

AKIS and advisory services in *Croatia*

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

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Executive summary

Agriculture Knowledge and Innovation System (AKIS) stands for the exchange of knowledge and supporting services between diverse actors in rural areas. AKIS should provide farmers with relevant knowledge and networks around innovations in agriculture.

AKIS system is an organization and interaction of persons, organizations and institutions that use, produce and need knowledge and innovation from agriculture and interconnected areas. The AKIS system consists of farmers, advisors, consultants, researchers, farmers' organizations, NGOs, networks, retailers, the media, services, public institutions, ministries that transfer knowledge and strengthen the links between research and practice.

To establish a functional AKIS system, it is necessary to assume at least that scientific research has been conducted and applied, innovations presented, digital solutions developed and available, advisory services available, established and functional EIP operational groups, and especially that farmers are involved in the system of counseling, training, exchange knowledge and work of operational groups.

Modernization as the next cross-cutting objective of the CAP is aimed at developing a smart and resilient agricultural sector. The emphasis is on innovation as a fundamental element of the knowledge transfer process. Although innovation occurs at a certain level, the distribution and exchange of knowledge and information is still fragmented and not fully functional. New technologies are being adopted very slowly. Cooperation and exchange between different actors of the AKIS system can be significantly accelerated and improved. A functional AKIS system is one of the main prerequisites for the successful development of Croatian agri-food sector.

Even though, agricultural advisory service is available for farmers and other beneficiaries on land and farm management, covering economic and environmental dimension, it needs further alignment and development to become an integral part of the CAP Strategic Plan by strengthening social dimension and provision of up-to-date technological and scientific information based on research and innovation.

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1. Main structural characteristics of the agricultural and forestry sector

The agricultural sector in Croatia is characterized by a numerous challenge that comes from more than 20 years of transition, from controlled, state economy to free trade environment. It is also defined by great climatic variety with specific combination of large flat areas with predominant crop production, hilly part with moderate climate, mountain climate with pastures and Adriatic part with blend of Mediterranean agriculture and fisheries.

Croatian agricultural sector is also characterized by the existence of a large number of small family holdings, where 70% manage less than 5 hectares and only 5% utilize more than 20 ha. The average size of the agricultural holding is around 7 hectares. 30% of the agricultural holdings are managed by people older than 65 years, and only 11% younger than 40 years of age. In Croatian farm register, the total number of holdings is around 170.000, and 98% are family farms characterized by relatively low land and labor productivity, low investment levels, limited performance in the knowledge and innovation sector, and low level of education. 21% of the holders have elementary education, and 6% faculty education.

By type of production, near one third of the holdings are specialized in crop production, one third in grazing livestock, and the others are specialized in horticulture or predominantly mix type of farming. Additionally, only 0,23% of registered producers (in 2016) were organized into cooperatives, that leads to weak negotiating position of small producers in value chain, and fragmentation of production. Croatia is currently competitive in low-value primary agricultural products, and the production structure is dominated by low-value crops and about two-thirds of the country's arable land produces low-value cereals. The average farm income is lower by half than the EU-28 average. During the last two decades, privatization and integration of domestic markets into the EU and global economies have been the dominant forces driving change in Croatia's agricultural sector.

In 2017, the agricultural sector in Croatia employed an estimated 7.5% of the workforce, compared to 4.25% in the EU-28. 43% of the Croatian population lived

in rural areas compared to 19.2% in the EU-28. Participation labor force in rural areas of Croatia was 51% compared to 56.7% in the EU-28.

Total expenditure on research and development in Croatia is low, 0.81% of GDP, compared to 2% in the EU. It is important to emphasize that Croatia also lags behind its main regional and global competitors in the region agricultural research and development. In the current programming period, only 2% of the total envelope is for rural development of Croatia programmed for knowledge transfer and advisory services, just over half of the EU average (which is 3.6%).

2. Characteristics of AKIS

2.1. AKIS description

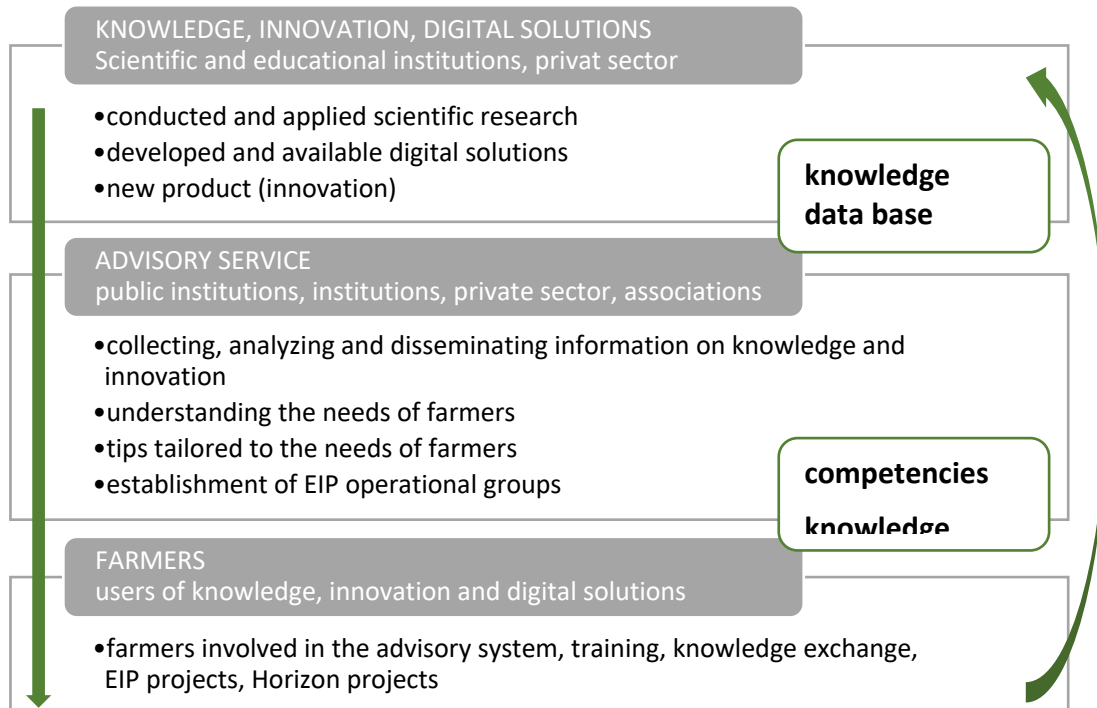
The Croatian Agricultural Knowledge and Innovation System (AKIS) is characterized by numerous public and private entities well experienced in education, research or advisory activities, but their connections are weak and there is no systematic and effective exchange of results, knowledge, data or innovation, which limits their impact to the economy. Research and applied research is happening to some extent but there is no system of transforming of acquired knowledge to the farmers or other stakeholders in the system. Although it was envisaged during establishment of Research Council for Agriculture (VIP) in late 90', the system of transfer of the project results, in form of the technical packages to the farm advisors, was never established. Also, except occasional involvement of some educational entities in short trainings, there was no systematic transfer of knowledge towards advisors.

Many of food processor and input providers are engaged in trials or research projects, mainly oriented to their production needs or marketing purposes. Public Advisory Service were engaged in organization of the trials or demonstration plots but collecting of acquired information and new knowledge was never systematically organized and presented through some knowledge reservoirs or other systems of exchange of information, including e-learning.

Croatian AKIS is moderately diverse with strong influence of public funded entities and, till recently, strong emphasis on public advisory service. Other significant contributions come from the food industry and input providers, who more and more invest in research and innovation and often include highly specialized advice to their cooperants or customers. Least developed part of the AKIS is the one related to the NGOs and farmers association, which is historically conditioned and typical for Croatia and neighboring countries.

The necessity to support producers and businesses entities in agriculture through training, expert advice and important information related to management systems production and compliance should be in future focus of increase investment from public and private sources to agricultural knowledge and innovation.

2.1.1. AKIS actors and knowledge flows



2.1.2. Policy framework at national level

The implementation of activities concerning establishing the operational and functional AKIS system is aligned with the preparation for the programming period after 2020 and contribution to the objectives of the CAP, which relate to stable income of farmers, increasing the competitiveness of farmers, inclusion of farmers in short supply chains, the impact of agriculture on climate change, sustainable use natural resources, protection of natural habitats, generational renewal, rural development and employment, and health and food safety.

To promote the modernization of the agricultural sector, the Croatian Strategic Plan will provide the answers on how activities and measures can contribute to the objectives: fostering and exchanging knowledge, innovation and digitalization, having in focus:

- establishing the AKIS system and strengthening research links
- accessibility and availability of advisory services to farmers
- recording and monitoring of scientific achievements and digital solutions in agriculture
- establishment and operation of European Innovation Partnership (EIP) operational groups

By defining roles, stronger links between actors and a results-oriented approach, the AKIS system will contribute to the strategic goals, and to the development of a structured and organized environment for knowledge development. In order to transfer valuable information to farmers more efficiently, it is necessary to determine the organizational structure, to define the forms of cooperation and determine the contribution of all actors, and to support the application of innovations and digital technologies in agriculture and rural areas.

The importance and role of agricultural advisors is changing and applied research projects are gradually being replaced by European Innovation Partnership (EIP) projects. This is a significant shift from the previous structure in the context of the underdeveloped AKIS system. With the support of rapid digital transformation in the agri-food sector, this could lead to the discovery of a new, optimal model that will ensure that general and specific information and advice are effectively transferred to farmers.

The AKIS system can play an important role both in meeting national priorities and in linking the objectives set in the new programming period. In order to achieve the expected results, it is necessary to decide on specific activities related to research through the EIP projects or national programs, demonstrations, data exchange, training, advice, pilot projects, etc.

The main current challenge is to better address the knowledge flows along the whole AKIS system, and to create specific incentives for researchers, so they can improve their impact on agricultural practice and share their results in an easy and understandable way using the main dissemination channels used by farmers and advisors.

The new obligation to develop an AKIS plan with defined roles of stakeholders, expected outcomes and enabling elements, will contribute to further improvements, stronger linkages between actors and result oriented approach. This will contribute to both national and EU objectives, development of structured and more organized knowledge developing environment, with more contributing actors. The goal is to produce valuable information faster and translate it to farmers more efficiently than before.

2.1.3. Coordination Structures

The main bearer and coordinator of all activities on the (re)establishment of the AKIS system in Croatia is the Directorate for Professional Support to the Development of Agriculture and Fisheries within the Ministry of Agriculture, responsible for planning, managing and implementing advisory activities in agriculture, and providing expert advice on new technologies, innovations, knowledge and skills needed to develop and preserve the value of rural areas and the sustainable development of agriculture. In addition to the competent body, other actors are included in the AKIS system:

I. Scientific and educational institutions

- Faculty of Agriculture, University of Zagreb
- Faculty of Agrobiotechnical Sciences, University of Osijek
- Faculty of Veterinary Medicine, University of Zagreb
- Agricultural College, Križevci

II. Public institutions and institutions

- Croatian Agency for Agriculture and Food
- Institute of Agriculture and Tourism, Poreč
- Agricultural Institute Osijek

III. Associations,

- Croatian Chamber of Agriculture
- Rural Development Network
- cooperatives, producer associations
- NGOs

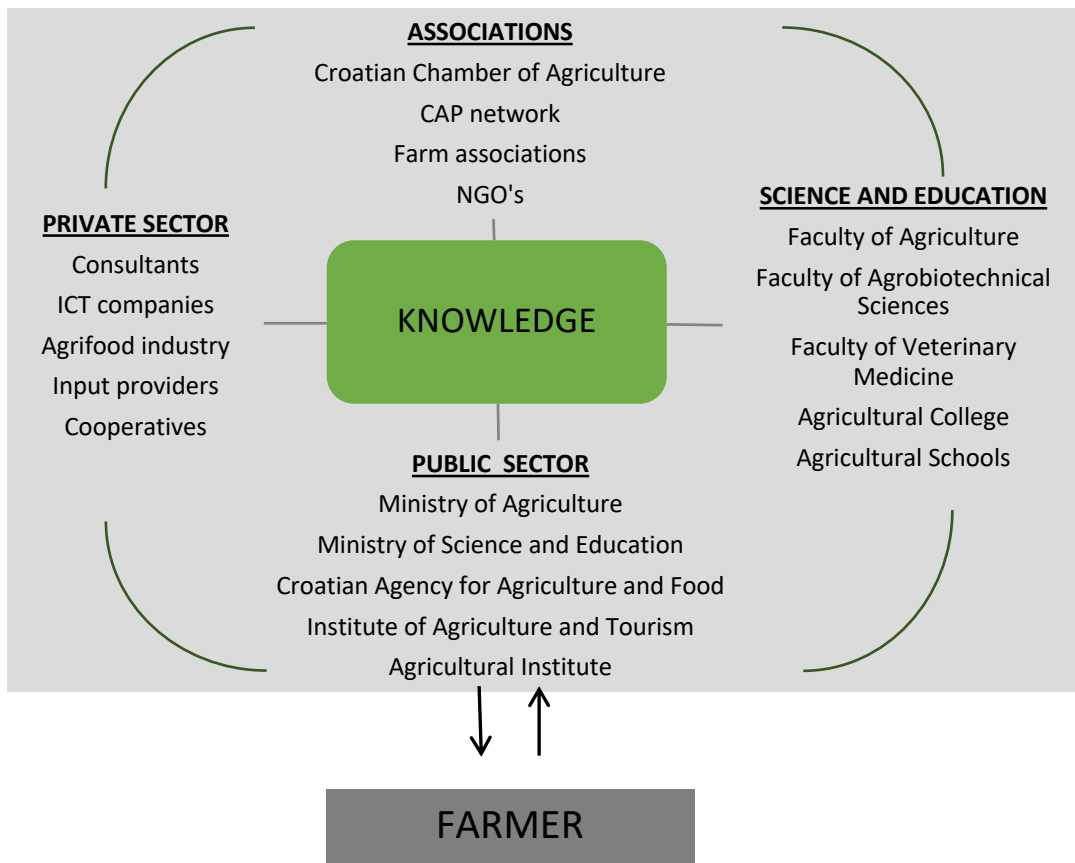
IV. Private sector

- ICT companies, suppliers, distributors, traders, farmers

AKIS system clearly indicates the importance of advisory services in establishing and implementing the AKIS system and connecting the various actors, their role relates to:

- knowing and understanding (and gathering) the needs of farmers
- willingness and ability to give advice in the field: economy, environment, social relations
- availability of information on the latest scientific achievements and knowledge
- readiness to acquire new knowledge and skills
- ability to transfer knowledge to farmers (application of innovations)
- supporting the establishment and operation of EIP operational groups.

2.2. AKIS diagram



3. History of the advisory system

Advisory activities in Croatia started in more organized form after the WWII, in the mid of the 20th century. At that time the former state decided to build two principal branches of assistance to farmers, veterinary stations and agricultural stations. Besides having general supportive role, as main spots for public information related to agriculture, intention was to also have educational role and to help with improvement of production.

At first mentioned veterinary and agricultural stations were financed 100% through the state budget. Later, at the beginning of 1960', new concept was introduced where those entities should become partially autonomous and be self-financed by the farmers. Veterinary stations survived that process and, from that period till today, it is common for Croatian farmers to pay for veterinary services. However, number of agricultural stations dropped and merged with state agricultural entities (agro-combinats) whose purpose was to organize production, processing and sales and to serve as a hub for cooperation with private farmers.

During 70' and 80' veterinary services developed enormously while specialized agriculture knowledge remained closed in agro-combinats, with limited influence on family farms.

In the beginning of 90' agriculture advisory service was established as a service within Agriculture Center of Croatia, with 51 regional branches and central office in Zagreb and 120 advisors, financed mostly from the state and rest from local community. This service has two principal layers of activities: regional branches organized to provide coordination of local municipality offices and to provide specialized information for farmers, and local municipality offices established to provide experts advice on production, plant protection, agro-environment issues, legal questions, financial issues etc. During that time, and even 20 years before the term AKIS was introduced, there was clear understanding of necessity to form capable, autonomous advisory services that communicate, learn and work with other stakeholders using all available means as phone, radio, TV, newspapers etc.

Starting in 1996, with financing from the World Bank, the agricultural advisory service implemented a project for strengthening agricultural services and building a comprehensive knowledge system in Croatian agriculture. During five years of the project implementation, basic framework of the Croatian agricultural

knowledge and innovation system was established, with the leading role of Advisory Service as autonomous public institution.

An important step during that period was the establishment of a system of research and knowledge exchange, led by the Agriculture Research Council (VIP), a research-driven body that manages the funds for applied research. The researches were expected to respond directly to problems of agricultural producers, to create new production technologies and to apply technologies adapted to different production conditions, especially the conditions of family farms. The VIP Council was established to serve as the main cohesion factor between different AKIS entities and to provide current knowledge and information for the farm advisors. A system for transfer of knowledge to farm advisors was established in the form of regular workshops and development of specific technical packages for advisors, upon completion of research.

During the 2002 – 2012 period, the main role of the VIP Council to serve as a knowledge hub and generate current knowledge for advisors, was practically forgotten and abandoned. Research continued, but the methodology for decision making on the research topics did not ensure strong farmers participation. The Advisory Service continued its function to serve the Ministry of Agriculture needs to deliver basic information to farmers, to help with statistics and application for subsidies. Specialized advice was also stated as a part of daily work of advisors, but this kind of advice was given only occasionally, within other administrative activities. In 2010 the Advisory Service was, by government decision, moved to be a part of newly formed Agriculture Chamber. In 2012, after numerous issues and challenges that occurred, it was again settled as a public institution.

In 2012, according to the new law of Advisory service, independent entity was again established, entering in its most dynamic period from its founding. During that time Advisory Service joined international associations of advisory services and started to cooperate in international projects. Also, co-financing of advisory services from diverse sources was pursued. Diversification of financing came from using the measure for advisory services in the rural development program (Measure 1 and 2), and from project activities (H2020 projects). The main goal was to achieve greater financial stability, independence and sustainability of operations, while upgrading the quality of services to farmers. Examples from other EU countries were followed and the whole process was closely aligned with ongoing EU AKIS development and recommendations for advisory services.

Throughout the last two decades, Advisory Service had an influential position in Croatian AKIS. It was a specialized public institution, responsible for advisory activities in agriculture, rural development and fisheries, including dissemination of general information to farmers, organization of vocational training, technical advising on farms, pest management forecasting and training, advising of forest owners, education and control in forestry, advising in fisheries and rural development program.

In 2018, Advisory Service was abolished as a specialized public institution and its employees and assets were merged with the Ministry of Agriculture. Also, applied research (VIP) projects will be substituted by European Innovation Partnership (EIP) projects.

Today, Directorate for Professional Support to the Development of Agriculture and Fisheries within the Ministry of agriculture, as legal successor of the former Advisory Service is responsible for planning, managing and implementing advisory activities in agriculture, and providing expert advice on new technologies, innovations, knowledge and skills needed to develop and preserve the value of rural areas and the sustainable development of agriculture.

1991 – 1997	Department within the Ministry of agriculture (MA)
1997 – 2010	Croatian Agriculture Extension Institute (CAEI)
2010 – 2012	Croatian Chamber of Agriculture – Public Advisory Service (CCA)
2012 - 2018	Advisory Service Croatia (ASC)
2018 - 2019	Croatian Agricultural and Forestry Advisory Service (CAFAS)
2019 -	Directorate for Professional Support to the Development of Agriculture and Fisheries (MofA)

Recent structural and organizational changes in agricultural advisory system represent a significant shift from the previous setting, which, in still undeveloped AKIS, can contribute to uncertainty and unpredicted outcomes. However, with support of rapid digital transformation in the agriculture, it is possible to find new,



optimal model that will ensure both general and specific information and advice to farmers.

4. The agricultural advisory service

4.1. Overview of service supplier

The Directorate for Professional Support to the Development of Agriculture and Fisheries within the Ministry of Agriculture, is administrative body responsible for planning, managing and implementing advisory activities in agriculture, and providing expert advice on new technologies, innovations, knowledge and skills needed to develop and preserve the value of rural areas and the sustainable development of agriculture.

Currently, Directorate is responsible for requirements, conditions and management commitments applying to the beneficiaries set in the CAP Strategic Plan, including requirements and standards under conditionality and conditions for support schemes as well as information on financial instruments and business plans, water protection policy, protection of natural habitats and of wild fauna and flora, ambient air quality, plant protection products and sustainable use of pesticides, transmissible animal diseases, farm practices preventing the development of antimicrobial resistance, risk management, innovation support for preparing and for implementing Operational Group projects of the EIP for agricultural productivity and sustainability.

On the other side, a process of strengthening the development of independent private sector is in place for the advisors in agriculture and rural areas. It is hard to envisage how the majority of small and medium size family farmers will accept private advisors. Also, some of them will probably have to work closely with existing input providers or agro-processors. However, private advisors are welcome change to the sector. Announced process of certification and obtaining of a permit should be as simple as possible to enable greater involvement of interested experts and bigger choice for the farmers, especially the advanced ones. Also, certification process should be oriented towards examination of advisory skills, not only on actual technical knowledge. Recommended certification option for advisory skills is already established on EU level under CECRA initiative (<https://www.cecra.net>) and should be used as a model.

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

According to the policy proposal on Strategic Plans, the Member States should set agriculture advisory services for improving the sustainable management and overall performance of agricultural holdings and rural businesses, covering economic, environmental and social dimensions, and to identify the necessary improvements regarding all measures at farm level in the CAP Strategic Plans.

To enhance the quality and effectiveness of the advice, Member States should integrate farm and rural advisors within the AKIS, to deliver up-to-date technological and scientific information, developed by research and innovation. The agricultural advisory system of synergistic three elements: general, public advisory service, specialized semi-commercial advisory service and private advisory service should preserve security of fulfilling public needs and minimum quality, with additional freedom of choice for beneficiaries and openness through private actors.

Formation of Central Agriculture Information System which connects all existing databases from agri-food sector (land, farm register, subsidies, register of animals, organic production, beekeeper registry etc) will be merged into one comprehensive IT system which should externally be presented as user friendly web site and mobile app. All related administrative data should be searchable and open for further analysis, and presented at state, county or municipality level. Individual data should be displayed through the system.

4.3. Human resources and methods of service provision

Directorate for Professional Support to the Development of Agriculture and Fisheries within the Ministry of Agriculture has more than 300 employees, operating in 21 counties in more than 100 local offices. County headquarters and local offices comprise expert advisors from various fields of agriculture – crop and animal production, plant protection, rural development – depending on local needs. Central office is based in Zagreb where most of the management and supporting staff operates.

1 HEAD OFFICE IN ZAGREB

Advisory service in agriculture and fishery	Rural development measures
Expert support in development	Fishery policy measures
Plant protection	Business development of young farmers and fishermen
Innovative technologies	Income support and market measures
Education and training	Information, promotion and publication
Organisation and coordination of advisory work	



As from 2015, the advisory service started to diversify its funding and to finance itself from several new sources. Till today, some basic advisory activities are:

- helping farmers to understand all aspects and key elements of Direct payments scheme
- helping farmers in applications for subsidies for direct payments,
- providing support, information and advises about policy measures (RDP, CMO) and opportunities for benefits
- organisation and conduction of vocational education, trainings and demonstration activities (Measure 01) for all mandatory beneficiaries of Measure 10 "Agriculture, environment and climate change", Measure 11 "Organic agriculture, young farmers as well as Measure 14" Animal welfare" which are regularly covered
- provision of advisory work „one to one” (Measure 02: Advisory Service, Agricultural Management Services and Agricultural Farm Assistance) as a set of activities aimed at the users in order to better define the scope

Existing vocational training program for farmers covers topics: cross compliance, environment and climate change, organic farming, sustainable use of pesticides, young farmers (compulsory modules) and courses the field of crop production, animal husbandry, diversification, irrigation, farm management, digitalization, bioeconomy (optional modules). Each of the total of fifty (50) vocational training courses for farmers is harmonized in terms of content and time with a specific topic and the obligations and requirements of the participants



Agroecology



Cross Compliance



Environment and Climate



Mechanization



Plant protection



Medicinal and aromatic herbs



Organic production



Horticulture



Crop production



Animal production



Agroeconomy



Mix farming

Advisory package help farmers to know exactly what to expect from the advisory service, depending on the type of production and the goals that they want to achieve in production. Advisory packages covers key areas of production and enable them to meet the priorities, focus areas and topics set by the RDP.

Although the number of advisers is limited and regularly below average, the advisory service and vocational training includes advice on cross compliance, a package of environmental measures, climate change and organic farming, advice on modernizing and increasing the competitiveness of farms, advice to young farmers, and vocational training of farmers (including topics related to the business of young farmers, farm management, etc.). Advisory service activities through the are carried out by providing advisory packages by the farmers and the method of individual advises, ie by implementing a vocational training program.

4.4. Clients and topics

Main topics and clients related to advisory activities are:

- technological and technical improvement of farms and the provision of expert support to farmers and fisheries
- implementation of RDP Measures - Knowledge transfer and Advisory Service
- promotion of knowledge and innovation in agriculture and fisheries
- advices, instructions and practical demonstrations in the field of agriculture and fisheries
- organization of demonstration activities
- dissemination of information and publishing

Focus of advisory activities is on Intensity and quality of individual advisory work with the farmers, vocational education and training for farmers (environmental measures, organic production, animal welfare), business development of young farmers, education and trainings of employees (specialization of advisors), information and support to RDP beneficiaries, international projects (Horizon 2020 on knowledge, innovation, digitalization), and new areas of cooperation with partner institutions.

4.5. Programming and planning of advisory work

The activities aim to clearly define the organizational structure of the AKIS system, the distribution of roles and tasks, and the definition of those types of advisory services that are aimed at knowledge transfer, and the application and adoption of innovations, and relate to:

- collecting data on the competencies and preferences of advisors
- revision and supplement of the professional development program of advisors
- formation of teams of specialist advisors in the field: economy, environment, and social relations
- organization of education of advisors in the field of social relations (communication, relations, etc.)
- creation a database on the needs and requirements of farmers
- collection of data on available scientific achievements, new technologies and techniques, digital solutions, etc.
- contracting cooperation with scientific and educational institutions, private companies and non-governmental organizations on the exchange of information on relevant technological achievements, knowledge and innovations

- creating a database of new knowledge and innovations
- support for the establishment and operation of EIP operational groups
- implementation of H2020 projects
- participation in the preparation of CAP strategic documents after 2020

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

According to annual working plans, aligned with the policy proposal on Strategic Plans, the role of advisory service (Directorate within the MofA) is to improve the sustainable management and overall performance of agricultural holdings and rural businesses, covering economic, environmental and social dimensions, and to identify the necessary improvements regarding all measures at farm level in the CAP Strategic Plans. To enhance the quality and effectiveness of the advice, Member States should integrate farm and rural advisors within the AKIS, to deliver up-to-date technological and scientific information, developed by research and innovation.

5. Summary and conclusions

5.1. Summary and conclusions on sections 1 – 3

The AKIS in Croatia is still highly fragmented and strongly influenced by publicly funded bodies where available. The history of the organization of the advisory service in Croatia is exclusively related to the functioning of the Public Agricultural Advisory Service, which was established in the late 90's, and through various forms of organization was the only institution in charge of providing advisory services. Scientific-educational and research institutions operating in the agricultural sector are for the most part state-owned.

The "new" role of advisors related to more active involvement in the establishment and functioning of the AKIS system will certainly require adaptation of existing and development of new advisory processes and systems, where the possibility of participation of private advisors of appropriate competencies is not excluded. Currently, activities are underway to establish a Committee for the establishment of the AKIS system in the Republic of Croatia and the process of drafting the AKIS plan with defined forms of cooperation and roles of all actors involved in knowledge transfer, application and adoption of innovations and digital solutions.

More general conclusion are as follows:

- No substantial research and innovation in agri-food sector
- Lack of cooperation and exchange between AKIS actors
- No permanent education of the public farm advisors
- Collected agriculture data is not easily visible and accessible
- Most of the farmers are not in line with modern developments in agriculture
- No support for research and innovation
- Weak perception of agriculture among the young

5.2. Summary and conclusions on sections 4

The basis of the AKIS system is the conversion of research results and projects into information packages that can be used in the education of advisors and / or

farmers. The AKIS system is a mandatory part of the CAP's strategic plan and a mechanism for achieving specific objectives in the agri-food sector.

Transforming research results and projects into information packages for advisors and farmers requires the development of a central information system in agriculture, a central data base for knowledge, innovation and new technologies. Although information on all relevant research and innovation at the national and international level is available, their connection and use is not possible, especially by end users. Therefore, it is necessary to consolidate all information, convert information into understandable language and determine how to transfer information to end users (application solutions).

Monitoring the needs of farmers and identifying possible solutions based on knowledge, innovation and technological achievements must be an integral part of the central information system in agriculture, and be used as a basis for the establishment and operation of EIP operational groups.

The post 2020 CAP cross-cutting objective on modernisation, knowledge sharing, innovation and digitalisation can be reached only when all relevant actors are involved in the AKIS Strategic plan together: when they cooperate and share responsibilities. The involvement of researchers is essential, and the possibility to share their work with practice can improve both the research organisation and its impact. The organisational structure of AKIS systems should enhance knowledge flows and strengthen links between research and practice. All approaches, for which research needs to bridge the gap with practice so that farmer practices become in line with the policies and societal challenges, are to be examined within the AKIS systems. Be aware that AKISs do not only relate to the narrow "agri"culture, but also incentivise the related food as well as non-food value chains to become more functional up until the consumer, and tackle biodiversity, environmental and climate change issues, rural challenges and much more.

A well-organized and functional AKIS system is the basis for efficient and competitive agriculture in Europe. Investing in knowledge and innovation will be as important as strengthening advisory services in agriculture and rural areas.

6. Acknowledgement of partners, information sources and gaps

To be added

References

To be added