AKIS and advisory services in HUNGARY

Report for the AKIS inventory (Task 1.2) of the i2connect project

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Executive summary

The first version of this study was prepared in 2020, however, the change in the relationship between the Agricultural Knowledge and Innovation System (AKIS) and the actors rendered the updating of the study necessary, which was completed by the authors in the spring of 2024. 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, until October 2020, 1,100 advisors and 48 organizations provided advisory services in Hungary, and by March 2024, this number rose to 1,307 people, so looking at the range of natural persons, (individuals) the number of advisors increased by 16% and that of the advisory organizations reached 164, which quadrupled compared to the previous period (71%). It is important to note that, until October 2020, the Hungarian Chamber of Agriculture employed 610 village consultants, who, among other things, provided information and helped chamber members regarding issues related to their activities. At the time of writing this report, the number of village consultants was 700 within the staff of NAK, and their scope of activities has also changed significantly. It can be stated that 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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Abbreviations

AGRYA	Association of Young Farmers
AKI	Institute of Agricultural Economics Nonprofit Ltd.
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
DAS	Digital Agricultural Strategy
DélKerTÉSZ	Southern Plain Gardeners' Cooperative
DÉS	Digital Food Strategy
EIP – Fókusz Csoport	EIP – Focus Group (FG)
EIP – Operatív Csoport	EIP – Operation Group (OG)
EIP – Szolgáltató pont	EIP – Service Point (SP)
EIP-AGRI	European Innovation Partnership "for Agricultural Productivity and Sustainability"
ELKH	Eötvös Loránd Research Network
EM	Ministry of Energy
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
GDP	Gross Domestic Product
HOI	Herman Ottó Institute Nonprofit Ltd.
HUN-REN	HUN-REN Hungarian Research Network
IALB	International Academy of Rural Advisors
ITM	Ministry of Innovation and Technology
KAP	Common Agricultural Policy
KFI	research-development and innovation
KGNH	National Office for the Circular Economy
KIM	Ministry of Culture and Innovation
KISLÉPTÉK	National Association of Interest Representations for Small-scale Producers and Service Providers
KSH	Central Statistical Office
LEADER	Community initiative in rural economic development
MAGOSZ	Association of Hungarian Farmers' Associations and Farmers' Cooperatives
MÁOK	Hungarian Veterinary Chamber
MATE	Hungarian University of Agriculture and Life Sciences
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	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
NFK	National Land Centre Forestry Department
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 István University
SzSzK	Professional Advisory Centre
TMR	Territorial Monitoring System
TSzK	Territorial Advisory Centre
Visegrád Group	Visegrad Cooperation
VP	Rural Development Programme
WFO	World Farmers' Organization

1. Main structural characteristics of the agricultural and forestry sector

Hungary is 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, 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 (56th 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.

According to the information issued by the Central Statistical Office (KSH) in 2023, the volume of the GDP in 2021 exceeded the level before the COVID. Growth continued in 2022 and, despite the risks intensifying during the year, the performance of the Hungarian economy exceeded that of the previous year by 4.6%. With regard to investments, in 2020, economic operators rescheduled some of their investments, as a result of which the volume of investments decreased by 2.7%, since most the developments aligned with the EU budget cycle had already been completed. The developments gained momentum again in 2021, while in 2022, the pace of expansion slowed but its volume increased. The volume of investments exceeded the base of the previous year by 1.0% owing to the enterprises that made 54% of the investments as well as to the manufacturing industry. According to the material-technical composition, the volume of construction investments increased by 1.7% and that of the investments in machinery and equipment by 0.2% in the examined period.

Digital society: In Hungary, 86% of the population aged 16-74 has already used the Internet during their lives. The Internet access of the 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 the 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). It can be said that by 2022, the Internet connection has become a part of the households, as a result of which the average use of the Internet by the Hungarian households reached 91%, i.e. it rose roughly to the level of the EU average, which was 92%.

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%. In Hungary, in the 2022/2023 school year, roughly the same number of people (1,935,900) participated in public education, vocational training and higher education as in the previously examined period, that is, in the 2019/2020 school year (1,914,400).

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%. Due to the pandemic, the growth of the labour market fell in 2020, and after 2021, it developed again favourably in 2022. The employment rate increased to 74.4% and the unemployment rate was 3.7%.

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). Based on the survey of the annually published European Innovation Scoreboard, in 2022, Hungary belongs to the group of emerging innovators, and was in the 21st place, improving one position compared to 2021. The country's performance was 69.8% of the EU average based on the KSH's publication Hungary in figures.

1.1. 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 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%.

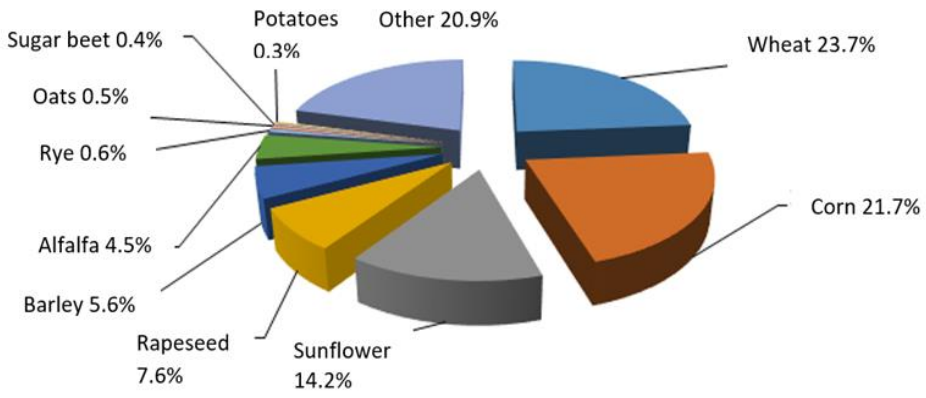

Figure 2. Ratio of the harvested area of some arable crops to arable land in 2018. Source: Central Statistical Office (2020)

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. The number of cattle changed to 862.1 thousand in 2023.
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 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. The number of pigs changed to 2.6077 million in 2023.
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 the 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 poultry changed to 35.6 million in 2023.
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 number of sheep changed to 0.907 million.

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%).

According to the KSH publication entitled Hungary in figures 2022, which was published in 2023, the performance of agriculture worsened during the examined period due to the severe drought and the high cost of inputs. Based on the figures of KSH, it can be established that the weight of the plant products in the production structure of agriculture increased until the beginning of 2022, while it decreased in 2022, the reason for which is to be found in the decrease in the volume of animal husbandry.

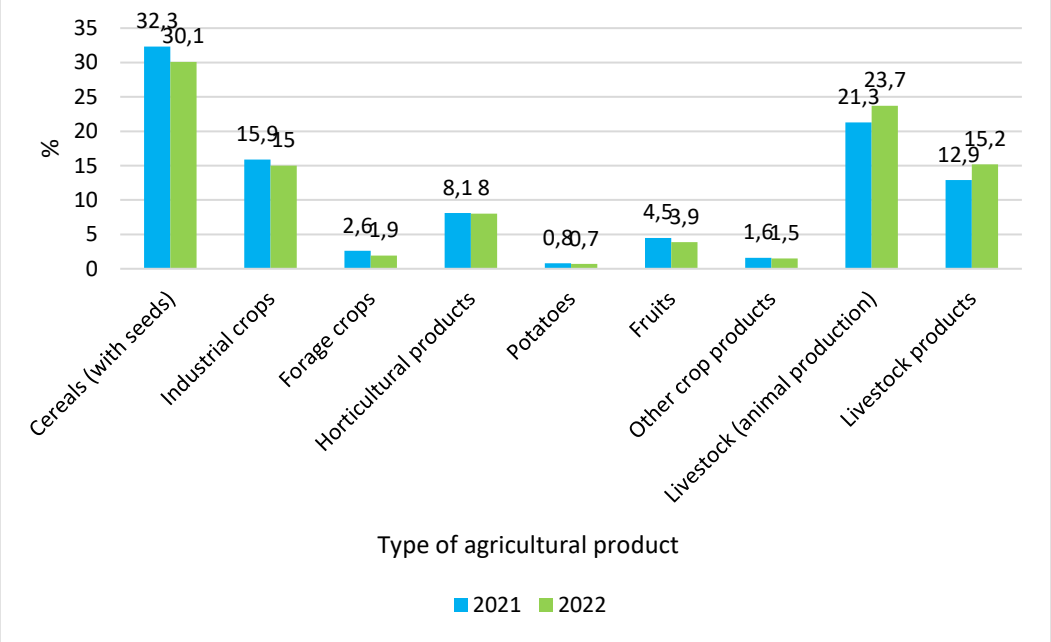

Figure 3. Production structure of agricultural products
in Hungary in 2021 and 2022
Source: Own editing based on KSH Hungary in figures 2022

Regarding cereals, as the analyses of previous years also showed, the harvested area of wheat and barley increased, while that of corn decreased. Among the

oilseed crops, the harvested area of sunflower increased in 2022, while that of rapeseed decreased compared to 2021 data.
Based on the KSH analysis, at the end of 2022, fewer of the main breeds of farm animals were kept than in 2021, the primary reason for which was the rising animal husbandry costs.
In terms of land use, Hungary's agricultural area was about 5.1 million hectares in 2022. 82% of the area was used as arable land, 15% as lawn, 2% as orchards and 1% as vineyards.
In the quick report of KSH published in December 2023, based on estimated data, the total output value of agriculture exceeded HUF 4.3 thousand billion in 2023, which was 6.5% higher than a year earlier. The growth was due to a 25% increase in the total production value. The total output volume of the sector decreased by 15%. The value of crop cultivation was 44% higher and that of animal husbandry was 0.5% lower. The record high value increase of individual field crops may have been caused by the low base value of the previous year.

1.2. 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 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.

Based on the latest forestry sector report of 2022, 2,072 thousand hectares of land for forestry purposes are registered in Hungary, of which 1,956 thousand hectares are forests. 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). According to the 2024 register of the Forestry Directorate of the National Land Centre (NFK), there are 3,015 full-time forestry professionals and 1,860 career entrants qualified as trainees. Of the total staff of 4,875 people, 3,425 forestry specialists have secondary and 1,450 have higher education.

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). Currently, i.e. in 2024, the forestry authority registers 1,167 such enterprises. Among the specialized forestry management companies, 371 are classified as authorized for forest management, i.e. they are entitled to enter into land use contracts with forest owners.

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. Forestry advisors are registered by the Hungarian Chamber of Agriculture, their number is currently (in 2024) 73, of which 60 are natural persons and 13 are advisory organizations. Both activities – that is, professional management and advisory services - are carried out by forestry specialists, with partial overlap.

In addition to the forestry management and advisory systems, the Hungarian Chamber of Agriculture also provides all assistance to forest owners and forest managers, but the Chamber's information service also extends to specialist managers. To this end, 5+9 people are available to the sector at the Budapest centre and regional locations with information on professional, farming, land use and support topics. The specialists of the so-called regional forestry expert network are available to customers in person, by e-mail and by phone.

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). The number of people employed in agriculture, forestry and the fishing sector was 202 thousand according to KSH's data of the 4th quarter of 2023.

According to NFK's public list, there are currently 1,167 specialist forestry management companies (371 of which are specialist forestry management companies authorized to manage forests). In Hungary, there are about 2,370 economic organizations registered with forestry as their main activity (including 21 state forestry organizations, almost 650 forestry associations, approx. 1,700 forestry service provider, forest management companies) and more than 16,500 individual enterprises working in forest management. About 10% of them are forest managers, and 90% are forestry contractors and service providers.

In forestry, as in other sectors of the national economy, innovation is of paramount importance, with special regard to economic and environmental sustainability, adaptation to the negative effects of climate change, and economic competitiveness. Innovative solutions can help increase productivity and use resources more efficiently, as well as improve forest management practices.

Innovative approaches can contribute to the conservation of biodiversity and the sustainable management of natural resources. They can strengthen the role of forests in the fight against climate change and in the development of ecotourism. Thanks to innovation, new market opportunities can open up, for example, in the area of forest-based economy.

Overall, it can be stated that the professionalism of sustainable, efficient forest management is ensured partly by those performing specialist forestry management activities and partly by forestry advisors. Both activities are carried out by forestry specialists, with partial overlap. Their preparation and encouragement for innovation through the presentation of domestic and international good practices is of particular importance, in which NAK also plays an active and initiative role.

2. Characteristics of AKIS

2.1. AKIS description

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 Hungarian AKIS is multi-level, flexible and customer- (farmer-) centric.

2.2. AKIS actors and knowledge flows

The Hungarian AKIS has numerous actors such as farmers/foresters/food producers, advisors and advisory organizations, researchers, agricultural producer organizations as well as governmental and non-governmental organizations, in-school and out-of-school educational institutions, domestic and international networks, media, other services, etc. That is, all those organizations, institutions and individuals who produce, use or transfer knowledge. Detailed information on the linkages/connectivity between AKIS actors can be found in section 2.5 (AKIS Diagram, Figures 8 and 9) and in the accompanying textual analysis (pages 35-37). In chapter 4.5, the linkages between the advisory system and other AKIS actors are described (Linkages with other AKIS actors/knowledge flows, page 45).

At the governmental level, the relevant AKIS actors are the Ministry of Agriculture (AM), the Ministry of Culture and Innovation (KIM) and the Ministry of Energy (EM) as well as the background institutions supporting the work of the ministries. 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, Hungarian University of Agriculture and Life Sciences, and Széchenyi István University. The mentioned higher education institutions are maintained by foundations.

Agricultural vocational schools covering the whole country and mostly 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).
The most important elements of knowledge dissemination include the media and other multimedia channels, be it online media, social networks or paper-based publications, as well as 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 (Hungarian Official Journal, 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).
The Farm Advisory System (FAS) operates within the framework set by law, with the coordination of the National Advisory Centre operating within the Hungarian Chamber of Agriculture. The FAS basically means regulation and coordination related to advisory activities, but the National Agricultural Advisory Committee (NATaB) is part of the system. The Committee 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.

Figure 4. Composition of the National Agricultural Advisory Committee. Source: NAK (2020)

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. Based on 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. In 2024, the number of farms reached 450,000, of which the number of organizations was 80,000. Based on the preliminary data of KSH's 2023 situation report, the labour force utilization of agriculture corresponded to 275,000 full-time activities. According to KSH's 2023 Agriculture economic structure census, the average age of farmers was 58 in 2023, of which 9.1% had a higher degree in agriculture. Based on the statistics, the majority of people in the age group between 25 and 44 have a higher degree in agriculture.

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.

Until 2022, the Ministry of Innovation and Technology (ITM) was responsible for industry, trade, innovation, research, climate change, and waste management, while the Ministry of Human Resources (EMMI) was responsible for higher

education and vocational training (excluding agricultural vocational training). At the time of writing this report, among other things, higher education, vocational training, innovation and business development belong to the Ministry of Culture and Innovation (KIM). The Ministry of Energy (ME) is responsible, among other things, for the circular economy, waste management, environmental protection, sustainability, energy policy and climate policy. The work of the ministries was supported until 2022 by background institutions such as the National Agricultural Research and Innovation Centre (NAIK). Due to the reorganization, NAIK joined the Hungarian University of Agriculture and Life Sciences from February 2022, while the work of the Agricultural Research Institute is continued by its legal successor, the Institute of Agricultural Economics Nonprofit Ltd. (AKI). 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 and helping 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 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 was also 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, the 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 István University (SZE), which consists of more than 60 model

farms/model plants and recognized training sites. The model farm network covers the entire agricultural production system and is an important tool for putting university research results into practice. Széchenyi István University plays an important role in the work of international advisory networks, so it is also a full member of advisory organizations such as IALB (Internationale Akademie für ländliche Beratung), EUFRAS (European Forum for Agricultural and Rural Advisory Services) and SEASN (South Eastern Europe Advisory Service Network). Széchenyi István University has recognized the importance of agricultural advisory service early on, 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. The staff of SZE seek to participate in cooperation and projects at EU level, thus emphasizing the importance of higher education training. 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 was a growing need for a well-organized higher education structure that meets local needs. This need was recognized by the education system, so in 2020, the higher education sector underwent 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 were transferred from direct state ownership to asset management foundations, thus renewing agricultural higher education.
In adult education, a new training system was launched 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). As a result of the pandemic, the importance of online courses has increased, but despite this, there are also many face-to-face courses on the adult training market. The so-called micro-trainings (trainings granting micro-certificates), which provide flexible opportunities for both employees and employers, are gaining more and more space.

Research centres, research institutes

Research and development are the drivers of innovation in which both state and market actors appear in Hungary.
Until 2019, basic research related to agriculture was 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 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 the 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 operated under the direction of Eötvös Loránd Research Network (ELKH) until mid-2019.

The HUN-REN Network became the legal successor of ELKH as of 1 September 2019. Hungary's new innovation strategy focusses on the strengthening of the knowledge-based economy, the connection of research sites, universities and the economy, therefore, the former ELKH network will continue to operate under the new name HUN-REN Network, which is responsible for the supervision and maintenance of the centrally funded research network. HUN-REN is an extensive network consisting of eleven research centres, seven research institutes and 116 supported research groups that participates in both basic and applied research at universities and public institutions in many scientific fields (e.g. natural science, life science, social science, etc.). During its operation, it builds on the diversity of knowledge assets accumulated over more than a century within the research network.

The Ministry of Culture and Innovation launched the János Neumann Program in June 2023, which is Hungary's new innovation strategy. The aim of the program is to connect universities and the economy. The Program's focus is on strengthening the knowledge-based economy, using the knowledge of people working in existing institutions, as well as the future development of this knowledge, and the implementation of new programs. Another goal is to strengthen cooperation between knowledge-producing systems (universities, research institutes) and economic actors, to increase the economic, social, and intellectual/scientific impact, and to measure them. As a result of this, continuous and adequate

measurement and impact evaluation of appropriate result and impact indicators in R&D grants (e.g. income-generating patents, product, sales revenue, quality publications, etc.).
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 the Hungarian researchers (even with full text content access). Until 2021, applied research was 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 organization of seminars, in the form of advisory services or visits to pilot stations. As of 1 February 2021, 11 research institutes of NAIK joined the Hungarian University of Agriculture and Life Sciences (MATE) with the aim of connecting the research and university spheres more closely, thus helping education and research and development in the field of agricultural modernization.

In addition to technological research, until 2021, the Agricultural Research Institute (AKI), the leading state-funded research institute of the Hungarian agriculture, was also part of NAIK. One-third of the Institute of Agricultural Economics (AKI) is engaged in research while the other units deal with data management and statistical 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 the 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 manages the central research financing fund as the background institution of the legal successor of ITM, i.e. the Ministry of Culture and Innovation. The objective

of the NKFI Office 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. It is of outstanding importance for the 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. 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.

Overall, researchers and educators can also provide consulting and training 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 (from 14 January 2022 replaced by Decree 1/2022 AM) 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, 1.307 natural persons + 164 organizations (data of 05/04/2024) 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 advisors (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.

From 1 April 2024, NAK operates a network of village consultants (general consultants) expanded with new service elements, employing more than 700 general consultants across the country. The main purpose of the network is to reduce the administrative burden on farmers. In addition to the previous tasks, among other things, they also help with completing the farming logbook, administration related to animal and area-based subsidies and proposals (agri-environmental management, ecological management, Natura 2000 grassland and forest), as well as administration related to satellite monitoring (Territorial Monitoring System (TMR)), if the farmer requests it. They provide detailed information and help in rural development proposals and explain the possibilities and the tasks in a personalized manner based on the characteristics of farming. They direct farmers' attention to current professional issues, innovative solutions,

and the challenges associated with climate change, so that they consciously apply sustainable farming models. The NAK village consultants' network operates nationwide with around a thousand customer service points. In addition, they help farmers with countless other administrative tasks. In 2023, the village consultants handled a total of 1.3 million cases for chamber members. In addition, they collect the data required for crop estimation and condition rating, help in the assessment of weather damage events, etc.

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, which employed about 1,200 people nationwide until January 2020, who provided information and helped chamber members regarding issues related to their activities. Based on the NAK HR data request of March 2024, the number of NAK employees is 1.260, of which the number of village consultants has increased to 700. 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 village consultants has more than 20 years of experience throughout the country. Village consultants are the local points of information supply and knowledge transfer. The extension of the service to cross-border areas and to the Hungarian minorities is also available (in the framework of the i2connect project, in June 2024, an interactive innovation training was organized for Hungarian advisors across the border). 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 f of the Standing Committee on Agricultural Research Agricultural Knowledge and Innovation System (SCAR AKIS SWG). The National Advisory Centre (OSZK) operates within NAK but in an independent status. Tasks of OSZK: registration and training of consultants, as well as liaison with other relevant AKIS actors (e.g. National Rural Development Network, Institute of Agricultural Economics, Széchenyi István University, Hungarian University of Agricultural and Life Sciences, Ecological Agricultural Research Institute, Ministry of Agriculture, etc.). 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.

The Association of Hungarian Farmers' Associations and Farmers' Cooperatives (MAGOSZ), which is the largest national organization for the protection of farmers' interests, operates as a significant farmer organization. Its rural network is made up of hundreds of local and 19 county farmers' associations, and its operation helps the development of modern, competitive family farms.

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 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 consulting 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 this study, 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 (until 2020) and its future operation during the new CAP 2023-2027 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 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 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. MNVH 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. From January 2024, Hermann Ottó Institute Nonprofit Ltd performs the tasks of the Rural and Regional Development Support Body of the CAP network.
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 therefore they were/are involved in a number of domestic or international projects (I2Connect, NEFERTITI, FAIRShare, EUREKA, EURAKNOS, EFFECT, LIFE, EU-FarmBook, AEDIH, DAA+, ATTRACTISS, modern AKIS, Climate Smart Advisors, ClimateFarmDemo).

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 specific rural area.

Online media, news portals, exhibitions, fairs

The media, news portals as well as exhibitions and fairs are a key influential force in shaping the attitude of and providing information for the practical side. Agroinform.hu and agrarszektor.hu, for example, are very popular agricultural portals where farmers/producers can access the latest technological information almost immediately. 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.
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), the AGROmashEXPO and Agricultural Machinery Exhibition organized by Hungexpo, the NAK Field Days, as well as the Star of the Profession Festival, organized by the Hungarian Chamber of Commerce and Industry and the NAK, where students who are about to choose a career can learn about agricultural professions.

2.3. Policy framework at national level (optional)

The horizontal (cross-cutting) comprehensive goal of the Hungarian government undertaken in the Strategic Plan of the Common Agricultural Policy is the modernization of the sector, the stimulation of knowledge, innovation and digitization. This can be achieved by sharing knowledge and information in the agriculture and forestry sector, in rural areas as follows:

- promotion of practice-oriented knowledge transfer,
- consumer education and orientation,
- expanding the knowledge of farmers and producers,
- knowledge transfer in order to speed up the generational change,
- training of consultants,
- the involvement of entrepreneurs in dual training (reception and employment of students),
- development of demonstration farms,
- developing the skills of the workforce required for the application of innovative technologies.

On 7 November 2023, based on the announcement No. 6/2023 of the National Management Authority, the rules of procedure of the National CAP Network were adopted, serving as the basis for the Decree of the Miniter of Agriculture No. 1/2024. (I.19.) AM which was published shortly after.

The National CAP Network started operating from November 2023 in accordance with Par. 5) of Article 12 of Act LXV of 2022 on the procedure for agricultural subsidies provided by the Common Agricultural Policy and the national budget as well as the provisions of the CAP Strategic Plan (CAP SP). The CAP network implements the objectives as per Par. 3) of Article 126 of Regulation (EU)

2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No. 1305/2013 and (EU) No. 1307/2013 by fulfilling the tasks as per Par 4) of Article 126.

One of the most important features of the new regulation is the introduction of strategic plans (CAP SP) at Member State level for EAGF and EAFRD (CAP Funds), which enables the Member States to adapt the provisions of the CAP to the needs of their own agricultural production structures. An essential element of the new CAP system is that it designates a single national management authority for the implementation of the CAP SP, i.e. for the management of both financial funds, which was previously a requirement only in the case of the Rural Development Program aimed at implementing the EAFRD. Regarding financial implementation, it is an unchanged element that the payments of both Funds must/can be made through a paying agency accredited by each Member State.

Government Decree 601/2022. (XII.28.) on the organization and institutions of the implementation of the Common Agricultural Policy and the agricultural subsidies provided from the national budget provides the necessary organizational, institutional and financial tools for the performance of the tasks undertaken in the CAP SP.

In accordance with the above legislation, the Ministry of Agriculture provided for the codification and coordination tasks of the CAP Network in its Organizational and Operational Regulations, in Par. 1) d) and e) of Section 24 and Point 6.1.3 of Appendix 2 of the Instruction No. 1/2023. (VI. 30.). The regulation also defines the detailed rules for the management of the CAP Network of the Agricultural Modernization Department appointed within the Ministry.
As a result of the first amendment of the CAP SP, from April 2024, the administrative consulting target area will count on an expanded network of chamber village consultants between 2024-2028, which will provide important assistance to farmers. The goal is to provide farmers in rural areas with up-to-date information about the measures defined in the CAP SP during individual information sessions. Responding to the challenges posed by the new CAP, the Hungarian Chamber of Agriculture transformed its network of village consultants and expanded it to nearly 700 people. From April 2024, the village consultants will help the work of farmers locally (general consulting) even more widely than before. In the forestry sector, it should be emphasized that in addition to the system of specialist forestry managers, advisors and village consultants, NAK also provides all assistance to forest owners and forest managers. To this end, 5+9

forestry experts are available to customers in the NAK centre and in rural areas (in regional locations).

Digitization in the new CAP period: In the common agricultural policy of the European Union, the protection of the environment has a special role, one of the tools of which is precision agricultural production. The profitability of precision farming is ensured by production data, for which it is essential to collect plant-level data, use plant management applications in the management of farms and in the preparation of decisions. The Digital Agricultural Strategy (DAS) created by Government Decision 1470/2019 (VIII.1.) on the promotion and coordination of the digitization of agriculture, which was prepared with a broad collaboration of professional and civil organizations and actors of the digital "ecosystem", contributes greatly to the modernization of the Hungarian agriculture. DAS is the summary name of the "agriculture 4.0" data-based technological and management reform, which is based on the mass data produced by the technologies and sensors used in precision agriculture, with the support of artificial intelligence. The purpose of the DAS, created within the framework of the Digital Welfare Program, is to contribute to increasing the profitability of agricultural production by the collection and processing of information generated in agriculture and the automation and robotization of technological operations, using the available environmental resources efficiently.

Another strategy that significantly helps the digitization of agriculture is the Digital Food Strategy adopted by Government Decision 1479/2022. (X. 11.), the aim of which is to increase the efficiency of the Hungarian food production, enhance competitiveness, in order to ensure stable food processing and food supply along the entire vertical production chain (information collection, processing and feedback), by automating and robotizing technological operations in the food industry. Another goal is to increase the efficiency of human resource management and reduce the emission of waste and other substances polluting/burdening the environment. The creation and operation of new, innovative technology and innovative services in the food industry by making optimal use of the opportunities provided by digitization. Achieving greater added value by improving quality with the help of digitization (e.g.: support program for the development of digitization in the food industry, development of a training program in higher education, assessment of the establishment of a data centre, construction and development of a quality assurance and monitoring system, reliable information to consumers and protection of their interests, increasing competitiveness, etc.).

Financial framework

For achieving the horizontal objective of the CAP SP, i.e. the modernization of the sector, the following resources are provided per intervention:

Title of intervention	EU Contribution	National co-financing	Additional national financing	Total (EUR)
Training and Demonstration Services KNOW(78) - RD58_A01_TRA_78	2 465 753	3 268 557	7 964 320	13 698 630
Consultancy Services KNOW(78) - RD60_A04_ADP_78	24 937 644	33 056 876	147 484 931	205 479 452
European Innovation Partnership (EIP) COOP(77) - RD61_A05_EIP_77	6 575 352	8 716 164	20 872 867	36 164 383
Total sum (2023-2027)	33 978 749	45 041 597	176 322 118	255 342 465

Figure 5. Distribution of funds for AKIS interventions. Source: Own editing (2024) based on Hungary's CAP Strategic Plan 2023-2027

The intervention called consultancy services separated three types of measures. Source in HUF (1 EUR = 365 HUF), as follows:

Interventions	Launching a new consulting service	Operation of a general network of consultants (Village consultant)	Special consulting services
Funds (HUF)	1.5 billion	50 billion	23.5 billion
Unit cost (EUR)	200,000	35	35
Unit	flat rate	hour	hour
Number of subsidized hours per year	not relevant	750,000 hours	401,311 hours
Number of subsidized hours for 5 years	not relevant	3,750,000 hours	2,006,556 hours

Figure 6. Funds allocated to consulting services. Source: Own editing (2024) based on Hungary's CAP Strategic Plan 2023-2027

2.4. Coordination Structures

In accordance with the legislation, the cooperating bodies that make up the CAP Network are as follows (see figure below): a) Rural and Regional Development Support Body, b) Innovation and Digitization Support Body, c) Green Support Body. The tasks related to the management of the National CAP Network are carried out by the Agricultural Modernization Department of the Ministry of Agriculture, while the coordination tasks are carried out by the CAP Coordination Department. The duties and operating procedures of the support bodies that make up the CAP Network are defined in a ministerial decree by the National Management Authority.

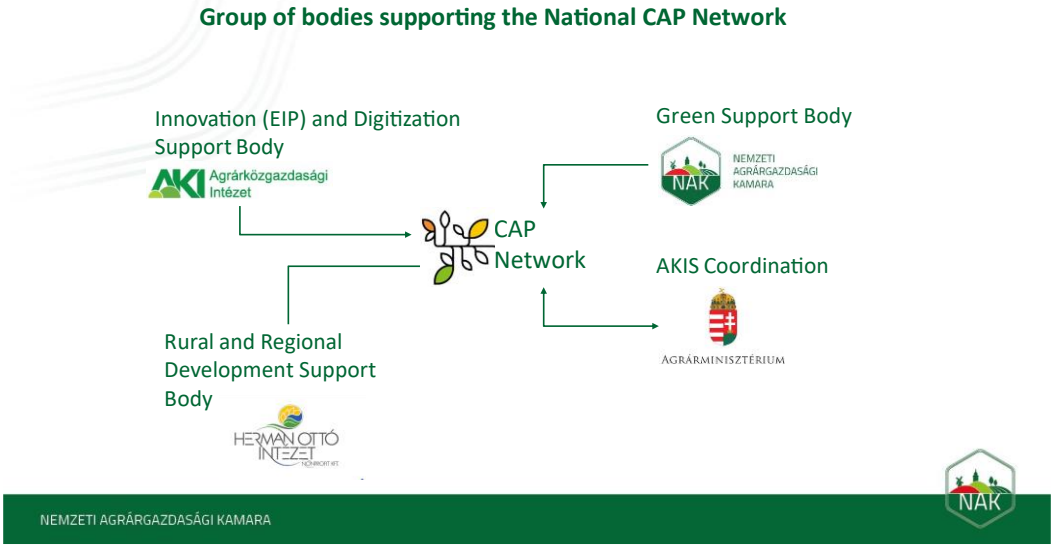

Figure 7. Diagram of organizational bodies supporting the National CAP Network. Source: Papp Gergely, NAK (2023)

Presentation of the organizational bodies supporting the National CAP Network
The organizational body of the Ministry of Agriculture performs professional and supervisory tasks, unites not only the individual elements of the National CAP Network, but also the AKIS system, and provides representation and active participation in the domestic and international professional network activities.

Rural and Regional Development Support Body: The main task of the support body is to help the implementation of the CAP SP LEADER and other rural development interventions as well as the smart village and generational renewal program, and to promote the networking of rural actors. It currently carries out its activities under the name Hungarian National Rural Network (MNVH).

Innovation and Digitization Support Body: The main task of the support body is to help the interventions of the CAP SP serving for the EIP and digital transition, as well as the implementation of DAS and DÉS, furthermore, to promote the networking of actors involved in research, innovation and digitization, and to manage the database of the green monitoring network in order to help the implementation of DAS, with the cooperation of the Institute of Agricultural Economics.

Green Support Body: The main task of the support body is to help the green interventions of pillars I and II of the CAP SP and the implementation of the related national programs, as well as to promote the networking of green actors, within the institutional framework of the Hungarian Chamber of Agriculture.

Through the supporting bodies, Hungary can introduce measures that can be applied in order to eliminate the fragmented institutional structure of the domestic climate change monitoring system, including the creation of a database, for example to unify the environmental knowledge bases.

Hungarian AKIS actors are also represented in the working groups of the European Union CAP Network (Ministry of Agriculture, Institute of Agricultural Economics, Hungarian State Treasury, Hungarian Chamber of Agriculture, Herman Ottó Nonprofit Kft (MNVH)).
In the CAP SP Horizontal Civil Dialogue Working Group two civil advisor delegates participate (in active member and observer member status) on behalf of NAK, through EUFRAS.

2.5. 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.
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 structure of the Hungarian AKIS is shown in Figure 8. (focussing on the actors) and Figure 9. (focussing on the relationships and relationship system of the actors).

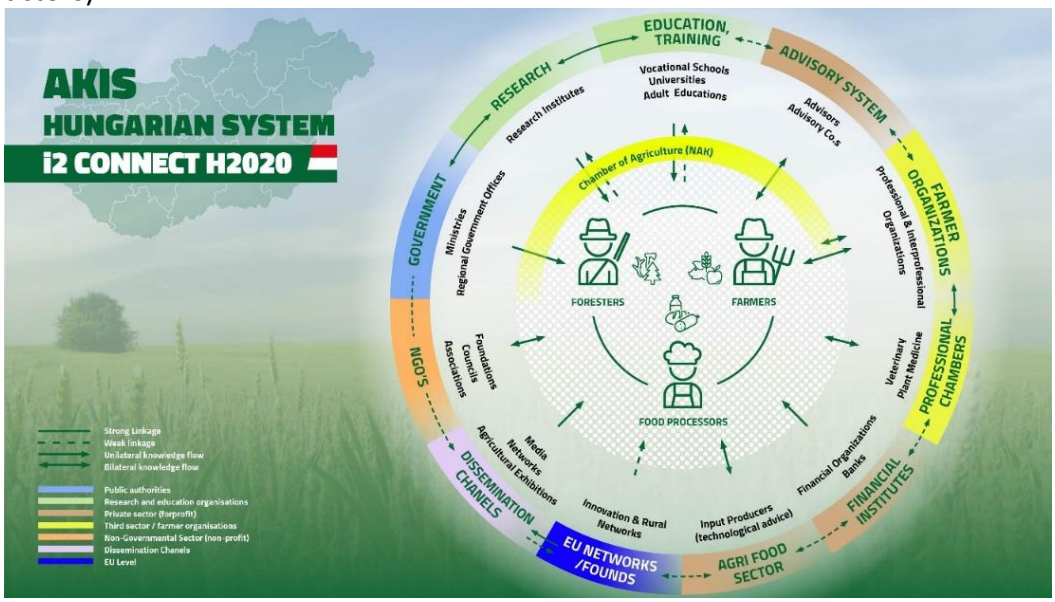

Figure 8. The Hungarian AKIS. Source: Own editing (2020)

The tasks related to the management of the National CAP Network set up by the Ministry of Agriculture at the end of 2023 are carried out by the Ministry's Agricultural Modernization Department, while the coordination tasks are carried out by the CAP Coordination Department. The organization unites, supports, supervises, coordinates, and represents to the EU the cooperating bodies that make up the CAP network (see Figure 7.). Given that the support bodies had a good working relationship before as well, it can be said that the existing formal and informal relationship between them is strong and intense. The experts of the institutions can work together effectively, understanding and support between them is close and mutual, which is useful at the level of the farmers.

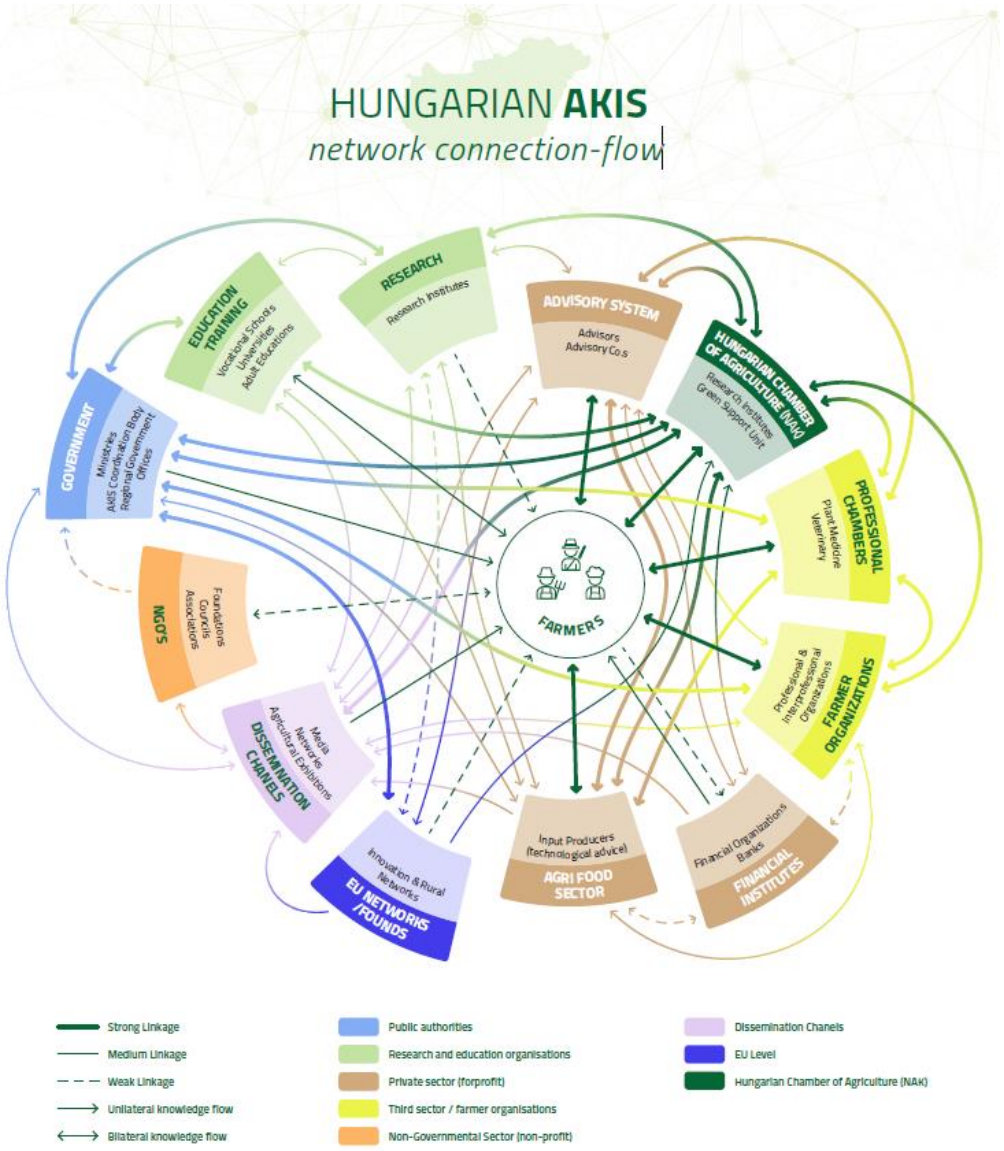

Figure 9. Network system of the Hungarian AKIS showing primary connections. Source: Own editing (2024)

Figure 8 shows the AKIS actors. Figure 9 illustrates the connections and relationship system between AKIS actors. This clearly demonstrates that, in accordance with the requirements of the new CAP framework, the CAP Coordination Body was created which plays a prominent role (see highlighted in blue). One of the roles of the Body is to help the flow of information between the actors in the system. Strong connections are represented by thick lines. The arrows at the end of the lines show whether communication is one-way or two-way. Actors with a general connection are marked with a thin line, while dashed lines indicate a weak connection. The figure illustrates the most essential relationship system of the AKIS actors, trying to show its dynamism.

3. History of the advisory system

The publication of J. Kozári entitled Szaktanácsadás (Advisory services) (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 advisors 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 20th 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 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 became 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 “consultants” 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 (FAS), which is mandatory for all Member States from 1 January 2007. The task of the FAS 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 FAS: 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 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.
As a result of covid 19, the use of online tools and software has gained special importance in the field of consulting and communication. These have been integrated into the consulting processes and both service providers and customers are happy to use them even after the danger has passed. By using online options, the time and money spent on the activity can be reduced.

4. The agricultural and forestry advisory service(s)

4.1. Overview of all service suppliers

The Hungarian advisory system can be classified into the so-called "mixed" category, i.e. "Public and Farm Based Organization". NAK plays a coordinating and registry role in the Farm Advisory System (FAS) within the framework of advisory services supportable from EAFRD funds, among its tasks and actors. From 14 January 2022, its duties are defined by Decree 1/2022 of the Ministry of Agriculture and Article 15/B of Act CXXVI of 2012 on the Hungarian Chamber of Agriculture, Food and Rural Development. Within NAK's own organizational framework, its operative tasks are carried out by the Advisory Group of the Directorate of Vocational Training and Consultancy. In Hungary, all consultants are included in the list of advisors registered by NAK, and the advisory services provided by them are available to the entire circle of entrepreneurs. Furthermore, agricultural cooperatives and associations, e.g. fruit and vegetable producers' cooperatives, the Hungarian Sheep and Goat Breeders' Association or the National Hungarian Beekeeping Association maintain their own consulting network for their members, which is why, among other things, we typified the domestic advisory system as a mixed system. Advisory organizations are market-based companies or private entrepreneurs who typically carry out their activities and services 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.
At present, (at the time of the first version of the country report, data of 2019!) 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, and they do not provide supported advisory services either. According to data of April 2024, there are 164 service organizations listed in the

register, of which 107 perform their services independently of input material distributors.
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. (Definition according to the Rural Development Program at the time of the first version of the country report).

4.2. Public policy, funding schemes, financing mechanisms, advisory service providers

The task of the Hungarian FAS 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 FAS 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 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 SSC 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. Farming 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.

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.

The support period of the Rural Development Program (2014-2020) ended in 2023. The call for proposals of the KAP SP for the period 2024-2028 is under preparation.

4.3. Human resources and methods of service provision

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, online communication, (MS Teams, Google Meet, etc.);
- methods used in written form and
- methods through mass communication.

In the case of problem solving	In the case of problem prevention
The goal is to provide individualized suggestions and solutions	The goal is to avoid problems
Farm visit	Lecture
Office consultation	Presentation
Telephone contact	Mass information (television, radio)
Written materials (e-mail, letter, reminder)	Written materials (articles from research results, brochures, textbooks, application documentation)

Figure 10. Knowledge transfer methods usable in the process of advisory services by arising problem.
Source: NAK (2023)

4.4. Clients and topics

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 10.

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 11. 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)

In the new CAP SP, three types of interventions will be supported from 2024 involving ~110,000 customers:

1. Launching of new consulting services
2. Operation of a general consulting network
3. Special consulting services

4.5. Linkages with other AKIS actors/knowledge flows

Based on the interviews, the relationship of the advisors and advisory organizations (see Figure 9: illustrated by continuous brown and green lines) with the other AKIS actors in terms of the flow of information is intense in a back-and-forth direction: with the farmers, the Chamber of Agriculture, and through the Chamber, with OSzK and the government (paying agency). The relationship with research institutes and universities can be said to be occasional during the relevant period, therefore the relationship with these actors needs further development. The quality and intensity of the relationship of advisors and advisory organizations with professional chambers (Plant Doctor and Veterinary Chambers) is traditionally strong and good, while it can be said to be moderate with farmers' organizations and financial institutions, and particularly strong with the agri-food sector. The intensity of the information flow with the EU network is medium, and this can also be said in relation to the dissemination channels (media).

4.6. Programming and planning of 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 SSC 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
    - 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.

4.7. Advisory organisations forming the FAS and evaluation of their FAS implementation

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 11.

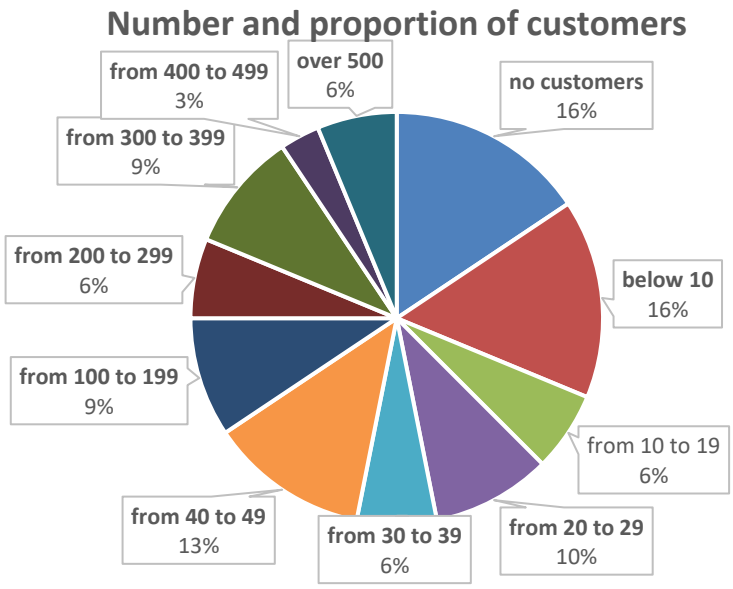

Figure 12. Distribution of advisory organizations by number of customers in 2019. Source: NAK (2019)

In 2022, on average, an advisory organization had 136 customers. 60% of the organizations performing advisory activities had 50 or fewer customers, 18% had 51 to 150 customers, and 22% had more than 151 customers.

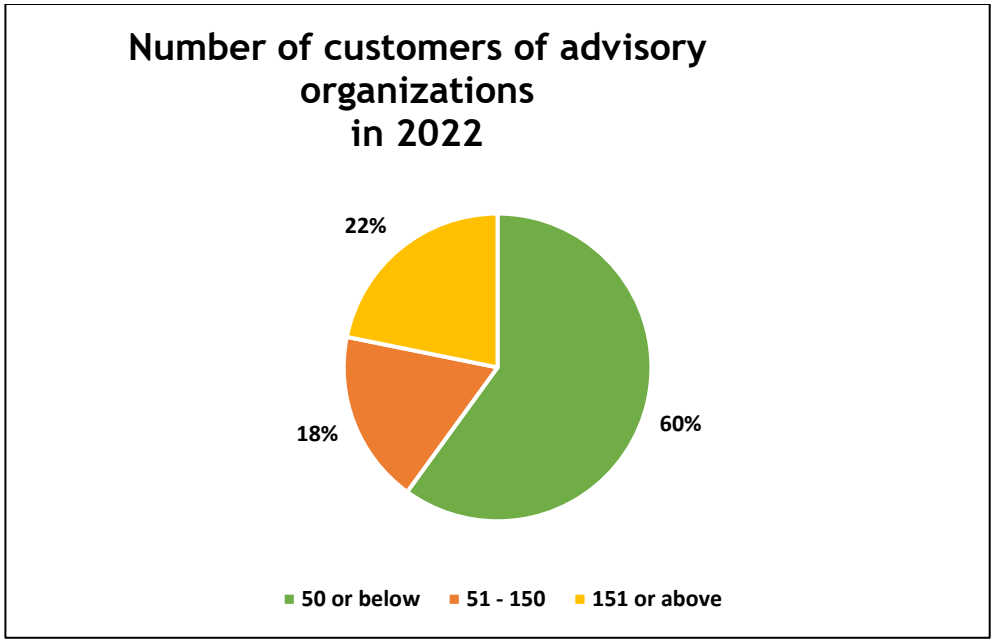

Figure 13. Distribution of advisory organizations by number of customers in 2022. Source: NAK (2023)

5. Summary and conclusions

The purpose of the document is to update the comprehensive examination of the Hungarian AKIS (2021), 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 on sections 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, when writing the first

version of the AKIS report (2020) 1,100 advisors provided advisory services in Hungary, and their number grew to 1,307 by April 2024. These advisors 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 1.260 people nationwide, including 700 village consultants 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.

In the Strategic Plan of the Common Agricultural Policy, the Hungarian government set the modernization of the agricultural and the forestry sector as a comprehensive goal, which can be realized through the development of knowledge, innovation and digitization.

The first amendment of the CAP SP made it possible to expand the administrative consulting target area as a result of which an expanded chamber village consultants' network will operate within NAK between 2024-2028 with the aim of providing quality and up-to-date information to farmers and customers during individual information sessions. In response to the new environmental, social, and legal challenges, NAK transformed its network of village consultants and expanded it to nearly 700 people within NAK's workforce, who work as village consultants (general consulting) from April 2024. The consultants can support the work of farmers locally even more widely than before. In the forestry sector, a total of 14 forestry experts are available to customers in the NAK centre and in rural areas, in regional locations.

The professional and supervisory tasks of the CAP Coordination Body undertaken in the CAP SP are performed by the Agricultural Modernization Department of the Ministry of Agriculture. The department brings together the individual elements of the National CAP Network and the Hungarian AKIS system, and it also provides representation and active participation in domestic and international professional network activities. The tasks undertaken in the CAP SP are implemented with the cooperation of the bodies supporting the CAP Network, namely, the Rural and Regional Development Support Body (Herman Ottó Nonprofit Ltd. - HOI), the Innovation and Digitalization Support Body (Institute of Agricultural Economics Nonprofit Ltd. - AKI), and the Green Support Body (Hungarian Chamber of Agriculture - NAK).

5.2. Summary and conclusions on sections 4

At present, there are 168 advisory organizations registered in Hungary, 107 of them are independent of input material distributors, of which 16 organizations are entitled to carry out supported advisory activities. By 2024, compared to when the first report was written (2020), the number of organizations providing consulting services has increased to 168, i.e. almost quadrupled in five years. Eight organizations do not provide commercial services, but they do not provide supported advisory services either. 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 natural persons 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 and potential 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 and rural development. 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.

6. Reflections and outlook

6.1. Characterisation of the Hungarian AKIS using SWOT analysis

According to the authors, in the light of the SWOT analysis model – strengths, weaknesses, opportunities, threats - the Hungarian AKIS can be characterized as follows, emphasizing the importance of the advisory services.

In the vast majority of cases, the system works in accordance with the needs of the farmer. The roles of the actors are well defined, cooperation between them is unimpeded, although the intensity of cooperation needs to be improved. The advisors' knowledge of the subject area can generally be said to be good. Among farmers and participants in agricultural vocational training, the events organized by chambers, universities, input material producers and other AKIS actors, which support the transfer of knowledge and promote the latest technologies and digitization, are the most popular. These are highly attended (Mezőfalva, Pápa Expo, Agromash Expo, OMÉK, etc.). The Hungarian agri-informatics developments, which are competitive even at the international level, and the high-speed broadband (4G, 5G), nationwide, high-quality internet access serving it, which is also due to Hungary's geographical features, and which greatly helps the transfer of knowledge and the flow of information between the actors, must be highlighted. The Model Farming Program and the Digital Presentation Program were launched with the cooperation of Széchenyi István University. The training of advisors with knowledge of agricultural informatics and innovation started throughout the country in 2023 (development of digital and innovation competences), thereby supporting agricultural modernization. The Hungarian AKIS actors were also involved in the large international multi-actor projects Horizon 2020 and Horizon Europe, and the positive impact of the programs can already be felt in the short term (networking at the national and international level, research and launch of new innovations). The development of secondary and higher education, cooperation between the actors has started (training workshops, training gardens). Professional training open to innovation, the transformation of dual training as well as scholarship programs help transformation and development. AKIS actors have the intention of increasing the expenditure on agricultural R&D. (Strengths).

Further development of the digital infrastructure of rural areas can be done through the implementation of the DAS and DÉS strategies. Solutions that develop cooperation skills can be searched for with the involvement of AKIS actors in the near future in order to strengthen the willingness of the actors to cooperate. Participation in international projects, getting to know new work cultures, co-creation, thinking together, getting to know international good practices and incorporating them into the domestic processes are excellent opportunities – just

like for other European countries. Another possibility is to take advantage of the development that can be accelerated by CAP subsidies. The authors define the even more effective implementation of the advisory service based on the needs of farmers with a bottom-up approach as a clear opportunity. (Opportunities).
The authors of the report agree that, according to experience, few students choose agricultural education, therefore increasing their number is an important goal. It can be said that the number of teachers and university lecturers has been decreasing in recent years, and the level of education of farmers remains below expectations, so raising the level of knowledge remains a priority. Research sites and research workshops are not adequately supported (underfunded). The sector is threatened by the "burnout" of older consultants, career drop-out, the lack of replacements, and the experience that there is plenty of development potential in terms of participation in voluntary training. The lack of language skills hinders joining the international "blood circulation", getting involved in cross-border applications and networks. There is too much information, which is often unstructured, reaching AKIS actors and consultants unfiltered, and this discourages them from continuing. As a result of the ongoing and uncertain political environment on the international stage, the sector is increasingly burdened by the fact that we have to face challenges in which we have no previous experience (see COVID19, Russian-Ukrainian war). (Threats).
The agricultural education system does not keep up with the challenges of the rapidly changing world, and the educational tools and infrastructure can also be said to be outdated. In general, the gap between science and practice is closing very slowly, the reason for which can be traced back to the lack of funding. Although a positive trend has started in the last ten years, the phenomenon of an "aging" farming society is still true of Hungary, just as it is typical of Europe. It is difficult for innovation players to find each other, and new, innovative procedures spread slowly at the sectoral level. It should be emphasized that, compared to Western European countries, there are hardly any proposals with a Hungarian consortium leader, even though the knowledge for it is there in the country. The AKIS actors build separate knowledge bases, the encouragement of practice-oriented research can be felt at the national level, but connecting them together, then using them in practice, and utilizing them at the national and international level can be a serious challenge. The success rate of agricultural training is less than expected, it is less attractive for farmers and agricultural professionals, therefore modernization is necessary. The trust between the actors cannot be strengthened in our fast, rushing world, due to the high turnover rate. Administrative duties take a lot of time, which can reduce the amount of time that can be spent on acquiring professional information and knowledge, and feedback is lacking. (Weaknesses)

6.2 Success Stories

Star of the Profession Festival: The event is the biggest celebration of the Hungarian vocational training, which has also included agricultural vocational training for the past three years, where 21 agricultural professions were represented. Students and their parents can learn about professions related to the agricultural and food industry through professional presentations. NAK considers successful generational change to be its mission, and therefore works continuously to ensure that agriculture offers an attractive alternative, providing young people with as many career paths as possible. In recent years, the number of vocational training programs in agriculture has increased. Continuous renewal, the expansion of the choice of training courses and the strengthening of dual training also indicate the success of vocational training, which is why more and more students choose vocational training and achieve better and better academic results. https://szakmasztar.hu/

REL-Expo, REL-HUB: Kislépték Egyesület as main organizer and NAK and MNVH as co-organizers have been organizing the Short Food Supply Chain conference and exhibition for several years, which focuses on collaborations and incentives related to supply chains, the tradition-based and environmentally conscious quality development of village agrotourism services, helping self-employment, supporting product manufacturers and local markets and increasing their knowledge, innovative solutions, and the presentation of many good practices. https://www.nak.hu/tajekoztatasi-szolgaltatas/rel-egyuttmukodes/106712-iii-rel-expo-konferencia-es-kiallitas-jakabszallason-februar-29-en and https://kisleptek.hu/

Network of Model Farms: Albert Kázmér Mosonmagyaróvár Faculty of Széchenyi István University coordinates a Model Farm Network consisting of more than 60 members. On the one hand, the model farms serve as places of practice for the students, but they also function as a link between research and practical life.

The members of the network are innovative farms and enterprises, from small family farms to large, multi-sector enterprises. Their activities include animal husbandry, mixed farming, arable crop production, horticulture, food industry and financial services. About 12% of the farms are organic farms. The faculty maintains an active relationship in the form of joint projects and research with those members of the network who are open to innovation, sustainable development and digitization.

Digital demonstration farm: The Digital Agricultural Academy Plus (DAA+) also provides demonstration and practical training locations for the technical

conditions of precision technologies, as well as for the measurements and evaluations that form the basis of the advisory activity. In the DAA+ system, the digital demonstration farms selected on a professional basis provide farmers with practical demonstration locations, where the technical conditions of precision crop cultivation and animal husbandry (precision power and working machines, sensors, etc.), precision field experiments, as well as measurements and evaluations that form the basis of precision advisory activities are presented.

Hungarian Precision Animal Husbandry Association: The association aims to popularize precision animal husbandry in Hungary by connecting researchers, developers, manufacturers and users of precision solutions. Their goal is to ensure the production of high-quality food of animal origin keeping animal welfare and environmental sustainability in mind. Precision solutions provide a detailed understanding of animals and their impact on nature, resulting in more efficient and environmentally friendly food production. The association acts as a hub to facilitate cooperation between different stakeholders and uses digitization to create a database to store and share relevant data.

Hungarian Precision Farming Association: The Precision Farming Association was founded in 2017, which works to represent the common interests of those who choose precision farming - be it field crop cultivation, horticulture, or animal husbandry - those interested in the technology, as well as the actors who appear on the "precision market" as traders or service providers. The purpose of the association is to introduce precision farming and digital agriculture, to apply them widely, and to share practical experiences and new knowledge.

Advisor of the Year Award: In order to strengthen the prestige of the advisory service, every year from 2019 the Hungarian Chamber of Agriculture and the Ministry of Agriculture announce the "Advisor of the Year" competition to recognize the work of those advisors who perform their work outstandingly, serving the interests of agricultural producers at a high level. Advisors who were directly recommended to the title by their customers were invited to submit applications. The candidates must submit application materials about their professional activities. The applications are evaluated based on an objective system of criteria, and the best ones are personally heard by a professional committee consisting of representatives of the Ministry of Agriculture, NAK and the National Agricultural Advisory Committee (NATaB). In addition to the committee hearing, it is also possible to support the nominated advisors by public voting on the NAK website. Based on the scoring and the personal introduction, the committee selects the professionals who will be awarded the title of "Advisor of the Year", with the approval of the Minister of Agriculture. Among the candidates for the award, the three applicants with the most points were heard by a professional committee consisting of representatives of the Ministry of

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