmers. It currently employs about 1,200 people nationwide, including 610 village agronomists, who, among other things, provide information and help chamber members regarding issues related to their activities. NAK covers and represents actors throughout the agri-food sector (membership is mandatory for farmers, food processors, traders and service providers – i.e. 400,000 members in total). It provides additional information and acts as knowledge transfer for members (by organizing events, seminars, trainings, study trips abroad), in person and through information publications. The national network of 610 village agronomists has more than 20 years of experience throughout the country. Village agronomists are the local points of information supply and knowledge transfer. The extension of the service to cross-border areas and to Hungarian minorities is also available. NAK is a member of, inter alia, the Committee of Professional Agricultural Organisations-General Confederation of Agricultural Cooperatives (COPA-COGECA), the World Farmers' Organization (WFO), the European Forum for Agricultural and Rural Advisory Services (EUFRAS) and the South Eastern Europe Advisory Service Network (SEASN), as well as the Strategic Working Group on Agricultural Knowledge and Innovation System of the Standing Committee on Agricultural Research (SCAR AKIS SWG).The National Advisory Centre operates within NAK but in an independent status. Tasks of OSZK: registration and training of advisors (1,100 people), as well as liaison with other relevant AKIS actors (e.g. National Rural Development Network). NAK is responsible for agri-food vocational training, it registers and coordinates students and farms participating in dual training, coordinates the organization of study competitions, takes part in the organization of master's courses and examinations, and in the promotion of the agri-food professions.

The Association of Young Farmers (AGRYA) is active in increasing the knowledge flow and knowledge transfer to young farmers. Through their programs, they help to shape consumers' attitudes and promote young people's farming spirit. Given that they have limited financial resources, they have recently been increasingly collaborating with NAK and working together on generational renewal.

Cooperatives, producer organizations, producer groups, regulatory councils, integrators

There are a number of professional and inter-professional organizations in Hungary that focus on the needs of a particular sector and represent the given group to policy makers with advocacy, inform consumers about current events through promotion and provide information, knowledge and other services to farmers in the sector. A good example of this is the Hungarian Fruits and Vegetables Inter-professional Organization and Product Council (Fruitveb). The organization regularly organizes professional days – even in foreign languages – focusing on a specific topic, and also conducts surveys, examines market opportunities, gives advice, provides supportive training, and connects farmers. Active organizations provide independent professional advice, primarily in their respective fields. The Southern Plain Gardeners' Cooperative (DélKerTÉSZ) works in a similar way, cooperating with universities in order to solve the common problems of its members through research activities, as well as helping students to organize internships. Another good example is the initiative of Gyümölcsért Kft., which helps the cooperation of political decision-makers, researchers and producers, or MEGÉR-TÉSZ Cooperative, which organizes trainings for their members in the spirit of knowledge transfer. There are many breeding organizations that facilitate the flow of information between breeders, raw material suppliers and those interested in breeding. The Hungarian Association of Pig Breeders and Pig Farmers (MSTSZ) brings together the pig breeding organizations registered in Hungary as an umbrella organization. The association facilitates the flow of information and provides information for producers, among other things, about the relevant regulatory provisions and the conditions of CAP support, and they are in daily contact with all breeders, so they regularly conduct surveys on their needs. The Association of Sheep and Goat Breeders also maintains direct contact with breeders: in addition to increasing the flow of information, awards are given to the most important farms year after year. The Hungarian Charolais Breeders' Association also serves as a good example: it regularly informs its

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members on both regulatory and technological issues. The Association of Sheep and Goat Breeders also maintains direct contact with breeders: in addition to increasing the flow of information, they give awards to the most important farms each year. The Hungarian Charolais Breeders' Association also serves as a good example: it regularly informs its members on both regulatory and technological issues.

There are integrators that specifically help the flow of knowledge with the goal of increasing market demand. Each of them is concentrated in a given sector, such as Master Good Kft. in the poultry sector, which integrates poultry farmers, organizes and manages the primary market, production processes and sales. It maintains a close professional relationship with its suppliers and pays special attention to their training. There are 168 recognized Producer Groups and 5 recognized Producer Organizations in Hungary, but unfortunately not all of these organizations are active. Many cooperatives operate partly as commercial member organizations and do not provide real, relevant advisory services.

EU actors, hubs

In addition to the above, the Ministry of Agriculture operates the EIP-AGRI Network (European Innovation Partnership "for Agricultural Productivity and Sustainability") at national level. The aim of the network is to make the agricultural and forestry sector more productive and sustainable. Through this, it helps AKIS actors to adapt to new challenges (market price fluctuations, climate change, stricter environmental rules, more fierce competition). The EIP-AGRI network (Service Point) is operated in cooperation with NAK, NAIK-AKI and the Hungarian NRN. Among the infrastructures and repositories for the dissemination of knowledge and innovation, the EIP platform (https://eip.fm.gov.hu) is worth mentioning, which allows current and future Hungarian Operational Groups (OGs) to register and share their innovative ideas, and to publish their subsequent results. The site also provides useful information and news on the European EIP network for the interested parties. At the time of writing, 58 winning applications are being recorded by AM.

The government is working to establish a simplified system of procedures for innovative initiatives in the agri-food sector, and plays a key role in international cooperation and promotion of capacity building for researchers not only in Hungary but also in the wider Central and Eastern European macro-region. Such as e.g. the BIOEAST initiative, which coordinates and represents the food and bioeconomy RDI interests of the Visegrad countries in the fields of sustainability and biomass-based economy, knowledge-based agriculture, aquaculture, and forestry. From the point of view of the future of the national AKIS, the strategic planning of the CAP by AM-AKI-NAK and its future operation is extremely important, for which the three organizations have concluded a cooperation agreement representing the government, science, and the interests of farmers.

The secretarial tasks of the Hungarian National Rural Network (NRN) were transferred from Széchenyi Program Office to Herman Ottó Institute Nonprofit Ltd. from 1 April 2020, so the secretariat operates in synergy with the European Union Rural Development Network (ENRD). The Hungarian territorial network provides information on rural development measures and also conducts surveys. NRN belongs to AM from 2020 and aims to enhance rural development initiatives from domestic financial sources, in line with the priorities set out in the National Rural Development Program. The Hungarian National Rural Network (MNVH) belonging to Herman Ottó Institute Nonprofit Ltd. (HOI) aims to organize the AKIS actors involved in rural development into a network so that it makes the retaining power, the socio-economic development and catching-up of the countryside as well as the efficient use of support resources widely available.

The Hungarian LEADER program is based on the cooperation of local administration, entrepreneurs and non-governmental organizations. Its aim is that small communities take actual, local decisions into their own hands. It creates geographically connected groups of settlements with a population of 10 to 100 thousand to implement the regional development strategies developed by the stakeholders. It regards actors living and working side by side as equal partners, thus shaping their habitat and, through this, their own future together.

The institutions presented above are committed to innovation and effective knowledge transfer and are therefore involved in a number of international projects (I2Connect, NEFERTITI, FAIRShare, EUREKA, EURAKNOS, EFFECT, LIFE, etc.).

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Agri-food sector, input producers and distributors, technological advisory services

The presence and influence of input producers and distributors providing technological advisory services is extremely important and unquestionable in AKIS. They play a leading role in providing technical and technological advice for farmers. They are mainly engaged in the distribution of fertilizers, seeds and agricultural machinery. Given that they provide "free" technological advice (note: the service fee is included in the price of the raw materials, so it is not really free), this type of advice may meet the needs of farmers who do not use independent advisory services. These input material production and distribution companies have developed knowledge transfer methods based on new technologies (technological advisory services) that provide farmers with the latest weather and pest forecasting, nutrient management data, and other information that are sent to the customers via emails, text messages, newsletters, and on-line advertising applications (pop-ups). They play a key role in promoting and disseminating new products and technologies. Uniquely, one of the largest Hungarian input service providers (integrators) launched a complex advisory service in Hungary a few years ago, using the so-called holistic approach depending on the size of the farm, for a fee (not automatic, i.e. it is not included in the price of the products, but can be used for a fee).

In summary, it can be said that for the other actors of AKIS, the companies producing and distributing input materials can be good partners in advisory services, for example by using the networks of regional representatives, and their existing customer network can be useful for searching for and recognizing "good practices" because through them the interested farms can be involved in AKIS.

Agricultural and food processors

The activity of food processors is moderate in terms of knowledge flow and knowledge transfer. However, a good example of such an interaction is the specific expectation of a given processing company towards the supplier (knowledge transfer against new technical, technological expectations). However, this is more typical for actors with a large, even international parent company background who, in many cases, have their own, fully equipped research base or, failing that, their financial circumstances allow them to purchase research. At the same time, medium-sized and especially smaller players in the food chain have limited own research and financial opportunities. There are a number of opportunities to encourage knowledge sharing within the food industry, including networking (e.g. knowledge centre), cooperation with universities and research workshops and sharing of best practices. However, widely applicable best practices for knowledge sharing in the food processing sector have not yet been found.

Financial organizations, banks

Financial institutions and financial actors have an important role to play in ensuring sources of funding for the agricultural sector. In addition, financial institutions work in a specialized form with the relevant actors to develop schemes that can help sectoral investment and the spread of innovation. As an AKIS player, they strive for effective knowledge transfer and high quality services for the customers.

Non-governmental organizations: foundations, associations, councils

In Hungary, non-governmental organizations also take part in the transfer of knowledge, but they are only present in certain areas because they were established for a special purpose. For example, Zsörk Foundation, which supports agroforestry, or the Hungarian Soybean and Protein Bean Association, which supports soybean production, or the National Association of Interest Representations for Small-scale Producers and Service Providers (KISLÉPTÉK), which supports smaller food producers, and the Cooperating Balaton Uplands Association, which deals with the development of a distinct rural area.

Online media, news portals

The media and news portals are a key influential force in shaping the attitude of and providing information for the practical side. Agroinform.hu, for example, is a very popular agricultural portal where farmers/producers can access the latest technological information almost immediately. It is important to mention the largest trade fairs and conferences in the country: the Precision Farming Conference and Exhibition (PREGA), the National Agricultural and Food Exhibition and Fair (OMÉK), as well as the AGROmashEXPO and Agricultural Machinery

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Exhibition organized by Hungexpo. Another noteworthy information provider is the web news portal Portfolio, which is a platform for the economic and financial sectors to meet: it regularly organizes high-quality conferences where research institutes, business organizations, policy makers and actors of the banking sector have the opportunity to express their views on the given topic. The Agro Napló is also a well-known news portal with its own magazine and it also organizes events for the actors of the agriculture sector.

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## AKIS DIAGRAM

The central actors of the Hungarian AKIS are farmers, foresters and food producers. Their work is supported by the institutional system around them, such as the government sector, research and development, education, the advisory system (National Advisory Centre), various farmers' organizations, professional chambers, furthermore, financial institutions, through EU networks, as well as media and information channels, and NGOs. Horizontally, the Hungarian Chamber of Agriculture plays a key role in the transfer of information and knowledge and the flow of knowledge between different organizations, in order to help the work of farmers.

As far as the relationships between AKIS actors are concerned, they can be incidental or regular, direct or indirect. By organizing various forums (thematic working groups (e.g. NAK KAP AKIS sub-working group), consultations, events, conferences, briefings, etc.), NAK helps the establishment of relations, knowledge transfer and information flow between the various actors. A system of relations independent of NAK is also established and operating between the individual actors.

The current structure of the Hungarian AKIS is shown in Figure 4.

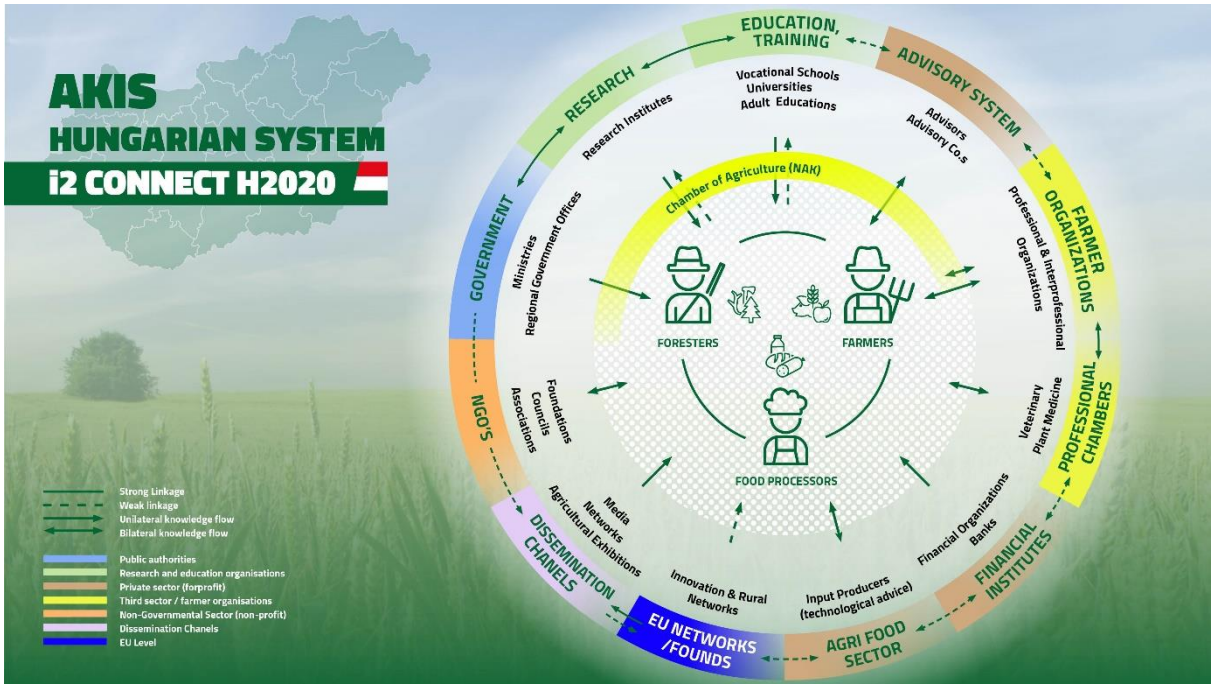


Figure 4. The Hungarian AKIS. Source: own editing

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## 3. HISTORY AND DEVELOPMENT OF ADVISORY SERVICES IN HUNGARY

The publication of J. Kozári entitled Szaktanácsadás (2007) explains in detail the formation and development of the Hungarian advisory system to this day. “The germs of advisory service developed in Hungary in the Middle Ages. We can be proud that our country was among the first not only in Europe, but also worldwide to organize agricultural vocational education and related advisory service.” He then goes on to say that the first authentic, written document on advisory service in Hungary dates back to 1892. In the early 1900s, the institutionalized framework of advisory services began to emerge primarily in the agricultural vocational education network, but at that time it had not yet become a national organization. In 1936, the name “Vocational School and Agricultural Advisory Station” was included in the titles and responsibilities of all primary and secondary agricultural vocational education institutions. Advisory activity based on large holdings was started in 1965. Attachment to the area and topic as well as central designation were abolished, and it was possible to gain admission to the Advisors’ Central Register by voluntary registration; the National Agricultural Advisory Committee (OMSzB) was established in 1968 from the leaders and representatives of the organizations included in the Register. By the end of the 1980s, the limited framework of the advisory network had become national in scope and affected all large agricultural holdings. At that time, there were 7,100 consultants from about 225 advisory institutions, mainly for large companies. The change of direction that had already taken place in Western European countries earlier unfolded in Hungary by the end of the 20$^{th}$ century. In these countries, farmers remained the primary target group for advisory services, but other groups in the agricultural population also played an increasingly important role. Government-supported rural development programs have allowed the emergence of agricultural advisors. However, according to Cser (2001), there was no proper information contact system and network between these advisory organizations, a lot of partial data and incomplete information were collected, which they could not manage and use properly. In the production systems that have become industrialized, it was especially important to apply new knowledge and introduce new technologies, so useful advisory service also played a significant role. The partner farms and farmers could be connected to the production systems through contracts. According to Kozári (1993), the advisory activity of production systems also contributed greatly to the high standard of the Hungarian agriculture. Nevertheless, this type of advisory service differs from the advisory service according to our current concepts. Integrated producers were usually provided with advisory service by experts from state farms and producer cooperatives, and less often by “advisors” of production systems.

Hungary joined the European Union in 2004. In Hungary, the transformation of the system of agricultural advisory services began in the autumn of 2005, taking into account the measures announced by the Hungarian Government and the provisions of the EU regulations that entered into force in the autumn of 2003. The aim of the transformation was to have a high-quality service system based on several pillars, which is easy and cheap to use and meets the needs of farmers and takes their possibilities into account. This is in line with the requirements set out in EU Regulations (EC) No 1782/2003, (EC) No 1698/2005 and (EC) No 1974/2006 for the Farm Advisory System (MSZR), which is mandatory for all Member States from 1 January 2007. The task of MSZR is to replace and supplement the knowledge and intellectual capacities necessary for the improvement of the quality of production within the framework of the service provided to farmers and foresters.

Actors of the Hungarian MSZR: National Advisory Centre (OSzK), Regional Advisory Centre (RSzK), Territorial Advisory Centre (TSzK), Vocational Advisory Centre (SZSzK), and the National Advisory Committee, later the National Agricultural Advisory Committee (NATaB).

Until 30 September 2014, the National Agricultural Advisory, Educational and Rural Development Institute (NAKVI) performed the tasks of OSZK, however, from 1 October 2014, OSZK operates within the organizational framework of the Hungarian Chamber of Agriculture (hereinafter: NAK). In accordance with Decree 73/2015 (XI. 6.) of the Ministry of Finance on agricultural and rural development advisory activities, the holder of a license issued by NAK on the basis of this Decree is entitled to carry out supported advisory activities. The authorization procedure can be initiated through the Advisors’ Electronic Directory Management System (ESzNR) managed by NAK. Basic and compulsory training for the advisors, as well as the related examinations are organized and conducted by NAK. Based on the knowledge base of agricultural higher education institutions, the Regional

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Advisory Centres (7, with regional geographical coverage) assisted the advisory work of the territorial advisory centres, as well as provided basic and mandatory further training for advisors to increase the efficiency of the advisory services and to develop new ones. The Territorial Advisory Centres performed the supported advisory tasks, i.e. advisory services implemented in actual practice. In the period 2007-2013, there were 82 accredited TSzKs, of which 23 preformed advisory services in 2016 actively. Vocational Advisory Centres (SzSzK) are organizations set up in agricultural research sites, development and service, as well as university further training sites that helped TSzKs and advisors in solving special problems within their respective fields. The National Agricultural Advisory Committee (NATaB), as the professional advisory body of the Managing Authority participates in the coordination of certain tasks related to agricultural advisory service with the power of proposing and giving opinions. The aim of the renewal of the committee in 2019 was that all actors involved in the advisory system are represented in the committee, from the decision-making level through agricultural higher education, research, professional and advocacy level to those involved in practice.
Overall, it can be said that agricultural advisory activity has a tradition in Hungary and the quality and methodology of knowledge transfer has developed dynamically in recent years as well. The advisory system has undergone significant changes in recent decades. With the establishment of the Hungarian Chamber of Agriculture the representation of farmers' interests and advisory service has risen to a new level.

## 4. DETAILED PRESENTATION OF ORGANIZATIONS PROVIDING ADVISORY SERVICES

Advisory organizations are market-based companies or private entrepreneurs who typically operate in a specific geographical area, but often with national coverage. An advisory organization may only be entitled to a field of specialization for which its participating advisors have obtained an advisor's entitlement.

### GENERAL PRESENTATION OF ORGANIZATIONS PROVIDING ADVISORY SERVICES

At present, there are 48 advisory organizations registered in Hungary, 24 of them are independent of input material distributors, of which 17 organizations are entitled to carry out supported advisory activities. Eight organizations do not provide commercial services, but they do not provide supported advisory services either.
A supported advisory organization may be an organization selected through a tender that has its registered office in the territory of the European Union and at least a site in Hungary and provides advisory services in the fields listed in the relevant legislation to persons who may be eligible for support financed at least partly from the public finance subsystem, from EU funds or from another program under an international agreement.

### ADVISORY POLICY, FINANCING SYSTEMS

The task of the Hungarian MSZR is to replace and supplement the knowledge and intellectual capacities necessary for the improvement of the quality of production within the framework of the service provided to farmers and foresters on the basis of the civil law contract concluded with them. The task of the MSZR actors is to provide effective advice to the beneficiaries on land management and farm management.
Supported advisory service plays a key role in enabling domestic producers and food processors, as well as foresters, to make good use of support resources, to know and comply with their obligations and to carry out competitive, sustainable agricultural, food processing and forestry activities.
In the Partnership Agreement the Government has set the objective of encouraging participation in lifelong learning for the programming period 2014-2020. It intends to achieve this goal in cooperation with the advisory organizations, in accordance with the conditions set out in the call for proposals for supported advisory service.
In the Rural Development Program of Hungary, the aim of the measure is to provide the actors of agriculture, forestry and food economy with professional assistance meeting their needs which primarily promotes efficient knowledge transfer and innovation, as well as increasing the economic competitiveness of the target groups involved in the Rural Development Program, also taking into account the requirements of sustainability, environmental and climate protection, as well as resource efficiency. In the case of foresters, advisory activity is primarily focused on the conservation of natural habitats, the protection of wildlife and plants, and the

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implementation of the Water Framework Directive, while in the case of food processors, on the production of healthy and safe food. The measure contributes to all the overall objectives of the CAP.

Under the measure, the advisory service is provided in two different forms, in the framework of individual and group advisory service in the following target areas:

1. **individual advisory service:**

Target area A: farmers;
Target area B: young farmers;
Target area C: foresters;
Target area D: food processing enterprises in rural areas qualified as micro and small businesses;

2. **group advisory service:**

Target area A: farmers;
Target area B: young farmers;
Target area C: foresters;
Target area D: food processing enterprises in rural areas qualified as micro and small businesses;
Target area E: producers of REL cooperation.

Innovation goals: With the help of advisors with a high level and up-to-date professional knowledge and experience, the innovation knowledge of farmers can be significantly increased, and they can receive advice on the practical application of innovations.

Climate policy goals: The main task of the advisors is to draw the attention of the participants to production methods that contribute to climate policy goals, i.e. the reduction of greenhouse gas emissions and energy consumption, and to provide practical advice on their application. The advisory service should also cover climate change mitigation and effective adaptation, farming aimed at protecting biodiversity and the waters, and increasing environmental performance. The importance of supported expert advice in Hungary is most relevant for small and medium-sized farms. Due to their low income levels, these farms can rarely or not at all afford to hire their own advisors, but at the same time, due to the time required for their activities, it is difficult and often late for them to obtain adequate information on their own. Thus, they are not always aware of their obligations and opportunities and therefore, their observance or the use of opportunities is not always appropriate. Therefore, as defined in the EAFRD Regulation, at the level of farms, supported advisory services must cover at least one of the following in Hungary as well:

1. Management requirements, standards for good agricultural and environmental condition, requirements at farm level;
2. Agricultural practices beneficial for the climate and the environment, maintenance of the agricultural area;
3. Measures at farm level provided for in the RDP;
4. Requirements of the Water Framework Directive;
5. Principles of integrated pest management;
6. Occupational safety standards or safety standards linked to the farm;
7. Starting agricultural management (optional farming forms, accounting, business economics, young farmer sub-program);
8. Forestry topic;
9. Economic and environmental performance of the enterprise.

Supported advisory activities in the period 2014-2020 are carried out by the advisory organizations that submitted a grant application and were selected for the service in VP1-2.1.1-2.1.2-17 Call for individual and group advisory service on agriculture, forestry and food processing.

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Requirements for organizations selected for supported advisory service:

1. availability of a customer ID;
2. their advisors attended and completed the mandatory further trainings;
3. have a working relationship with registered advisors;
4. through their advisors they are able to provide advisory service on at least three of the topics set out in Article 15 of Regulation (EU) No 1305/2013.

Only an organization that qualifies as a transparent organization under the legal conditions can apply for support.

## PEOPLE WORKING IN THE ADVISORY SYSTEM AND METHODS OF KNOWLEDGE TRANSFER

In Hungary, advisory services may be provided by legal entities and private individuals included in the register according to the related legislation. The most important methods of knowledge transfer used in the advisory work are as follows:

- individual: farm visit, office consultation;
- group: lectures; organization of presentations;
- use of online tools: website, blog, professional subpage on social platform;
- methods used in written form and
- methods through mass communication.

| In case of problem solving, the goal is to provide suggestions and solutions tailored to the individual | In case of problem prevention, the goal is to avoid problems |
|---|---|
| Farm visit | Holding of lectures |
| Office consultation | Organization of presentations |
| Online and telephone contact | Mass information (social media, television, radio) |
| Preparation of written materials (e-mail, letter, reminder) | Written materials (articles, brochures, textbooks) |

Source: NAK (2020)

## PRIMARY TARGET GROUPS OF THE ADVISORY ORGANIZATIONS

When defining the primary target groups, we have data regarding the supported organizations. The supported advisory organizations were selected on the basis of a call for proposals issued by the Managing Authority (MA). Currently, 17 organizations can provide support from EU funds, however, they were designated between June and July 2019, so we still have little information about the related activities and concrete results. The number of farmers to be reached per special field as specified in the RDP is shown in Figure 6.

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| Focus area | Planned number of those receiving advisory services (persons) |
|---|---|
| Primary agricultural production | 40,250 |
| Food processing | 5,250 |
| Forestry | 4,500 |
| Environmental management | 18,000 |
| Farmer in SSC cooperation | 2,000 |
| Young farmer | 4,200 |

Figure 6. Number of farmers required for the supported advisory organizations, broken down by focus area. Source: VP1-2.1.1-2.1.2-17 call for proposals (2017)

## PROGRAMMING AND PLANNING OF THE ADVISORY WORK

The advisory program includes a schedule that helps the advisor decide when and which advice should be published and which methods should be used at a given moment. For example, plant protection programs should be started before pathogens are expected to appear. The advisor should be prepared for these tasks. The methods proposed for application should support each other, and their timing can help a lot in this.

The task of the advisor is to create a program that is able to raise awareness in the farmer of the lack of his knowledge and to make the solution attractive through the benefits of implementing the program. (Kozári & Tóth (2019).

The advisory plan of the supported advisory organization must contain the following information for accounting for the grant (VP1-2.1.1-2.1.2-17 Call for proposals for individual and group advisory service related to agriculture, forestry and food processing):

- Planned number of customers
- Classification of the planned number of customers per indirect beneficiary
    - farmer;
    - food processor;
    - forester;
    - young farmer;
    - producer of REL cooperation.
- Fields of specialization of the participating advisors
- Number of advisors involved in supported advisory service
- Mandatory topics covered by the participating advisors (topics under Paragraphs 4), 5) and 6) of Article 15 of Regulation (EU) No 1305/2013)
- Planned number of supported individual advisory hours
    - Net hourly rate for individual advisory service
    - VAT payable on support qualified as consideration, provided for the individual advisory service
    - To be understood per contract concluded
        - sum of hours
        - expected service hourly rate
- Gross hourly rate of individual advisory service
- Planned number of supported group advisory hours
    - Net hourly rate for group advisory service

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- VAT payable on support qualified as consideration, provided for the group advisory service
- Gross hourly rate for group advisory service
- sum of hours
- expected service hourly rate.

## ADVISORY ORGANIZATIONS THAT MAKE UP THE FAS AND EVALUATION OF THEIR OPERATION

Data on the operation of advisory organizations in Hungary are available from 29 May 2019 on the basis of the annual reports submitted by the organizations. The advisory organizations registered in accordance with the law had to prepare and submit the report to OSZK on the online platform created for this purpose by 28 February 2020. The evaluation of the organizations is made from data of the reports.

In 2019, there were 5 organizations with less than 10 customers, 50 organizations with 10 to 39 customers, 4 organizations with 40 to 99 customers, and 11 organizations with more than 100 customers. Customer numbers are detailed in Figure 7.

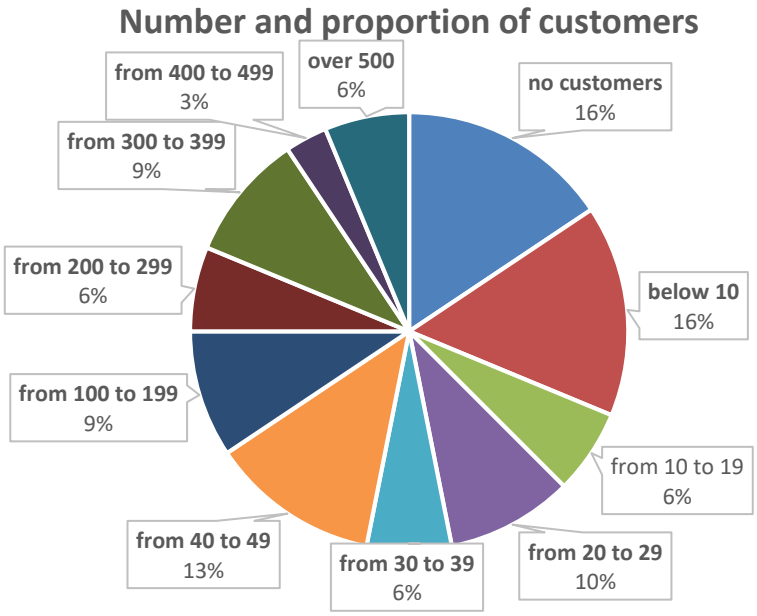


Figure 7. Distribution of advisory organizations by number of customers. Source: NAK (2019)

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# 5. SUMMARY AND CONCLUSIONS

The main purpose of this report is a comprehensive examination of the Hungarian AKIS, with special regard to agricultural advisory services. The study contains the general characteristics of the Hungarian agricultural and forestry sector and AKIS, as well as the historical development of the advisory system. The organizations providing advisory services, policy issues, methods of knowledge transfer, as well as the advisory organizations that make up the FAS and their operation are presented in detail.

The authors define AKIS as a system that connects people and institutions to promote mutual learning and to produce, share and use technologies, knowledge and information related to agriculture. The system integrates farmers, advisors, educators in agricultural education, researchers and other actors who generate, share and use knowledge and information from different sources to operate and develop the agricultural sector.

## 5.1. SUMMARY AND CONCLUSIONS, CHAPTERS 1-3

The most important natural treasure of Hungary is arable land. 70% of its area is suitable for agricultural use, and within this proportion, 72% is arable land. The number of employees in Hungary increased continuously between 2011 and 2018, and in 2019, it exceeded 4.5 million. Agriculture is an extremely important sector of the national economy in terms of food supply for the population, which has been further strengthened by the restrictive measures caused by the COVID 19 pandemic. The number of people employed in agriculture, forestry and fishing was 210.7 thousand in 2019, representing a decrease of 2.0% compared to the previous year. Due to the varied local conditions, field crop production is very diverse, but the role of cereals and oilseeds is decisive. Hungary has good conditions for feed production and animal husbandry, therefore, animal husbandry traditionally plays an important role in the Hungarian agriculture. Organic farming accounts for 4% of domestic agricultural land. In Hungary, 2,055 thousand hectares of forest land are registered, 56% of which is state-owned.

The Hungarian AKIS has a rather heterogeneous structure. In addition to the various ministries, actors in the advisory system, participants in education and research, professional chambers, advocacy organizations, farmers' organizations, media and information channels, NGOs and various EU networks play a decisive role. The Hungarian Chamber of Agriculture plays a key role in AKIS, especially in the field of protection of farmers' interests, as well as in the generation and dissemination of information. Advisory services, which are brought together by the National Advisory Centre, have a prominent role in the transfer of knowledge and the practical application and dissemination of innovations. OSzK plays a coordinating, recording and controlling role within the framework of the Hungarian Farm Advisory System (advisory services supportable from EAFRD funds), among its tasks and actors. According to the register, 1,100 advisors provide advisory services in Hungary, and they play a very important role in achieving CAP (Common Agricultural Policy) support and in strict compliance with environmental and administrative requirements. There are many farmers' organizations in Hungary that focus on a specific sector, but there are also organizations that represent the interests of all farmers and thus, they operate as an umbrella organization of other sectoral organizations. Such is the Hungarian Chamber of Agriculture (NAK), an agricultural advocacy organization founded in 2013 for the farmers which currently employs approximately 1,200 people nationwide, including 610 village agronomists who, among other things, provide information and help chamber members regarding issues related to their activities.
Agricultural advisory activity has a long tradition in Hungary and the quality and methodology of knowledge transfer have developed dynamically in recent years as well. The advisory system has undergone significant changes in recent decades.

## 5.2. SUMMARY AND CONCLUSIONS, CHAPTER 4

At present, there are 48 advisory organizations registered in Hungary, 24 of them are independent of input material distributors, of which 16 organizations are entitled to carry out supported advisory activities. Eight organizations do not provide commercial services, but they do not provide supported advisory services either.

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Advisory organizations are market-based companies or private entrepreneurs who typically operate in a specific geographical area, but often with national coverage. An advisory organization may only be entitled to a field of specialization for which its participating advisors have obtained an advisor's entitlement.

In Hungary, advisory services may be provided by legal entities and private individuals included in the register according to the related legislation. In their work advisors primarily use individual and group knowledge transfer methods, however, the pandemic has also highlighted the importance of using online tools.

According to the authors, the further development of the Hungarian AKIS is possible with the help of the following:

- Increasing the flow of knowledge between research and practical life. This encourages researchers to meet practical experts, organize thematic events on farms where they present their results, so farmers and researchers meet and exchange experiences.
- Assessing the needs of farmers continuously and as widely as possible and sharing the results with advisors who act as intermediaries in various innovative initiatives; they transfer knowledge and hold thematic trainings/presentations to transfer and update knowledge.
- Encouraging interactive innovation initiatives. Facilitating the networking of actors, sharing domestic and cross-border calls/opportunities, facilitating the exchange of knowledge, setting up innovation supporting services, developing projects and finding innovative ideas.
- Supporting intergenerational renewal through expert collaborations.
- Supporting digital development in agriculture. Development and practice-oriented use of databases in the sector for the development of digital skills.
- The relevant potential of the educational network should be used even more effectively in the future. The research results accumulated in agricultural higher education institutions/research centres need to be transferred to farming practice even faster by means of innovative knowledge transfer methods.

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## 7. LIST OF ABBREVIATIONS

| | |
|---|---|
| AGRYA | Association of Young Farmers |
| AKIS | Agricultural Knowledge and Innovation System |
| AM | Ministry of Agriculture |
| ATK | Agricultural Research Centre |
| COPA-COGECA | Committee of Professional Agricultural Organisations and General Confederation of Agricultural Cooperatives of the European Union |
| DélKerTÉSZ | Southern Plain Gardeners' Cooperative |
| EIP-AGRI<br><br>Szolgáltató Pont<br>Operatív Csoport<br>Fókusz Csoport | European Innovation Partnership "for Agricultural Productivity and Sustainability"<br>Service Point (SP)<br>Operational Group (OG)<br>Focus Group (FG) |
| ELKH | Eötvös Loránd Research Network |
| EMMI | Ministry of Human Resources |
| EMVA | European Agricultural Fund for Rural Development (EAFRD) |
| ENRD | European Union Rural Development Network |
| ENSZ | United Nations Organization |
| ESzNR | Advisors' Electronic Directory Management System |
| EUFRAS | European Forum for Agricultural and Rural Advisory Services |
| EU | European Union |
| FAR | Adult Education Data Supply System |
| FAS | Farm Advisory System |
| Fruitveb | Hungarian Fruits and Vegetables Inter-professional Organization and Product Council |

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| | |
|---|---|
| HOI | Herman Ottó Institute Nonprofit Ltd. |
| ITM | Ministry of Innovation and Technology |
| KAP | Common Agricultural Policy |
| KFI | research-development and innovation |
| KGNH | National Office for the Circular Economy |
| KISLÉPTÉK | National Association of Interest Representations for Small-scale Producers and Service Providers |
| LEADER | Community initiative in rural economic development |
| MÁOK | Hungarian Veterinary Chamber |
| MNMNK | Hungarian Chamber of Professionals and Doctors of Plant Protection |
| MNVH | Hungarian National Rural Network |
| MSTSZ | Hungarian Association of Pig Breeders and Pig Farmers |
| MSZR<br>FAS | Farm Advisory System |
| MTA | Hungarian Academy of Sciences |
| MTMT | Hungarian National Scientific Bibliography |
| NAIK | National Agricultural Research and Innovation Centre |
| NAIK-AKI | NAIK-Agricultural Research Institute |
| NAK | Hungarian Chamber of Agriculture |
| NAKVI | National Agricultural Advisory, Educational and Rural Development Institute |
| NATaB | National Agricultural Advisory Committee |
| NÉBIH | National Food Chain Safety Office |

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| | |
|---|---|
| NKFIH | National Research, Development and Innovation Office |
| NKIB | National Research Infrastructure Committee |
| NRN | Hungarian National Rural Network |
| OECD | Organization for Economic Cooperation and Development |
| OMÉK | National Agricultural and Food Exhibition and Fair |
| OSZK | National Coordination Centre of Advisory Centres |
| ÖK | Centre for Ecological Research |
| ÖMKi | Research Institute of Organic Agriculture |
| PREGA | Precision Farming Conference and Exhibition |
| REL | Short Supply Chain |
| RSzK | Regional Advisory Centre |
| SEASN | South Eastern Europe Advisory Service Network |
| SZBK | Szeged Biological Research Centre |
| SCAR AKIS SWG | Strategic Working Group on Agricultural Knowledge and Innovation System of the Standing Committee on Agricultural Research |
| SZE | Széchenyi University |
| SZIE | Szent István University |
| SzSzK | Professional Advisory Centre |
| TSzK | Territorial Advisory Centre |
| Visegrád Group | Visegrad Cooperation |
| VP | Rural Development Programme |
| WFO | World Farmers' Organization |

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| | |
|---|---|
| GDP | Gross Domestic Product |
| KSH | Central Statistical Office |

## 8. LIST OF FIGURES



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