Strengthening EU AKISs

5th mandate report of the SWG SCAR-AKIS (2019-2022)

SCAR
Standing Committee
on Agricultural Research

Strengthening EU AKISs

Standing Committee on Agricultural Research (SCAR)

5th report of the SCAR Strategic Working Group on Agricultural Knowledge and Innovation Systems (AKIS)

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List of abbreviations

AKIS	Agricultural Knowledge and Innovation System
AKS	Agricultural Knowledge System
CAP	Common Agricultural Policy
CCO	Cross-Cutting Objective of the CAP 2023-2027
CEJA	European Council of Young Farmers
COPA-COGECA	Committee of Professional Agricultural Organisations-General Confederation of Agricultural Cooperatives
CSA	Coordinating and Support Action
CWG	Collaborative Working Group
DAT	Digital Advisory Tool
EC	European Commission
EIP-AGRI	Agricultural European Innovation Partnership
ENRD	European Network for Rural Development
EU	European Union
EUFRAS	European Forum for Agricultural and Rural Advisory Services
FG	Focus Group
FAO	Food and Agriculture Organisation of the United Nations
GABW	Green Agenda for the Western Balkans
GODAN	Global Open Data for Agriculture and Nutrition
HE	Horizon Europe
ISS	Innovation Support Service
KR	Knowledge Reservoir
MA	multi-actor
MAA	multi-actor approach
M&E	Monitoring and Evaluation
MS	Member State
OG	Operational Group
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
REAGW	Regional Expert Advisory Working Group
R&I	Research and Innovation
SCAR	Standing Committee on Agricultural Research
SFSC	Short Food Supply Chain
SEE	South East European
SME	Small Medium Enterprise
SWG	Strategic Working Group
TN	thematic network
WB	Western Balkans
WG	Working Group

Preface

Since 2010, the Strategic Working Group on Agriculture Knowledge and Innovation Systems of the Standing Committee on Agricultural Research (SWG SCAR-AKIS) has been improving the functioning of AKIS, increasing the impact of research by integrating non-research actors in research and innovation actions. The thematic fields of AKIS cover the entire agri-food and biomass chains and related issues in an integrated systems approach. As stated by Anikó Juhász, co-chair of the SWG during its 5th mandate (2019-2022), "*Interaction is crucial for innovation and for addressing the right challenges, in order to stimulate appropriate research and innovation activities, knowledge generation and knowledge exchange.*"

Indeed, interaction between different actors along the agri-food chain, including farmers, foresters, advisors, researchers, innovation brokers, policy makers, businesses, NGOs, etc. is key to achieving common goals and innovative solutions to enhance the transition to a socio-economic and environmentally sustainable agriculture.

A well-functioning AKIS can greatly contribute to the sustainability objectives of the Common Agricultural Policy (CAP) and the European Green Deal strategies, like the Farm to Fork and Biodiversity Strategies, the Forestry Strategy, the Soil Strategy and the Long-term Vision for Rural Areas. The CAP and the Green Deal strategies recognise the importance of well-functioning national knowledge and innovation systems in accelerating change towards sustainability. Under the CAP 2023-2027, each Member State is obliged to make a national AKIS plan and implement an AKIS Strategy, led by the AKIS coordination body in connection with the AKIS networks of the Member State, to better connect actors and strengthen synergies between the various AKIS interventions of the CAP Strategic Plan.

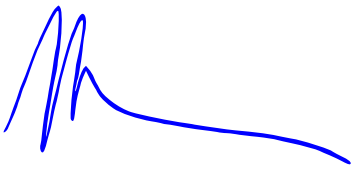
Within the EU AKIS, the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) has demonstrated its effectiveness since its start in 2012. More than 350 multi-actor projects funded under Horizon 2020 and Horizon Europe, including over 50 transnational thematic and advisory networks, stimulate the exchange of existing knowledge and ensure better interaction across the AKIS of different Member States. More than 3 200 CAP-funded Operational Group (OG) innovative projects support interactive innovation and stimulate the exchange and cooperation between researchers, advisors and other key actors with complementary expertise. Over 6 600 OG projects are planned over the period 2023-2027, as part of the CAP Strategic Plans, which means a threefold increase of the number of OG innovative projects per year, and results in an enlarged scope of activities covering all 9 CAP objectives, while adding also new approaches, such as rural innovation territorial projects, the creation of knowledge hubs, innovation support services, etc. To strengthen networking, and profit from synergies and cooperation, it was decided to merge the EIP-AGRI Network and the European Network for Rural Development (ENRD) into a single EU CAP network for the CAP 2023-2027.

The SWG SCAR AKIS meets on a regular basis, with representatives of Member States, the European Commission and key advisors, as well as participants from third countries associated to Horizon Europe. The activities under the 5th mandate strived to achieve a greater impact of the multi-actor approach implementation in EU AKIS and to define the role of education, digitalisation and e-infrastructures in knowledge exchange, and social innovation and inclusiveness in EU AKIS.

Being successful in delivering outputs that are welcomed and taken up by the Member States and key actors in their AKIS, the SWG SCAR AKIS will continue its activities under a 6th mandate, to create a dynamic and resilient AKIS that can deal with current and future sustainability and socio-economic challenges.

This report gives new insights and shares experiences and recommendations to strengthen AKIS across the EU, in particular its governance, structures and implementation, bridging the gap between the different actors and sharing knowledge to foster innovation.

I wish you a pleasant reading



Wolfgang Burtscher, Director-General of DG Agriculture and Rural Areas

Summary

The main mission of the Strategic Working Group on Agriculture Knowledge and Innovation Systems of the Standing Committee on Agricultural Research (SWG SCAR-AKIS) is to build a knowledge and innovation network across the EU, focusing specifically on speedy research and innovation impact, with experts, advisors and researchers working hand in hand with farmers, foresters, and other rural actors. More specifically the objectives of the SWG SCAR-AKIS are (1) improving the functioning of knowledge and innovation systems in agriculture, bio-economy and the rural areas (2) pursuing the outcomes of foresight studies to tackle challenges and stimulate appropriate research and innovation activities, knowledge generation and knowledge exchange and (3) covering all agri-food and biomass chains, from producer to consumer, in a systemic approach.

During its 5th mandate (2019-2022) the SWG has discussed **5 main topics** on which Member States (MS) and multiple actors exchanged insights, shared best practices, presented case studies, and distilled useful recommendations from these discussions. This report reflects and highlights the main points of the interactions across the EU AKIS actors, by means of brainstorming sessions, and includes main conclusions and outcomes such as policy recommendations.

The work performed on **synergies of AKIS policies** took the broader perspective of AKIS as contributor to the nine specific CAP objectives, which support the CAP Cross-Cutting Objective on knowledge, innovation, and digitalisation. It showcases the success of the EIP-AGRI as well as the importance of AKIS to foster knowledge exchange as well as research and innovation (R&I) thus contributing to the European Green Deal. Several Operational Group projects (OGs), Horizon-funded multi-actor projects, thematic and advisory networks, and other groups were invited to the SWG meetings to discuss cross-cutting issues. SWG SCAR AKIS members fed their valuable insights into these projects and a bilateral learning process took place. A roadmap to level up the EIP-AGRI was designed.

Frameworks for the implementation of MS' **AKIS strategies** as well as to assess those were repeatedly and widely discussed, including MS' examples of improved AKIS governance, structures, and mechanisms. Besides, the SWG SCAR AKIS counterpart in the Western Balkans was presented as a basis for potential collaboration.

As key intermediaries between research and practice, **advisory services** were scrutinised: who are advisory services serving, which content is covered and what type of advice is generally provided, which methods can help to advise the hard-to-reach farmers, and how can we make better use of social sciences and various advisory concepts to deliver advice contributing to the 3 pillars of sustainability, economic, environmental as well as social domains? How can we better integrate advisory services into the AKIS, stimulate peer-to-peer learning and improve sharing of knowledge and innovative solutions from interactive innovation projects, ensuring that these solutions are ready to be applied in the field? Innovation Support Services (ISS) as major drivers of agriculture innovation were also part of the discussions and sharing of practical examples.

During this mandate, the SWG SCAR-AKIS also continued its work on the Horizon **multi-actor approach**, that systematically makes various actors (farmers, advisors, experts on all kind of subjects, innovation support services, policy makers, researchers, non-governmental organisations (NGOs), businesses, media, etc.) co-create new knowledge and innovative solutions in agriculture and forestry. Best practices were discussed and demonstrated, including the multi-actor approach as applied in food systems, illustrated by a series of Horizon 2020 funded projects. In the framework of discussing the multi-actor approach, exchanges were made with the SWG SCAR Food Systems and the SWG SCAR Agroecology, in particular on the upcoming partnerships and ways to make them better deliver. Recommendations for strengthening the multi-actor approach in thematic networks, partnerships, and innovation processes were made to achieve better uptake of results and hence higher impact.

As a way forward, a **new type of call for thematic networks**, building on existing OGs from different MS on a common theme, were developed by the SWG SCAR AKIS. The first projects from Horizon Europe call 2021 were able to present their excellent plans to the members in one of the last meetings of this mandate. A key learning was that this specific type of thematic networks will be a critical addition in Horizon work programmes to improve the functioning of MS' AKIS, as they add depth on specific thematic areas and work across borders on practical

issues for which there is a real need. They are also an ideal way of creating synergies between CAP and Horizon funded projects.

The role of **education** in the dynamics, functioning and strengthening of AKIS is not to be underestimated. The way advisory services can improve education and training was discussed and practical examples were visited in the Netherlands. The training of advisors themselves, to make them more competent, was discussed on the basis of a sample and a number of case studies from various countries (Belgium (Flanders), France, Italy, Estonia, the Netherlands and Switzerland), as illustrated in this report. Digital education and tools such as virtual on-farm demonstrations (emerged due to the COVID crisis, but becoming a potential other way of demonstrating) and the inventory of digital advisory tools (DATs) for advisors showcase the link between digitalisation and education. Skills training based on instruments from related policies, such as the Pact for Skills and the European Structural Funds, were included from the capacity building perspective.

Social innovation was considered another important aspect of the broader AKIS. The SWG looked at several dimensions to enhance social inclusion and integration into AKISs. Social innovation in marginalised areas, approaches to tackle farmers' health problems in problematic times and aspects of generational renewal are highlighted as important topics in social innovation to be taken into account in the AKIS.

As the last main focus area of the 5th mandate, **digitalisation** in AKIS was discussed. The vision of an overarching EU knowledge reservoir for practice, containing all outcomes and innovative practices from OGs and MA projects, being interoperable with related national digital database initiatives, were put forward and elaborated as part of an integrated EU AKIS strategy. Some examples of MS that are already setting up such a national knowledge platform as well as examples of OGs as a basis for implementing digitalisation in agricultural practice in the field were given.

Introduction

After the 4th mandate of the SWG SCAR AKIS group, co-chaired by Spain (2016) and France (2017-2018, and Hungary (2017-2019), the 5th mandate of the SWG SCAR AKIS (2019-2022) was coordinated by Hungary and France respectively with co-chairs Anikó Juhász, deputy State Secretary of the Ministry of Agriculture, and Pascal Bergeret, head of a mission on adaptation to climate change and international affairs, regional directorate of the French ministry of agriculture and food for the Occitanie Region. The SWG SCAR AKIS co-chairs were supported by Inge Van Oost, Natalia Brzezina and Ana Patricia Lopez Blanco (DG AGRI). **The 5th mandate of the SWG SCAR AKIS was based on several challenges** that emerged from new themes, international commitments, the further development of the EIP-AGRI, and seeking European AKIS structuring and AKIS strategies to strengthen governance, structure, and mechanisms at EU Member States (MS) level.

The first challenge was related to the **AKIS policies at national and EU levels creating further EIP synergies** between agriculture, research, innovation, and education policies. To this end, Chapter 1 of this report is dedicated to AKIS policies creating synergies at the EU and national levels. It includes a comprehensive report that will help the European R&I community, advisors, policy makers CAP networks and other AKIS actors to find their way towards well-functioning and effective AKISs, and the implementation of the EIP-AGRI. Good examples and ideas were collected on strategic actions to take and how to set up effective networking in a knowledge and innovation system, and adapt to researchers' and advisors' needs. Best practices on how to evaluate positive AKIS elements, strategies and governance are presented. annex 1 and annex 2 complement this chapter giving an overview of CAP AKIS related legal requirements and providing a "How-to" guide on AKIS strategy and related CAP interventions, meant to improve understanding and implementation of Member States' AKIS Strategies.

The second challenge was about the **achievement of greater impact of the multi-actor approach (MAA)** implementation in EU AKISs. Chapter 2 is therefore dedicated to learning from the MAA projects in a variety of AKISs at all territorial scales (regional-national-European) and to the understanding of the co-innovation process in order to increase its quality and efficiency, and to achieve a greater impact in farming and forestry related sectors, and rural development. The chapter reflects the discussion and sharing of best experiences of the MAA in projects at regional, national and EU levels. The work resulted in recommendations for the European R&I community to set up and implement more impactful MAA projects bringing key actors together in agriculture and/or forestry and interrelated fields, to share, co-create and co-innovate in a bottom-up systems approach based on real needs from user groups.

The third challenge of the 5th mandate was to learn and **better understand education as an important part of building AKIS** which requires an effective involvement of the farmers or foresters, and other linked supply chain actors. Chapter 3 is about the work that has been done to better connect education within AKISs. It highlights the underestimated role of educators in AKIS as key multipliers of knowledge dissemination and showcases best practices and innovative solutions. In this chapter, experiences from MS are shared, innovative science and the role of education highlighted, and the link with digitalisation is explained. Chapter 3 highlights the importance of targeted educational programmes with interactive updated content, peer-to-peer and demonstration activities. Examples are given of good practices in vocational schools, advisors', and farmers' training.

The fourth challenge identified is **the social innovation dimension and its inclusiveness in AKIS**. Social innovation is a broad concept. It involves among others rural communities (including communities of farmers and foresters), finding creative solutions to the complex social challenges. These challenges are often linked to location, generational renewal, status, poor infrastructure and rural services, lack of skills for picking up new opportunities such as development of smart villages, care farming, consumer-producer short supply chains, agri-tourism, rural commons. Chapter 4 is about those themes in the context of social entrepreneurship, the development of new business models, as well as consumer-driven innovation, the urban-rural dimension (urban farming/forestry, social innovation in food chains, as well as topics that engage city people such as agroecology).

The **last challenge** of the 5th mandate was related to **digitalisation related to e-infrastructures for knowledge exchange**. This chapter investigates how digitalisation supports AKIS and how AKIS supports digitalisation.

Chapter 5 is therefore also dedicated to open access in knowledge reservoirs at national and EU levels and data management of Findable, Accessible, Interoperable and Reusable (FAIR) data, results and outputs of Horizon funded and other projects. This chapter includes a report of the discussions in the SWG SCAR-AKIS meetings on the best practices of management of digital applications and tools, enhancing effective data use and knowledge flows, collecting, and providing inspiration on how well-functioning e-infrastructures and digitalisation can support each other.

During this mandate special attention was also given to **cross fertilisation with the other SCAR SWG groups** on cross cutting issues, in particular SWG SCAR Food Systems and SWG SCAR Agroecology. This is included in Chapter 2.

Overall, this report reflects the work that has been performed over the past four years by the SWG SCAR-AKIS according to the objectives of its 5th mandate, with the main outcomes of the 14 meetings and activities including presentations, workshops, discussions and brainstorming related to the challenges above. The report also files **policy recommendations** for policy makers at **regional, national and EU levels to strengthen AKISs** in the MS and at EU level. To widen the scope, the report also adds some positions of AKIS related Horizon projects on advisory services, the sustainability and impact of thematic networks (TNs), strengthening the enabling environment for multi-actor process facilitation, and a Vision on an EU wide digital knowledge reservoir (annex 8).

Based on the results and conclusions of the 5th mandate, perspectives for **the 6th mandate** are projected, taking into account the recent insights in the new dimensions of the broader AKIS' perspective at EU, national, regional and local levels, and the need for inclusiveness and integration. In the coming years, MS will implement their new CAP Strategic Plan (2023-2027) and AKIS strategies. Therefore the first topic of the 6th mandate will be dedicated to **the implementation of the CAP AKIS plans**, including education and digitalisation strategies for knowledge exchange such as the building of open access knowledge reservoirs. Within this topic exchanges on MS' experiences, best practices and bottlenecks will be focused on. A second topic is related **to enlarging the EU AKIS concept to the widening countries and beyond**. Collaboration with, amongst others, Western Balkans countries, and international organisations such as FAO and OECD will be further encouraged. The third topic is **on the resilience of AKIS and the ability of the AKIS system to continuously respond to challenges and adapt** on the short term, (such as pandemic and a destabilising geopolitical situation) and on the long term in the frame of global sustainability challenges such a climate change, biodiversity, and food security. Amongst others, the enabling environment to create capacity and flexibility is key in building AKIS resilience. To realise this, **R&I priorities** to strengthen AKIS under EU (i.e., Horizon Europe and beyond) and national R&I programmes will be discussed. Besides, rural innovation also plays an important role and more synergy between policies, such as the Rural Vision[1], SMART Villages[2], LEADER[3], the Smart Specialisation Strategy (RIS3)[4] etc. is needed. This will be looked at from the AKIS, CAP and EIP-AGRI perspective, in the fourth topic, which is **AKIS for rural innovation**. As for the 5th topic, the sixth mandate will continue the work on the **multi-actor approach as the basis for co-innovation processes**. Learning from AKIS related Horizon Europe and national projects to better engage multiple actors and how to involve user groups, remains an important point of attention to contribute to create a well-functioning AKISs and spur innovation in agriculture and forestry.

[1] Home (europa.eu)
[2] European Smart Villages Forum – bringing rural areas into the 21st century (smart-villages.info)
[3] LEADER: A European programme serving rural areas (europa.eu)

[4] Smart Specialisation (europa.eu)

1. AKIS policies creating further synergies at EU and national levels

1.1 The broader perspective of AKIS

Elena Feo (Euromontana), Eelke Wielinga (Link Consult), Sylvia Burssens (Ghent University) and Inge Van Oost (DG AGRI)

The origin of the Agricultural Knowledge and Innovation System (AKIS) concept goes back a long way. It is rooted in the systemic AKS concept, and agricultural and extension services (EAS) in the early 1960's. The farming system concept from an advisor point of view was later on defined as *Agricultural Knowledge Systems* (AKS) (Swanson 1997). The term AKIS firstly emerged as 'Agricultural Knowledge and Information Systems' in the 1970's in policy discourses of international organisations such as the Food and Agriculture Organisation of the United Nations (FAO) and the Organisation for Economic Cooperation and Development (OECD). The "I" of Information was added (Röling, 1988) to stress the importance of the dissemination factor. The *Agricultural Knowledge and Information System* was defined as '*A set of agricultural organisations and/or persons, and the links and interactions between them, engaged in such processes as the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilisation of knowledge and information, with the purpose of a synergistic work to support decision making, problem-solving and innovation in a given country's agriculture or domain thereof*'.

Since then, agricultural innovation moved further away from a linear way of thinking, reflecting the Transfer of Technology model (ToT), towards a co-innovation model in which a dynamic network of actors is exchanging complementary expertise and sharing knowledge towards innovative solutions. **The current definition of AKIS** as in the CAP Strategic Plan regulation refers to this (co)-innovation ecosystem in which flows of knowledge are constantly in motion:

What are Agricultural Knowledge and Innovation Systems and what do they cover?

Agricultural Knowledge and Innovation Systems (AKIS) include all people and organisations (farmers, foresters, farmers' and foresters' organisations and cooperatives, advisors, researchers, businesses, NGOs, etc.) that generate, share and use knowledge and innovation for agriculture and interrelated fields[5]. AKIS thus relates to agriculture as well as to rural areas, value chains, environment, climate, biodiversity, landscapes, society, consumers, and much more.

In the co-innovation process, all types of actors and their expertise are considered to be of added and equal value. Practitioners, farmers and/or foresters, are considered as collaborative partners contributing with tacit knowledge and expertise gained on the field. All knowledge providers are potentially knowledge users and vice versa. The farmers and foresters (or potentially other users[6] of results such as researchers, aquaculture producers, fishermen / fishermen's groups and associations, rural dwellers, advisors, food, bioeconomy, rural and other businesses, consumer associations, local communities, citizens, civil society organisations including NGOs, government representatives, etc.) are now in the centre of the integrated AKIS to support modernisation , innovation and the transition to sustainable agriculture (*Fig.1*).

To create an effective AKIS the enabling environment is recognised as the fuel of the process. In a stimulating environment, farmers can interact and share knowledge in informal networks of peers, advisors, or by participating in multi-actor[7] projects. Recent research focused on this new and complementary understanding of the dynamics in AKIS starting from farmers' perspective, calling it the concept of "MicroAKIS". MicroAKIS was referred to as "the knowledge system that farmers personally assemble, including the range of individuals and organisations from whom they seek services and exchange knowledge" (Sutherland and Labarthe, 2022).

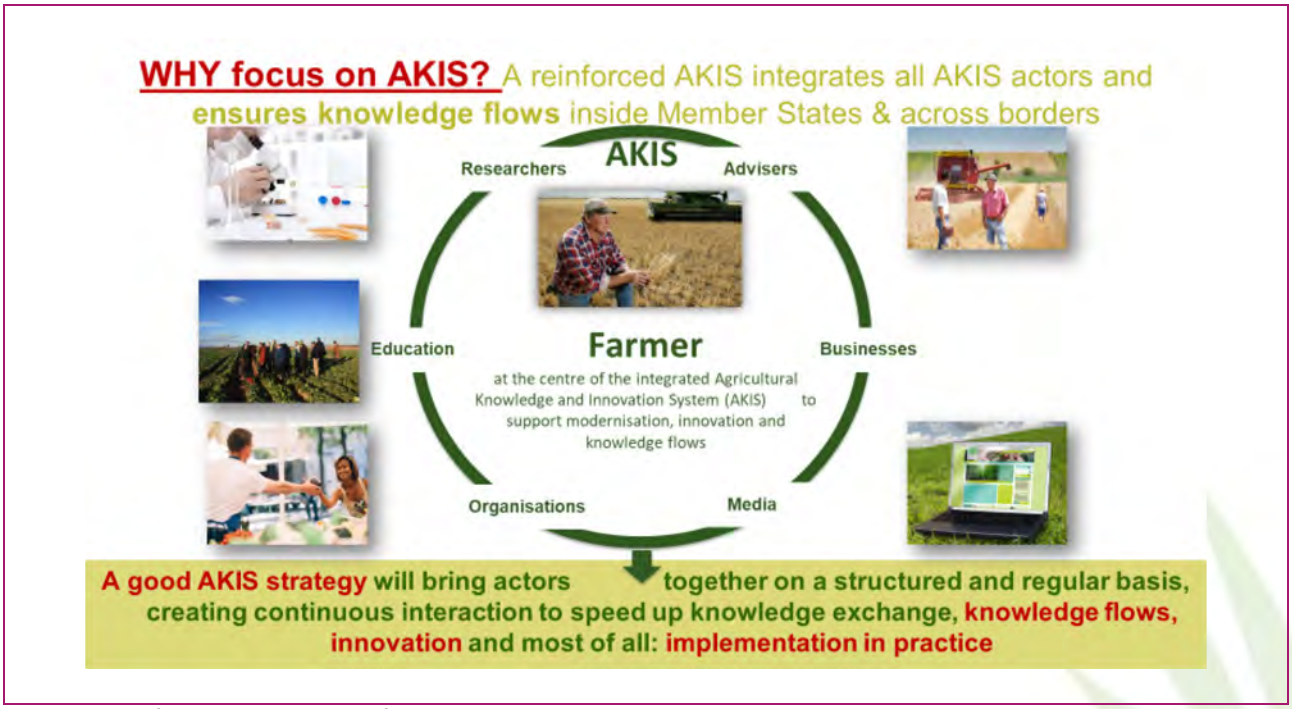


Figure 1: The farmer at the centre of the Agricultural Knowledge and Innovation System (AKIS) in between other key actors: researchers, advisors, businesses, educators, journalists and representatives of organisations (source: Inge Van Oost)

[5] Regulation 2021/2115, Art. 3k: definition of AKIS
[6] A user is a person who puts the knowledge or results of projects into practice
[7] See Horizon Europe Work Programme 2023-2024 for the requirements for the multi-actor approach of projects

The enabling environment is not only key at the level of an individual person, organisation or institution, but also at the levels of local, national and/or regional policies which facilitate the access of AKIS actors to networks, knowledge and information, and stimulate interaction between different actors and peers with a view to co-creating innovation[8]. For example, the full provision of competent and capable advisors can only be achieved by stimulating continuous learning and supporting advisors in attending seminars, training, and cross-visits, and by maintaining a broad network, in which the advisors can operate (I2connect 2020; Knierim et al. 2020). Therefore, the CAP regulation for the 2023-2027 period overhauls the Farm Advisory System approach from the former CAP. The new CAP advisory approach is based on the policy recommendations of the SWG SCAR AKIS in its 4th mandate and obliges MS to improve the functioning of their AKIS and to integrate all advisors, public as well as private, in the AKIS.

1.2 Achievements and recent developments within the EIP-AGRI

Inge Van Oost (DG AGRI) and Sylvia Burssens (Ghent University)

1.2.1 Innovation and well-functioning AKISs are key enablers for sustainable agriculture

The two strategic documents for the future of Europe, the European Green Deal and the From Farm to Fork Strategy, recognise the important role of knowledge and innovation systems in accelerating change towards food sustainability. Researchers and advisors, together with the other actors of the AKIS, have the mandate to cooperate more closely to support all on this transition path. This includes stronger and more structured networking, increased information sharing and using digital tools to this effect. A systemic and interactive approach in the CAP strategic plans 2023-2027 aims to increase AKIS effectiveness, starting from what has already been achieved in the European programming period 2014-2020[9].

European farmers need to **find innovative solutions** for current and future challenges to ensure their businesses **sustainability**, increase its **competitiveness** and **resilience,** and to deliver on key **policy priorities** such as the European Green Deal and its strategies, in particular the Farm to Fork, the Biodiversity and the Soil strategies and the Climate Action.
Knowledge sharing is a key element of the innovation process, where farmers, farm advisors, innovators, researchers and other actors are connected in **innovation ecosystems** to spur innovations (all types of innovation, technological and social or organisational innovations) that will make farming more sustainable, resilient, competitive and productive.

In this context of supporting **innovation in the agriculture and forestry** sectors and in **rural communities** and to **better connect research and practice**, the EC launched in 2012 the **European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI**).

The EIP-AGRI strengthens the EU AKIS through **enforcing the use of the interactive innovation model[10] in both the CAP and Horizon funding.** This model is based on ensuring co-creation along the interactive innovation projects by partners with complementary knowledge (from practice and science/other expertise). This brings along greater motivation of practitioners to use the outcomes as they are more applicable and ready for practice. The model also strengthens the focus on concrete end-user needs, to speed up application and impact of the project outcomes. The interactive innovation model applies the AKIS principles from the Standing Committee of Agricultural Research (SCAR): *'In a well-functioning AKIS, innovation actors regularly and intensively connect, take care of the training, advice, and peer-to-peer learning as well as support innovation projects and effective dissemination. All this should build and promote a good innovation ecosystem in the MS and regions, thus supporting knowledge exchange and co-creation of innovation supporting farmers'/foresters' needs.'* (SCAR, 2012).

[8] Interactive innovation model: Regulation 2021/2115 Article 127(3)
[9] Italian Review of Agricultural Economics, vol 75, n°3, 2020, Inge Van Oost and Anna Vagnozzi
[10] The basics of the Interactive innovation model are set out in Article 127(3) of R.2021/2115 and in the requirements for the multi-actor approach (see section 2.1)

1.2.2 The EIP-AGRI promoting interactive innovation

The **EIP-AGRI** fosters innovation for competitive and sustainable farming and forestry in the EU. It brings people with different experience and knowledge (farmers, foresters, advisers, researchers, businesses and others) together in EIP projects focusing on end-users' needs **to co-create and test innovative solutions** ready for practice. For example: the more efficient management of natural resources, the sustainable control of pests and diseases, the smart use of waste and by-products, and alike.

Both the CAP, through rural development programmes (RDP) and CAP Strategic Plans (CSPs), and the EU research and innovation policy (Horizon) are instrumental for the EIP, be it through providing project funds or by connecting and networking actors. Rural development in particular supports **Operational Group** (OG) **projects**, within a country or a region. Rural development funding also supports so-called Innovation Support Services to connect potential project partners and help them develop an initial idea into a fully-fledged innovation project. Horizon funds **multi-actor projects** (MAPs) and **thematic networks** (TNs) that involve partners from at least three EU countries. The CAP also provides funding for networking at EU and national levels which have a focus on knowledge exchange and innovation/EIP-AGRI**.** Together with the OG and multi-actor projects, **CAP networking activities** are key tools to bridge between these two policies, connect research with practice and help disseminate project results to increase their impact across Europe.

1.2.3 The first seven years of EIP-AGRI: main achievements

Although a novelty, **the uptake of the EIP-AGRI in rural development programmes 2014-2020** was impressive, especially if compared to the very low uptake of the other CAP measures supporting innovation, knowledge and advice. 27 of 28 Member States[11] provided support for the preparation and implementation of OG projects in the 2014-2022 period. Since 2014, regular calls for projects across the EU have given rise to **more than 3200 OG** projects[12], and more are expected to see the light until the formal closure of the current programmes in 2025. On the research policy side, an overall investment of almost 2 billion EUR through the Horizon Programme in the 2014-2020 period resulted in over **200 multi-actor projects**, including **34 transnational thematic networks** (TNs) adding up to an increasing EU amount of knowledge "ready for practice" (EIP-AGRI 2016; EIP-AGRI 2020; Van Oost 2021)**.**

Figure 2: Increasing volume of innovative practice-oriented knowledge from EIP-AGRI CAP and Horizon funded projects (source: Inge Van Oost)

[11] Of the 28 MS in 2014 (UK still included) , only Luxembourg did not foresee funding for Operational Groups

[12] The overall number of OG projects planned by MS in their 2014-2020 programmes. Thanks to the prolongation of the CAP regulation 2014-2020 until 2022, these programmes will be supporting OG projects until the end 2025 at the latest, which will increase the total number of OGs even more.

OGs, MAPs, and TNs cover agricultural, forestry and rural areas sectoral topics but also related cross-cutting issues such as **short food supply chains; bioeconomy; digital and data technologies; reduction of water, pesticide and antimicrobials use; generational renewal; farmers' health and welfare; social innovation**, and much more. They bring together researchers, innovators, and users together to work together from the conception of the innovation project to its finalisation and implementation. In this way, projects are user-centred and increase the uptake of the project results by practice. Those projects also deliver so called '**practice abstracts**', concise summaries (including contact details of the project partners) which are published on the EIP-AGRI website[13] and facilitate knowledge flows on all innovative and practice-oriented EIP projects from the start till the end of the project.

In the 7 years from 2014-2020, the EU level EIP-AGRI Network has helped to bring such results into fruition[14]. For example, by organising over **40 live workshops and seminars** to connect projects, farmers, advisers, researchers, exchanging on innovative practices, and fostering capacity building – including for administrations. Or by eliciting farmers' needs to be taken up by research, notably through **49 EIP Focus Groups** (FGs) on key aspects of the farming and forestry systems. EIP-AGRI FGs are temporary multi-actor groups of selected experts focusing, sharing knowledge and expertise on a specific subject. In short, expert groups take stock of the state of play of practice, listing problems and opportunities, and of research, summarising potential solutions. Based on the needs of the sector, they identify future directions for research and highlight priorities for innovative actions by suggesting potential practical formats to test solutions and opportunities, including **ways to disseminate the practical knowledge** gathered (Innovation & knowledge exchange | EIP-AGRI | European CAP Network (europa.eu)[15]. Overall, the network mobilised more than 6400 experts and stakeholders from Europe and beyond through workshops, seminars and brokerage events. In addition, sustained communication and dissemination efforts via the **EIP-AGRI website, social media**, and **tailor-made publications** – factsheets, press articles, newsletters, magazines – for practitioners, innovators, farmers and researchers and other actors in the innovation ecosystem, have increased knowledge sharing and built an impressive online EIP community[16].

With hindsight, three key aspects lie behind this **success story of the EIP-AGRI**:

The right focus. Farmers and foresters are at the centre of the EIP's 'interactive innovation model'[17]. This ensures that innovations fit their needs, and that farmers are more motivated to swiftly implement them in their own context. The neighbours too can see the benefit, so eventually they adopt the same solutions. Farmers and their organisations are the most represented type of partners in OG projects, and are actually in the project lead in 10-20% of the cases[18].

The right tools. A complementary and coordinated set of policy tools, underpinning financial resources (from the CAP and Horizon) and accompanying measures such as dedicated EU and national networks, have created the necessary conditions to ensure a swift uptake and long-term sustainability. The EIP-AGRI is the only EIP out of five[19] that operates across two consecutive policy cycles and is still active.

The right governance. One single Directorate General, DG AGRI, manages both the EIP-AGRI and the agricultural research projects. With the help of an external contractor[20] and stakeholders' representatives in the SCAR[21] AKIS Strategic Working Group and in the Subgroup of Innovation[22], it contributes to 'break silos' and foster synergies between two of the most important EU policies.

[13] As from 2023, on the single EU CAP network website
[14] See also the report 2014-2020: EIP-AGRI: 7 years of innovation in agriculture and forestry
[15] https://eu-cap-network.ec.europa.eu/support/innovation-knowledge-exchange-eip-agri_en
[16] July 2020: over 6200 subscribers to the EIP newsletter, 6700 followers on Twitter and 2300 on LinkedIn, over 5400 registered website users.
[17] The interactive innovation model is the trademark of the EIP-AGRI. It means that people with different expertise and knowledge co-create all along the road from the problem definition to the final application in the field.
[18] As highlighted by the 'EIP-AGRI Operational Groups assessment report 2018', and confirmed by OG available data at January 2021.
[19] Under the Europe2020 Innovation Union flagship initiative of the Commission Communication in 2010, initially 5 EIPs were established.
[20] "The EIP-AGRI Service Point"
[21] SCAR: Standing Committee on Agricultural Research
[22] A permanent group of representatives from national and EU authorities and organisations supporting the work of the EIP-AGRI.

1.2.4 Current and future challenges

However, all the achievements are still not sufficient to turn current challenges into future opportunities. Therefore, the CAP post 2020 will ensure continuity with the past, and further work to set the right framework is necessary.

With **over 60% of OGs working on innovative solutions to pressing environmental and climate challenges**, the EIP-AGRI was already contributing to making the CAP a key instrument to deliver on the European Green Deal objectives even before it was set up. To be up to the future challenges, a systemic approach is needed to ensure that knowledge circulates widely, and is channelled to those who need it, and effectively used.

Investment in AKIS strategies and interventions

Support and promotion of knowledge exchange events, targeted training and advice, innovation support services capturing grassroots innovative ideas and dedicated innovation networking are equally important tools that need to work in synergy with the EIP-AGRI to build effective AKIS.
For the future, it will be essential to remove possible administrative barriers (for instance using more simplified cost options) and prompt **MS to make the best use of these tools in their CAP strategic plans, breaking away from the path of under-investment**[23] . This has been consistently flagged in the Commission recommendations to MS as regards their CAP strategic plans, and calls for appropriate follow up of the plans' development and implementation.

[23] The Evaluation support study on the "CAP's impact on knowledge exchange and advisory services" , see summary in Annex 3. (https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cmef/research-innovation-and-technology/evaluation-caps-impact-knowledge-exchange-and-advisory-activities_en) reports a decrease in 2014-2020 planned RDP budget for the knowledge exchange and advice measures of 13% and 20% respectively in comparison with 2007-2013. Data referring to June 2020 show a very slow execution rate of the two measures so far, respectively only 31% and 19% of the planned budget was spent at that moment (note that the spending period is still running until end 2025).

Finally, an adequate monitoring framework, against which targeted evaluation activities can be carried out, should be seriously considered at all levels[24].

The **EIP-AGRI** will **continue to support knowledge sharing and local innovation projects**, and will encourage the **establishment of OGs**, intended to bring together complementary actors such as farmers, researchers, advisers, businesses, environmental groups, consumer interest groups or other NGOs to advance innovation in the agricultural and forestry sectors.

MAPs should also link OGs in their fields to the extent possible. In the current Horizon Europe programme (2021-2027), it is strongly encouraged that TNs are built on and with OGs. In this way, yearly calls for cross-border interaction and exchange at EU level between the different OGs is stimulated: TNs are closely connected to practice through a better involvement of farmers/foresters and advisors. Annual calls for Horizon EU advisory networks will connect advisors across the EU for knowledge sharing of best practices and innovation on specific themes such as reduction of pesticide and fertilisers use, sustainable livestock systems, etc.

1.3 Strengthening AKIS under Horizon Europe

Natalia Brzezina and Ana-Patricia Lopèz Blanco (DG AGRI)

There are several **sustainability challenges** related to environmental, climate, social and economic aspects. In 2019, the EU launched the **European Green Deal**[25], which is the EU green growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy where economic growth is decoupled from resource use. In this framework, the Commission adopted, among others, **the Farm-to-Fork strategy**[26], the **Biodiversity strategy**[27], the new **Forestry strategy**[28], the **Soil strategy**[29], the proposal for a **Climate Law**[30] as well as the new action plan for the **Circular Economy**[31]. All these strategies tackle diverse issues relevant to agriculture, forestry and rural areas. The Commission works with the MS and **all the actors in the AKIS**, to ensure that from the outset the national strategic plans for agriculture fully reflect the ambition of the relevant European Green Deal strategies.

R&I are key enablers for implementing the priorities of the Green Deal and thereby accelerating the transition to sustainable development**.** Horizon Europe is the key EU funding programme for R&I with a total budget of 95,5 billion EUR to address sustainability challenges, to achieve the UN's Sustainable Development Goals and to boost the EU's competitiveness and growth. The **Horizon Europe Strategic Plan (2021-2024)** supports the European Green Deal priorities. In particular, the Cluster 6 focuses on achieving six expected impacts that are in line with the European Green Deal: 1) climate adaptation and mitigation, 2) protection and restoration of biodiversity, 3) circular and bioeconomy 4) sustainable food systems from farm to fork, 5) sustainable development of rural, coastal and urban communities, and 6) innovative governance enabling sustainability. To achieve the impacts, in 2021-2027, the EU will invest around **EUR 9 billion** under Horizon Europe Cluster 6 into R&I activities related to food, bioeconomy, agriculture and environment, with nearly half of the topics requesting a **multi-actor approach.**

In addition to R&I projects that develop new knowledge and innovative solutions, it is essential also to support sharing of knowledge and innovative solutions. It is important to scale them out and up, and maximise their impact on the ground. Therefore, strengthening AKIS under Horizon Europe, is key to support the implementation of the CAP cross-cutting objective and to contribute to the European Green Deal, thereby accelerating the transition to sustainability. Operationally, the sixth impact of the Cluster 6 in the Strategic Plan 2021-2024 corresponds to the

[24] Guidelines on 'Evaluating the AKIS Strategic approach in CAP Strategic Plans': https://eu-cap-network.ec.europa.eu/publications/guidelines-evaluating-akis-strategic-approach-cap-strategic-plans_en
[25] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
[26] https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en
[27] https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en
[28] https://environment.ec.europa.eu/strategy/forest-strategy_en
[29] https://environment.ec.europa.eu/topics/soil-and-land/soil-strategy_en
[30] https://climate.ec.europa.eu/eu-action/european-green-deal/european-climate-law_en
[31] https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

destination in the Horizon Europe Cluster 6 Work Programmes that concerns "*Innovative governance, environmental observations and digital solutions in support of the Green Deal*" and includes **topics that aim to strengthen AKIS**.

A new types of AKIS supporting networks in Horizon Europe

In addition to topics that support different AKIS elements, such as all multi-actor projects and projects on innovation support services, AKIS coordination bodies, the EU knowledge reservoir for practice, there are the classical bottom-up thematic networks (TNs) as in the 2014-2020 Horizon 2020 period. Moreover, new types of networks have been added in the Horizon Europe, such as the EU wide **advisory networks** as well as **thematic networks with predefined themes** and **thematic networks based on EIP-AGRI OGs.**

Figure 3 Horizon Europe Cluster 6 supporting EU wide knowledge flows in a horizontal and vertical way (source: Natalia Brzezina, 2023 EU AgriResearch Conference, session on "Bridging the gap between R&I and practice: tools and skills for today's and future generations")

The first Work Programme 2021-2022 resulted in the following projects that support effective functioning of AKIS in diverse ways: PREMIERE focusing on preparing successful multi-actor projects, EU-FarmBook building an EU knowledge reservoir, ModernAKIS contributing to the effective organisation of AKIS, ATTRACTISS helping development of innovation support services, two advisory networks improving consumer-producer cooperation, i.e., COREnet and EU4Advice; four thematic networks focusing on sharing across borders the results of EIP-AGRI OGs, i.e., CLIMED-FRUIT , Oper8, GOFORESTS, NUTRI-KNOW and seven classical thematic networks, i.e., B-THENET, BROILERNET, Grazing4AgroEcology, AF4EU, EUNetHorse, NUTRICHECK-NET, ResAlliance. The Work Programme 2023-2024 includes topics that will broaden the portfolio of Thematic and advisory networks (see Fig 3).

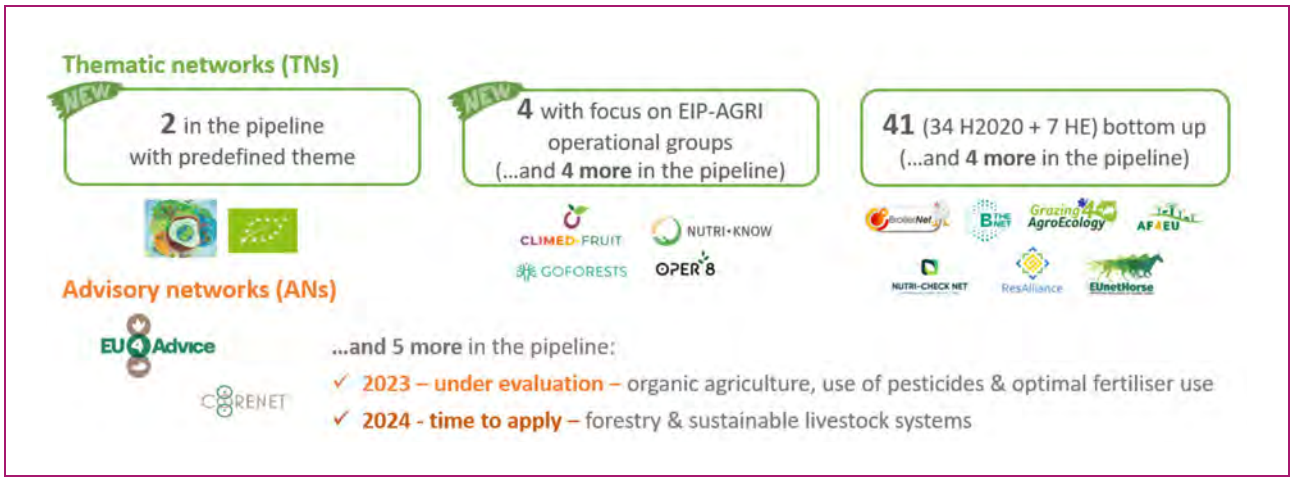


Figure 4: Horizon Europe Cluster 6 projects to support EU wide knowledge flows in a horizontal and vertical way (source: Natalia Brzezina, 2023 EU AgriResearch Conference, session on "Bridging the gap between R&I and practice: tools and skills for today's and future generations")

AKIS is also overall reinforced under Horizon Europe by improving the **multi-actor approach (MAA)** that supports the implementation of the **interactive innovation model**. To this end, the definition and requirements of the MAA included in the introduction of the work programme[32] have been revised and simplified. In addition, the scope of the topics outlined the main actors that are required to be involved in the projects. In the evaluation, MAA is not only an excellence criterion, but also the **eligibility criterion.** The multi-actor approach has also been **opened up to all sectors under Cluster 6** including agriculture, forestry and rural areas, food, bioeconomy, environment, fisheries and aquaculture, etc. As a result, in the two consecutive Cluster 6 Work Programmes, **44% of the topics** (worth more than 40% of the budget) require MAA. In total, under Horizon 2020 and Horizon Europe, more than **350 multi-actor projects** have been funded so far.

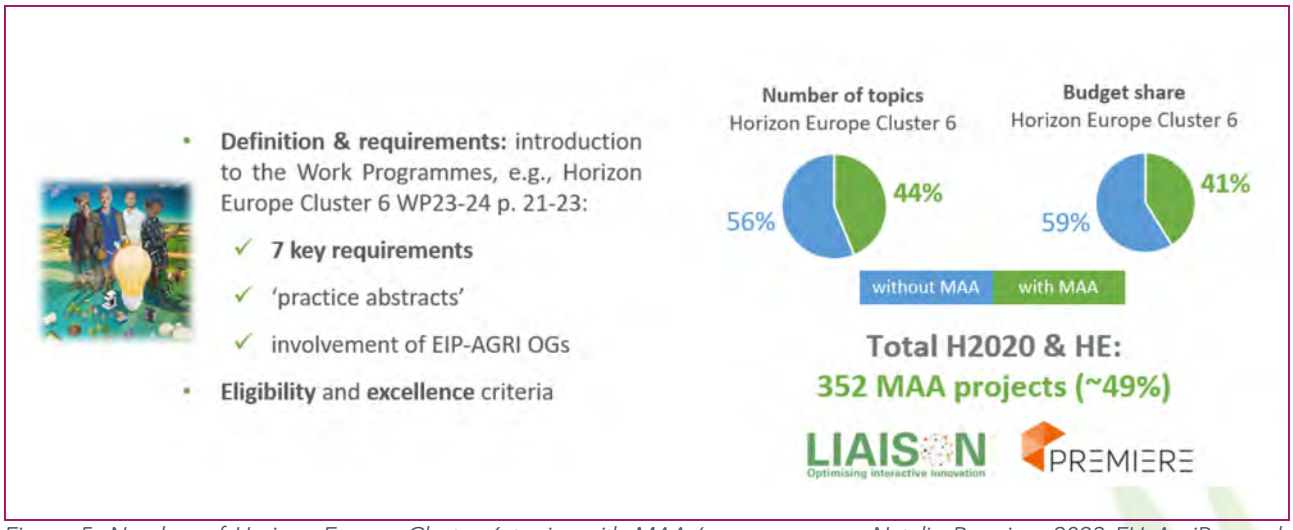


Figure 5: Number of Horizon Europe Cluster 6 topics with MAA (source: source: Natalia Brzezina, 2023 EU AgriResearch Conference, session on "Bridging the gap between R&I and practice: tools and skills for today's and future generations")

AKIS is strengthened also under the Horizon Europe through the **Missions**. In particular, the **Mission 'A Soil Deal for Europe'** that aims to lead the transition towards healthy soils by:

- funding an ambitious **research and innovation programme** with a strong social science component
- putting in place an effective network of **100 living labs and lighthouses** to co-create knowledge, test solutions and demonstrate their value in real-life conditions
- developing a harmonised framework for **soil monitoring** in Europe

[32] Horizon Europe Cluster 6 WP 2023-2024, p. 21-23: wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf (europa.eu)

- raising people's **awareness** on the vital importance of soils.

Living labs are places where to experiment on the ground. Soil health living labs will be partnerships between multiple partners and different actors, like researchers, farmers, foresters, spatial planners, land managers, and citizens who come together to co-create innovations for a jointly agreed objective. Living Labs will be established at territorial, landscape or regional scale, with several experimental sites covered underneath. In a Living Lab, experiments happen in real-life conditions, operating with end-users i.e. commercial farms or forest exploitations, real urban green parks or industrial sites, and other actors such as NGOs or local authorities. This is key to make sure that research and innovation find solutions to societal challenges and challenges that land managers face on the ground.

Lighthouses are single sites, like a farm or a park, where to showcase good practices. These are places for demonstration and peer-to-peer learning. Here good practices are tested or in place and can be showed to inspire other practitioners to move towards sustainable land management. In addition, in lighthouse sites, researchers work together with land managers to ensure that research responds to concrete needs encountered in the field.

AKIS will benefit also from the **Partnerships** under Horizon Europe. They are initiatives bringing together the EU and a wide range of public and/or private partners. Partners jointly support the development and implementation of a common agenda for research and innovation activities. The partnership will coordinate, align, and leverage European and national R&I efforts. Relevant partnerships strengthening AKIS starting in 2023 are the partnerships on agroecology living labs and research infrastructures, agriculture of data, animal health and welfare and sustainable food systems for people, planet, and climate[33].

1.4 The CAP, an important instrument to strengthen AKIS at national and EU levels

Inge Van Oost (DG AGRI), and Sylvia Burssens (Ghent University)

1.4.1 AKIS strategies in the new CAP plan period 2023-2027

The two main funding instruments at the hand of the farmers to take part in the innovation processes are the EU **research and innovation (R&I) Horizon programmes** and **the CAP**.

The new CAP (2023-2027) was built around nine key objectives focused on social, environmental, and economic goals, as a basis for the MS to design CAP strategic plans starting on January 1, 2023. The objectives are to ensure a fair income for farmers, to improve the position of farmers in the food chain, to increase competitiveness, climate change action, environmental care, to preserve landscapes and biodiversity, to support generation renewal; vibrant rural areas, to protect food and health quality, fostering knowledge and innovation (Fig 6).

[33] An overview of European Partnerships in agriculture and food can be found here (https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe/food-bioeconomy-natural-resources-agriculture-and-environment_en) and a short summary in https://scar-europe.org/images/newsletter/SCAR_newsletter_01-June-2022.pdf

Figure 6 The 9 CAP specific objectives focused on social, environmental, and economical goals (COM 2020, SPR R.2021/2115 Article 6(1)), and the Cross-cutting objective supporting all 9 CAP specific objectives (Art 6(2))

The new CAP also has an important role in terms of knowledge and innovation. To contribute to the accomplishment of these objectives, the CAP Strategic Plan Regulation (SPR) provides many new or improved tools for AKIS under the Cross-Cutting Objective (CCO). Many of these elements were based on MSs' discussions and outcomes of the SWG SCAR AKIS in its 4th mandate. MS in their **CAP strategic plans need to scale up support for AKIS** and strengthen knowledge flows using a strategic approach to interlink people and funding sources. These extra resources should be used to develop and maintain **tailored advisory services and effective training, interlinking all AKIS actors** (such as farmers, farm workers, agricultural educators, researchers, non-academic experts, public and independent private advisors, supply chain actors, and other actors in the agricultural and forestry sector) on a regular basis, for sustainable and profitable farms (See annex 1).

Each MS had to deliver a draft CAP Strategic plan by December 2021 and include an organisational set-up of the national AKIS along with an analysis of the Strengths, Weaknesses, Opportunities, and Threats (SWOT) of the agri-food sector (see section 1.7 AKIS strategies in EU MS). All CAP plans were adopted by the Commission by end 2022 and entered into force on 1 January 2023 (for CAP regulatory requirements, see annex 2).

AKIS strategies and AKIS Coordination bodies

The development of a **national AKIS strategy** needs to be a new, transformative, dynamic, and continuous process, taking into account stakeholders, and engaging all key actors. To coordinate and facilitate this process, each MS should set up an **AKIS coordination body and platform as a beacon in the AKIS landscape, acting as a spider in the web of its national AKIS**[34] . It will be the contact point for all AKIS related issues towards the EC. It will cooperate with all AKIS multi-actor platforms across the geographical levels in the country, following day to day AKIS interventions and actions. The coordination body may ask for modification in the CAP plan when needed, while continuously supporting networking, interaction, and implementation of the AKIS plan[35] .

In this way, support can be provided across ministries and institutions in order to set up AKIS measures and new initiatives to strengthen the system and cope with pressing challenges in agriculture and/or forestry. Additionally, an 'innovation strand' of the new **CAP Networks**, both at national and at EU level, will provide the program to expand the existing role of the National Rural Networks (NRNs). The aim is to support the strengthening of the national AKIS and the development of links with the research projects under Horizon Europe and national research and innovation instruments (Van Oost 2021a)**.**

Farmers also have a particular need for **impartial and tailored advice on sustainable management** choices for their businesses. MS' **AKIS,** which are at the heart of the cross-cutting CCO of the CAP on modernisation , are a key driver to enhance co-creation and thus speed up innovation and the uptake of results needed for sustainable farming and hence **contributing to the Green Deal objectives and targets**. Specifically, the targeted interventions in the new CAP are the following: funding for knowledge exchange, advice, and information (Art. 78) and funding for preparing and implementing innovative EIP OG projects (Art. 77 and 127). MS should also provide innovation support for preparing and implementing OG projects, and how to apply the interactive innovation system (Art. 15 and 114).

MS must have impartial farm advisors integrated within the AKIS, **covering all the sustainability fields** with up-to-date knowledge and innovation. Support is provided for knowledge and information events including the use of advice, the training of advisors, the setting up of advisory services, on-farm demonstration, life-long-learning/vocational training, thematic and cross-sectorial knowledge exchange events, etc. The provision for **innovation support for OGs**, from capturing grassroots ideas to development and implementation of innovative projects, is obligatory. CAP networks (Art. 126; former NRNs) will connect existing OGs and interact with Horizon Europe National Contact Points (NCPs). The co-financing for OGs is raised (80% co-financing instead of 43%; Art. 91).

[34] Presentation "AKIS coordination in practice: Fostering an effective and integrated AKIS in Member States", https://eu-cap-network.ec.europa.eu/sites/default/files/2023-06/SEM_AKIS_Pres03_Inge%20Van%20Oost_AKIS%20Coordination%20in%20practice.pdf

[35] see the various MS and project presentations during the EU CAP Network seminar "Fostering an effective and integrated AKIS in Member States" https://eu-cap-network.ec.europa.eu/events/fostering-effective-and-integrated-akis-member-states_en

Advisors to be integrated in the AKIS

In particular, Art.78 aims to reinforce the role of advisors as key intermediaries. Advisors should be integrated in the MS' AKIS (Art 78(2))[36]. They should be regularly trained, in order to make them more competent and knowledgeable on up-to-date knowledge and innovation and able to cover all sustainability domains, economic, environmental and social. It is the task of the AKIS coordination body to organise the advice and advisors according to the new advisory approach in the CAP 2023-2027, offering advice in a transparent way, listing all impartial advisors with their expertise on a public website, such as the one of the Ministry of Agriculture. (Art 15(1). The AKIS Coordination Body should ensure advisory support stays open for all expertise of impartial public and private advisors, in particular the most trusted ones.

Advisors are called to train in order to develop **new skills** (e.g. facilitation of knowledge exchange, learning, giving training, vision building among diverse communities, mediation of conflict situations, network and knowledge brokerage, matching of demand and supply of innovation support services). All these roles may lead to an improved understanding of the farmers' needs, increasing the connection and the exchange of knowledge flows between actors (Klerkx et al. 2012; Sulaiman and Davis 2012; Knierim et al. 2020). Although their role is fundamental to allow farmers to have the overall picture in mind (Labarthe et al. 2013), only 9% of the OGs involved advisors or advisory services (Van Oost 2021b). Hence MS in their strategic CAP plans should reserve a specific focus regarding this matter to strengthen their AKIS (COM 2020d). Moreover, fostering **digitalisation** and linking it with training and education in agriculture is a CAP cross-cutting objective (Art 6(2), Art 114).

1.4.2 Operational Groups: co-creating practice in the field

The success of the EIP-AGRI concept supported by the new CAP is illustrated by the fact that for this upcoming period of 5 years starting in 2023, **MS plan around 6630 OGs** throughout Europe, which triples the yearly number of planned OG projects compared with the former RDP period and illustrates their success. Some MS already used OG projects to prepare for future CAP measures, such as Rural Development agri-environment-climate commitments and Pillar 1 eco-schemes. The co-creation with the future beneficiaries in those OG projects helps effectiveness and future acceptance of the CAP measures and at the same time is an early promotion among peers.

Broadening of the objectives of OG innovative projects

OGs may now cover any bottom-up idea that contributes to one of the nine specific CAP objectives, not only for improving farm profitability and sustainability, but equally covering cross-cutting issues such as short supply chains; bioeconomy; digital farming; reduction of water, pesticide and antimicrobials use; generational renewal; farmers' health and welfare; social innovation, and much more. OGs co-create innovation related to any agricultural, forestry or rural area issue, economic as well as climate/environmental or social issues.

The CAP strategic plan has to mention how advisors, researchers, and CAP networks will join their forces and collaborate within the framework of the AKIS (Art. 114), and how advice and innovation support services will be provided to farmers (Art. 114, Art. 15). It should link the different CAP measures, with OGs, MAPs, and other EIP-AGRI tools to ensure alignment and inclusiveness.

[36] Presentation "Integrating advisors in the AKIS" https://eu-cap-network.ec.europa.eu/sites/default/files/2023-06/SEM_AKIS_Pres10_Inge%20Van%20Oost_Integrating%20advisors%20in%20the%20AKIS.pdf

Back-offices and specialist advisors

Typically, back-offices with specialist advisors, as suggested in the report of the 4th mandate of the SWG SCAR AKIS (chapter 4)[37] , can be supported under the CAP 2023-2027. They are an ideal connection instrument among AKIS actors since they can help innovation support services having captured a grassroots innovative idea to find the right experts and most recent knowledge and innovation on a variety of themes. Hence, they are key to develop targeted and effective OG projects.

Currently, the situation of the existing national and regional AKISs in the EU is fragmented and not sufficiently developed and interconnected within each MS to effectively support interactive innovation (SCAR AKIS 2019). The H2020 project 'i2connect'[38] highlighted that in 2020 the situation in some MS (e.g. Ireland, Austria) is well advanced and has active rural networks which are well-integrated in the national AKIS. This includes comprehensive linkages with OGs and national partners that are active in Horizon 2020 projects. A similar situation is present in Poland, however, the collaboration with EIP still needs to be fostered (EIP-AGRI 2020c). Other MS (e.g. Romania, Greece) have less experience in networking, rather fragmented AKISs, and launching OGs started late in the 2014-2022 period. Nonetheless they show a keen interest in building up capacity for EIP interactive innovation and in exchanging experiences with other countries. Additionally, the i2connect report pointed out that forestry advisors are as important as farming advisors in the AKIS system (Knierim et al. 2020). From the same study, it emerged that forestry advisory service providers are addressed in some countries, although not as comprehensively as agricultural advisory services. Moreover, the forestry sector is even more fragmented than the general AKIS in some MS (e.g. Latvia) (i2connect 2021). Additionally, the EIP-AGRI report highlights several weaknesses that MS AKIS are experiencing and that need to be faced in the CAP strategic plan. The weaknesses represent, for example, the difficulty of identifying farmers' needs, as well as targeting and involving smaller AKIS actors. The lack of young farmers' involvement and young advisors limits the uptake of innovation, the adoption of digital tools, and the transition to sustainability. Currently, there is no overview of how advisors interact between each other nor an advisors' platform to share their ideas and experiences. Recently Horizon Europe projects have been initiated to create thematic advisory networks across Europe in order to better connect and exchange experiences and best practices among OGs (see section 1.3).

1.4.3 Sustainability and impact of thematic networks

Views from the Horizon funded project EURAKNOS (see annex 5)

Modernisation of national strategic CAP plans will require a more efficient collaboration between researchers, advisors, and CAP networks, and stronger integration of digitalisation, and education. To build an inclusive and well-functioning EU AKIS, better connectivity and intensive knowledge sharing are needed. TNs can play an important role in the exchange of information and knowledge between key actors in agricultural and forestry innovation at European, national, and regional levels, and creating synergies. Maintaining the outcomes of TNs within the AKIS beyond the funded project period is the main challenge. As the sustainability and legacy of TNs projects are not guaranteed, the results of TNs may get lost at all levels in a relatively short time, hence losing their impact on agricultural and forestry innovation uptake. Funding schemes should provide **extra financial incentives for farmers and foresters** to participate in meetings, participatory activities, or consultation rounds.

The **six recommendations** below can serve as guidelines for policy makers and funders at national and European levels to improve the form, function, and outputs of TNs and secure their sustainability, legacy, and impact beyond the funded project period. Ultimately, the structure, governance, and financing of TNs should be adapted to enhance the sustainability and impact of TNs and their outcomes.

[37] SWG SCAR AKIS 4th mandate report "Preparing for future AKIS in Europe" p.103-112
https://agriculture.ec.europa.eu/system/files/2019-10/report-preparing-for-future-akis-in-europe_en_0.pdf
[38] https://i2connect-h2020.eu/

Those six criteria and recommendations identified by key actors in the EU and national AKISs indicate that TN projects need greater support from the European Commission, as well as government departments and funding agencies at the national level. TNs and their outputs should also be more intensively used by national, regional, and local governments and aligned to other initiatives and networks to achieve greater sustainability and have a greater impact on agriculture and forestry innovation.

Sustainability of thematic networks and their outputs

Funding schemes should be clear, and simple, allowing **TNs to be flexible and responsive to challenges** that present themselves or develop over the project's lifetime.

Funding and intermediary agencies should develop and promote **standardised dissemination formats which appeal to different TN target groups** (farmers, foresters, advisors, and educators in different agricultural and forestry sectors).

National or regional and local governments should facilitate and financially support the **mapping of local (user) networks and the main information sources for farmers and foresters**.

Funding schemes should stimulate **connection to (digital) training and education initiatives** for sustainable agriculture and forestry.

National and/or regional government departments should support the sustainability of **TN outputs by integrating these into a national and/or regional open-access knowledge platform** and by promoting the creation and maintenance of a common EU-wide agricultural knowledge platform according to the Findable Accessible Interoperable Reusable (**FAIR**) principles.

TNs, be it at the EU, national or regional level, are a key instrument to improve MS' AKIS, as part of their CAP AKIS strategy. To ensure sustainability TNs should make better use of national and other local networks to maximise the engagement of key AKIS actors in participatory activities related to specific thematic fields on the one hand and to maximise the dissemination and exploitation of outcomes on the other. Through the implementation of these recommendations, TN projects will also respond better to the needs of farmers and foresters, enhance uptake of results by a wider community of users over a longer timeframe, and be more sustainable, ultimately accelerating innovation in agriculture and forestry. Funding programmes and frameworks should be adapted to facilitate interaction between different actors and local (user) networks to better address user needs and stimulate the adaptation of new knowledge, innovative solutions, and best practices in support of the AKIS. This would ultimately make TNs more efficient and impactful at regional, national, and European levels. To achieve this, policy makers and decision-makers at all levels (EU, national, regional, and local) should adapt the project structure and funding requirements for calls to improve the interaction between different actors and networks. The budget should be diverted from a variety of project websites, which are often not sufficiently known, to a common standardised and interoperable digital platform that connects to multiple actors, including educational institutions. An enabling environment, supporting the digital AKIS and facilitating synergy, will make TNs more efficient, sustainable, and impactful, improving the information flow and sharing of knowledge between key actors in the AKIS at European and national levels.

1.5 Roadmap to levelling up the EIP-AGRI – a common framework for functional capacity development across EU member states

Views from the Horizon 2020 funded project LIAISON (see annex 6)

Significant advances have been made – and many successes achieved - with the implementation of the EIP-AGRI in the 2014-2020 programming period. It is anticipated that these advances and successes will increase with the support of the strategic AKIS approach and regulatory adjustments of the new CAP, and the increased funding for the multi-actor project approach in HE. However, if the full potential of the EIP-AGRI is to be realised, weaknesses in its implementation still need to be targeted with specific policy interventions.

Towards an EIP-AGRI common framework for Capacity Development

Capacity Development is a multi-dimensional and multi-actor process that goes well beyond the direct transfer of knowledge and skills at the individual level. Instead, it encompasses organisational and institutional dimensions. Capacity Development builds on the existing knowledge and skills to drive a dynamic and flexible process of change. One of the key conclusions of the LIAISON empirical work was that the future implementation of the EIP-AGRI concept would benefit from the introduction of a Capacity Development Framework, which will focus specifically on the development of actors' functional capacity. For that reason, **LIAISON teams recommend developing and including Capacity Development as a core policy concept for the implementation of the Post-2020 CAP.** Hence, Capacity Development would be seen as a policy objective for the Commission and other bodies promoting interactive innovation, and as a goal for those, which are interested in stimulating the engagement of farmers, forester, advisors, researchers, and other relevant actors to speed up innovation.

The proposed EIP-AGRI Common Framework (CF) for multi-level CD represents an innovative approach to strengthening the capacity of actors and the enabling environment. Due to the large diversity across and within MS, no blueprint or one-size-fits-all recipe can be applied for CD. **The draft CF for CD, designed by LIAISON teams, can be further developed into a dynamic and flexible vehicle for structuring and organising CD for implementation of the MAA across MS**.

Already, the current draft version aims to provide a structure for bringing CD issues to national level but also ensuring a coherent approach for CD across the EU. The LIAISON CF wants to lay a common ground for assessing MS innovation 'readiness' capacity and a common CD language across the implementation of the EIP-AGRI. MS own and manage their CD processes and will ensure that the design and sequencing of CD activities will fit the countries' CD needs and circumstances, as well as national level CAP implementation plans.

Capacity Development definitions

Capacity development can be defined in different ways. A commonly used definition is the definition of the Organisation for Economic Co-operation Development's Development Assistance Committee6
Capacity as the ability of people, organisations and society as a whole to manage their affairs successfully.
Capacity Development the process whereby people, organisations and society unlock, strengthen, create, adapt, and maintain capacity over time, in order to achieve result.
Capacity Development versus **Capacity Building**
While 'capacity-building' suggests building something new from the ground up, according to a pre-imposed design, 'capacity development' is believed to better express an approach that builds on existing skills and knowledge, driving a dynamic and flexible process of change, borne by local actors
Both terms are still widely used and often used interchangeable in various EU policy documents.[39]

[39] Views from the Horizon 2020 funded project LIAISON (see annex 6)

Capacity development as a core policy concept

LIAISON teams recommend **to develop and include Capacity Development as a core policy concept for the implementation of the Post-2020 CAP**

The proposed EIP-AGRI Common Framework for CD consists of five core elements:

- A focus on **functional CD** across the implementation of the EIP-AGRI, on
- three (3) **CD levels, micro, meso and macro**, for multi-level CD, through
- five (5) CD principles to speed up interactive innovation, by
- **adoption, adaptation and expansion of existing CD support mechanisms** within and outside the **rural policy domain**, based on
- a self-assessment tool for functional capacity, which MS will use to develop their need-based CD activities.

1.6 Assessment of AKIS

Views from Simona Cristiano (CREA), Patrizia Proietti (CREA), Andrea Knierim (UHOH)

AKIS is an acronym for a concept that has proven to be useful to support stakeholders in the analysis of knowledge infrastructures, network building and innovation processes and to promote national and regional cooperation for enhancing progress in the green sector. Still, its popularity is quite recent, and what makes its application challenging are the many ways of understanding and using the concept (Klerkx et al. 2012; EU SCAR 2012; Knierim et al 2015, Sutherland et al. 2023). Given the broad political attention that knowledge and innovation support has gained (EU 2021), it is evident that questions arise on the effective set-up and functioning of structures and instruments, on the performance of communication and information services in terms of reaching the intended users and targets, and on their impact for a more sustainable and resilient agriculture.

Thus, the assessment of AKIS in the new CAP requires particular attention and should be based on several criteria and be done at several levels including the mapping of its actors, their functions, interrelations and networking, and the enabling environment.

The major aim of such an assessment is to facilitate the enabling environment for capacity building and install coordination and structural mechanisms to enhance the effectiveness of AKIS and its strategic interventions at several levels.

Some tools and methodologies are already available and a framework for the AKIS assessment currently being developed through the HE ModernAKIS project.

1.6.1 AKIS assessment framework

In the context of CAP 2023-2027 programming, the conceptualisation of AKIS takes on a political perspective aimed at establishing an enabling environment for the modernisation of agriculture and rural areas (EU, 2021). **AKIS becomes a strategic mainstream element of the CAP** and this makes financial resources and a set of targeted interventions available to support the AKIS and their functioning in MS: support to increasing innovative and entrepreneurial capacities, knowledge exchange and networking, access to qualitative and impartial advisory and innovation support services, multi-actor and interactive innovation projects and directing research toward end-users needs.

All of this is certainly challenging since the level of awareness of the actors about AKISs and their own positioning within them, the systemic thinking, and the governance capacities, for example related to defining appropriate strategies for strengthening AKISs, are still limited in Europe, even if approaches in the CAP Strategic Plan look promising (EC, 2022; Aparicio Montero, et al., 2019).Overall, for the CAP 2023-2027, there is a new approach for **monitoring and evaluation frameworks focusing on measuring results ("the new delivery model")**, arrangements and tools applied on a continuous basis to collect baseline information on the AKIS across the EU.

In this context, evaluation frameworks are to be defined to help timely capturing and providing expert knowledge on the state of art of the AKIS' components in MSs and changes occurring during the programming period, on the potential of CAP strategic approaches for reinforcing the AKIS and the approaches' effectiveness to bring about changes at local and sectoral levels, and also for the AKIS approach chosen to support the achievement of CAP objectives and to create innovation ecosystems.

In fact, over the last forty years, we observe a somewhat parallel evolution of the concept and studies on AKIS and on AIS (agricultural innovation systems). In the course of the decades, several perspectives have been developed to use such system concepts, which certainly can be used as complementary ones to provide insights and dimensions for defining an exhaustive and tailored evaluative framework that well fits the AKIS and their strategies within the CAP (Klerkx et al., 2012; FAO, 2022; Toillier et al., 2018). In the following, we present three different perspectives.

(i) **The structural-oriented approach** reflects a static **perspective** that looks at the structural components of a specific AKIS (corporate actors, infrastructures and institutions/rules/regulations) at a given moment and place/sector/**dimension**, through their mapping and analysis of the roles they play within the system. This perspective includes understanding the agent-structure that configures a

specific AKIS, in terms of embeddedness/integration/quality of the components, of holes and ties between them and it allows assessing the extent to which there is an enabling environment for a creative recombination of knowledge towards innovation (Sorensen, 2011; Knierim et al., 2015; Klerkx, Aarts and Leeuwis, 2010; Hall et al., 2006; Wieczorek and Hekkert, 2012; Hermans et al. 2015).

(ii) The functionality**-oriented perspective** looks at the performance of the AKIS by means of a set of key features that, regardless of actors, are considered "engines of innovations" since their degree of interaction determines or hinders changes: knowledge development and diffusion, entrepreneurship, experimentation and innovation take-up, guidance of research and prioritisation based on innovation system vision, market formation, creation of legitimacy and expectations towards innovations, and resource mobilisation to support innovations (Hekkert et al., 2007; Bergek, 2012; Verburg et al., 2022; Wieczorek and Hekkert, 2012; Musiolik et al., 2012; Lampidropolu et al., 2012).

(iii) The third perspective is **process-oriented,** and it focuses on innovation dynamics within the AKIS, as co-evolutionary processes of interactive development of technology, practices, markets and institutions that lead to complexity-aware and adaptive "systems in making" (Douthwaite, 2003; 2017a; 2017b; Toillier A. et al., 2018). The process or procedural perspective puts a focus on cooperation and 'knowledge flows' between the different actors e.g. in a network or an operational group, along a value chain and across various professional organisations etc. It therefore implies the possibility to illustrate effectiveness, intensity and dynamics of all kinds of knowledge and innovation services (Moschitz et al. 2015; Ingram 2015);

An additional element brought forward is the microAKIS (Sutherland and Labarthe, 2022). The idea is to start from the farmers' perspective to understand changes in AKIS at broader scales (Sutherland et al. 2023). In line with pioneer research on sectoral systems of innovation (Marlerba, 2002), the idea is that changing the scales of analysis, zooming in and zooming out, can help to better understand transformation in knowledge and innovation systems. Hence, starting from a micro-level perspective can help assess some hidden or gradual changes in the systems, as well as better incorporating the diversity of farm structures and profiles in AKIS evaluation.

The **Capacity Development**-oriented perspective looks at individual, organisational, and inter-organisational capacities within the AKIS that enable transformative pathways of system change: 1. Capacity to navigate complexity based on system understanding; 2. Capacity to collaborate, including diversity/conflicts and complementarities management; 3. Capacity to reflect and learn towards action and change; 4. Capacity to engage in strategic and political processes; and; 5. Capacity to adaptation and responsiveness towards the potential of innovation (Tropical Agricultural Platform, 2017; FAO, 2022; Weber and Rohracher, 2012; Van Mierlo et al., 2010; Klerkx et al. 2010; FAO, 2022; Toullier et al, 2018).

It is worth noting that since 2012, basically in the frame of PRO AKIS, but also in i2connect EU Horizon 2020 projects, AKIS diagnoses have been carried out, the latter with the focus in particular on the advisory services' role. Ultimately, the context, SWOT and needs analyses carried out for the purpose of CAP programming, lead to the collection of a body of relevant knowledge. The latter mainly reflects the infrastructural and process perspectives on AKIS across the EU and can certainly be used as a baseline for ensuring further assessments during the CAP strategic plans implementation.

A well-tailored assessment framework will be applied during and at the ex-post stage of the CAP 2023-2027 programming period by building upon that baseline knowledge and through enlarging its scope to include the functionality and capacity development perspectives. In this regard, table 1 presents a proposal for an assessment framework that will be further tailored upon the specific demand for knowledge on the AKIS and relating strategies in MS.

This could be well-designed by integrating the analytical frameworks applied on innovation systems and by

including some key characterisation that well fit the specifics of the assessment of AKIS under the CAP 2023-2027, by taking into account: (i) a level of AKIS analysis that is at the MS but includes the multiplicity of knowledge flows and innovations arising from endemic and numerous regional, territorial, intersectoral, cross-sectoral and even cross-border system paths; (ii) the combination of the interventions of the CAP SPs, which outlines real strategies for strengthening AKIS, with own intervention logics, objectives, and expected results; (iii) the cross-cutting nature of these strategies to CAP objectives and interventions (Table 1).

Evaluative approaches should also be tailored to fit the needs for knowledge of policy makers and other AKIS actors in order to provide expert knowledge to incentivise continuous improvement of AKIS interventions and governance, through the systematic production of evidence-based knowledge of the various and context-specific theories of change of AKIS in MS, and also by reflecting their context-dependency, multi-dimensionality and multi-level feature.

In this regard, reflexive and developmental approaches should be embedded in the assessment of AKIS to accompany AKIS governing bodies and other actors in evolutionary paths of overall system thinking and capacity development (Cristiano et al., 2023). These approaches, in fact, allow the AKIS actors achieving a mutual recognition of their respective contributions to AKIS functioning, common understanding about lessons learnt and commitment on the tasks to follow-up the results of the evaluations (van Mierlo et al., 2010, Patton, 2008; Gamble, 2008; Patton & Horton, 2008; Klerkx et al., 2010). In fact, those approaches appropriately mix processes of participatory exploration and reflexive assessments on the theory of changes of the specific AKIS and CAP intervention strategies with the respective users through generating iterate reflexive processes, consequent actions and innovations (Botha et. al, 2017; Douthwaite, 2016; 2017).

Table 1: Overall framework for the AKIS assessment under the CAP

Stages of evaluations	Topics	Main evaluative question	Evaluative Criteria	Analytical perspective
Ex-ante	AKIS strategic approach design	To what extent does the AKIS strategy address knowledge and innovation needs and has the potential to reinforce the AKIS?	Strategic approach to AKIS reinforcement and its coherence upon the context, SWOT and needs analyses Internal and external coherence of Policy design Inclusiveness, coherence and quality of delivery systems Availability/Supportiveness of technical and functional capacities to support knowledge flows and innovations within the system Availability/Supportiveness of M&E arrangements for the AKIS actors	Structural-oriented perspective Functionality-oriented Capacity development
	State of art of the AKIS in MSs	To what extent AKIS provide an enabling environment for knowledge flows and innovations and transformative paths?	Presence/Absence/quality of AKIS structures (actors, infrastructures, interactions, and institutions) Degree of adaptiveness/responsiveness/innovativeness of the AKIS Availability/Integration/Supportiveness of technical and functional capacities to support knowledge flows and innovations within the system Presence/absence of system thinking and common vision on AKIS Quality of AKIS governance Plurality of AKIS by level/dimension (sector, value chain, farming system) Drivers and Barriers to knowledge flows and innovations Innovation capacities and skills of AKIS actors and governing bodies Availability and integration of education capacity	Structural-oriented Capacity development – oriented Functionality-oriented Process-oriented
During the programming period	AKIS strategic approach implementation	To what extent the AKIS strategic approach is well-implemented?	Supportiveness of AKIS strategy towards CAP objectives Efficiency and effectiveness of the delivery system of AKIS strategy Synergies and complementarities with other policies/programmes Good practices/Failures	Process- oriented Functionality-oriented

Stages of evaluations	Topics	Main evaluative question	Evaluative Criteria	Analytical perspective
	AKIS functioning in MSs	To what extent key features are present within the AKIS in order to support knowledge flows and innovations along transformative paths?	Effective playing of key processes within the AKIS (by which actors?) through well-functioning knowledge flows and innovations Dynamicity/Adaptiveness of the AKIS Benchmarks	Structural-oriented Process- oriented Functionality-oriented
Ex post	AKIS strategic approach effects	To what extent the AKIS strategic approaches have effectively contributed to achieving the CAP objectives and strengthening the AKIS in MSs?	Impact of AKIS strategy in contributing to CAP objectives through enabling transformative paths across agriculture and rural areas Effectiveness of innovations at farm level Effectiveness of AKIS Strategy in strengthening the AKISs in MSs Lessons learned	Functionality-oriented Capacity development
	State of art of the AKIS in MSs	To what extent AKIS provide an enabling environment for knowledge flows and innovations and transformative paths?	Presence/Absence/quality of AKIS structures (actors, infrastructures, interactions, and institutions) Degree of adaptiveness/responsiveness/innovativeness of the AKIS Availability/Integration/Supportiveness of technical and functional capacities to support knowledge flows and innovations within the system Presence/absence of system thinking and common vision on AKIS Quality of AKIS governance Plurality of AKIS by level/dimension (sector, value chain, farming system) Drivers and Barriers to knowledge flows and innovations Innovation capacities and skills of AKIS actors and governing bodies Availability and integration of education capacity	Structural-oriented Capacity development – oriented Functionality-oriented Process-oriented

It is evident that an assessment framework about the AKIS cannot only rely on quantitative data as it also necessitates qualitative and descriptive information and thus it should run around a mix of methods for the collection and analyses.

Eventually, due to the novelty of the matter, an adequate M&E framework of the AKIS should make use of methods and tools (indicators, evaluative questions) that allow knowledge exchange on lessons learned, comparative analyses and benchmarking (EU SCAR, 2019).

ModernAKIS: Enabling international exchange and capacity development for AKIS implementation and assessment

The Horizon Europe project modernAKIS (https://modernakis.eu/about/), which started in September 2022 and will run for seven years, aims to improve AKIS actors' capacities to leverage individual, organisational and systemic resources needed for the transformation towards more coherent, effective and efficient AKIS systems and the transition to a more sustainable management and use of natural resources in farming and forestry. The project is co-developed by a partnership spanning all 27 Member States and including 9 CAP Managing Authorities, 2 CAP networks, 8 private and public advisory services, 4 farmer representative organisations, 12 educational and research institutions as well as 4 companies (SMEs) from the agri-food sector.
Among other activities it will support the development of an AKIS assessment framework, an AKIS benchmarking instrument as well as capacity development, reflexive exercises and experience exchange in the implementation and monitoring of the AKIS evaluation.

ModernAKIS project will help the key actors of the AKIS in MS, and primarily the AKIS coordination bodies and public authorities, to develop, based on users' needs, a meaningful and comprehensive evaluative framework, and to strengthen the capacities for supporting the development of related M & E activities.

Two main objectives are pursued by the modernAKIS project: 1. the evaluation AKISs' strategies that are defined within the CAP strategic plans that is, according to the EU Regulation, compulsory, and primarily aims at judging the extent to which the respective goals and their contribution to the CAP SPs are effectively accomplished (key elements of success); 2. the assessment of the AKISs and their functioning (in reality) in each MS.

Besides, it is important that AKISs as innovation systems are gauged with respect to the performances that effectively reflect the values and perceptions of the AKISs actors (Cristiano and Proietti, 2018), rather than through typical (external) evaluations, even if they are carried out through participatory methods. In this respect, the assessment processes become part of the intrinsic dynamism of the AKIS and they help build trust and create ownership and engagement among the different AKIS actors, based on their own findings and insights in the course of on-going decision making and change. [40]

1.6.2 Comparison and benchmarking of AKIS

There are a number of examples, how the AKIS concept can be used for qualitative comparative assessments of a knowledge infrastructure landscape, e.g. at national or at state level (Blum 1991; Lamprinopolou et al. 2012; Hermans et al. 2015; Knierim et al. 2015). Also, visual approaches to represent organisational constellations, infrastructures and linkages among actors, so called AKIS diagrams, have proven their immediate use, e.g. as support to a situational diagnosis where different AKIS stakeholders exchange on and assess access to knowledge and information services. However, visualisation also bears risks as it relies on an inevitable reduction of contents.

[40] Cristiano et al., 2023 - Deliverable 1.1. "Conceptual and methodological framework for transformative/evolutionary AKIS journeys". modernAKIS project

Secondly, such diagrams provide a static picture at a given moment in time which does not appropriately reflect the manifold dynamics that can be observed in the field. Thirdly, and more generally, the notion of 'system' is fluid and its borders and elements strongly depend on the eye of the observer.

A comparative assessment and benchmarking of AKIS thus requires agreement on the components, the frame and the inner logic of what is 'the system' under consideration, in a first step. The example of such a comparison elaborated in PRO AKIS relied on the infrastructural perspective and a ranking of a number of qualitative indicators for what was considered a strong resp. a weak and a fragmented resp. an integrated AKIS (Fig. 1). The graph is based on data from 2014. It opened the eyes of MS as to their relative positions within the EU. Some critiques have been ushered on the inadequacy of some placements, in particular in the case of Member States where differences between regions occur.

Still, it is used for demonstrations because it captures and illustrates key AKIS features in a concise, simple way and as such is very useful. In a follow-up AKIS assessment and comparison exercise, Birke et al. (2021) preferred to avoid such rankings and to make use of a broader range of key features to compare. For future approaches to AKIS assessments and benchmarking, both qualitative as well as quantitative ones, Fieldsend et al. (2021) set up a participatory development process involving the broad range of AKIS stakeholders concerned and built upon conceptual bases and previous experiences in a comprehensive manner. Hereby, good examples of complex multi-actor, multi-level transdisciplinary assessment approaches for e.g. the promotion of agricultural innovations (Spiegal et al. 2022) are expected to inform procedural and instrumental steps to be taken. It remains a challenge to capture in an understandable way, as was done for the PROAKIS project, the main elements and differences between Member States AKIS.

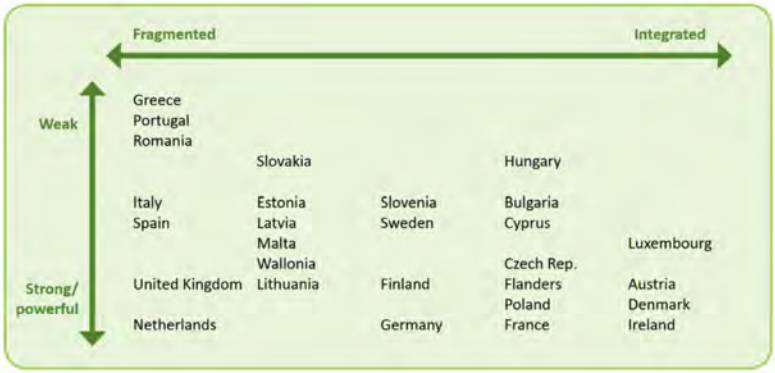


Figure 7 Overview of European AKISs (Knierim and Prager 2015)

1.6.3 AKIS assessment tools for EU Member States: AKIS related impact, result and output indicators

Inge Van Oost (DG AGRI)

The new delivery model of the CAP 2023-2027 provides a number of AKIS related indicators, which enable the follow-up of the impact of the AKIS Strategic approach[41] as set in Member States CAP Strategic Plans.

Impact indicator (Article 7, Annex I of R.2021/2115)

- I.1 **Sharing knowledge and innovation**: Share of CAP budget for knowledge sharing and innovation

Output indicators (Article 7, Annex I of R.2021/2115)

- O.1 Number of European Innovation Partnership (EIP) operational group projects
- O.2 Number of advice actions or units to provide innovation support for preparing and implementing European Innovation Partnership (EIP) Operational Group projects
- O.29 Number of supported training, advice and awareness actions or units

Main Result indicators(Articles 7, 104 and Annex I of R.2021/2115)

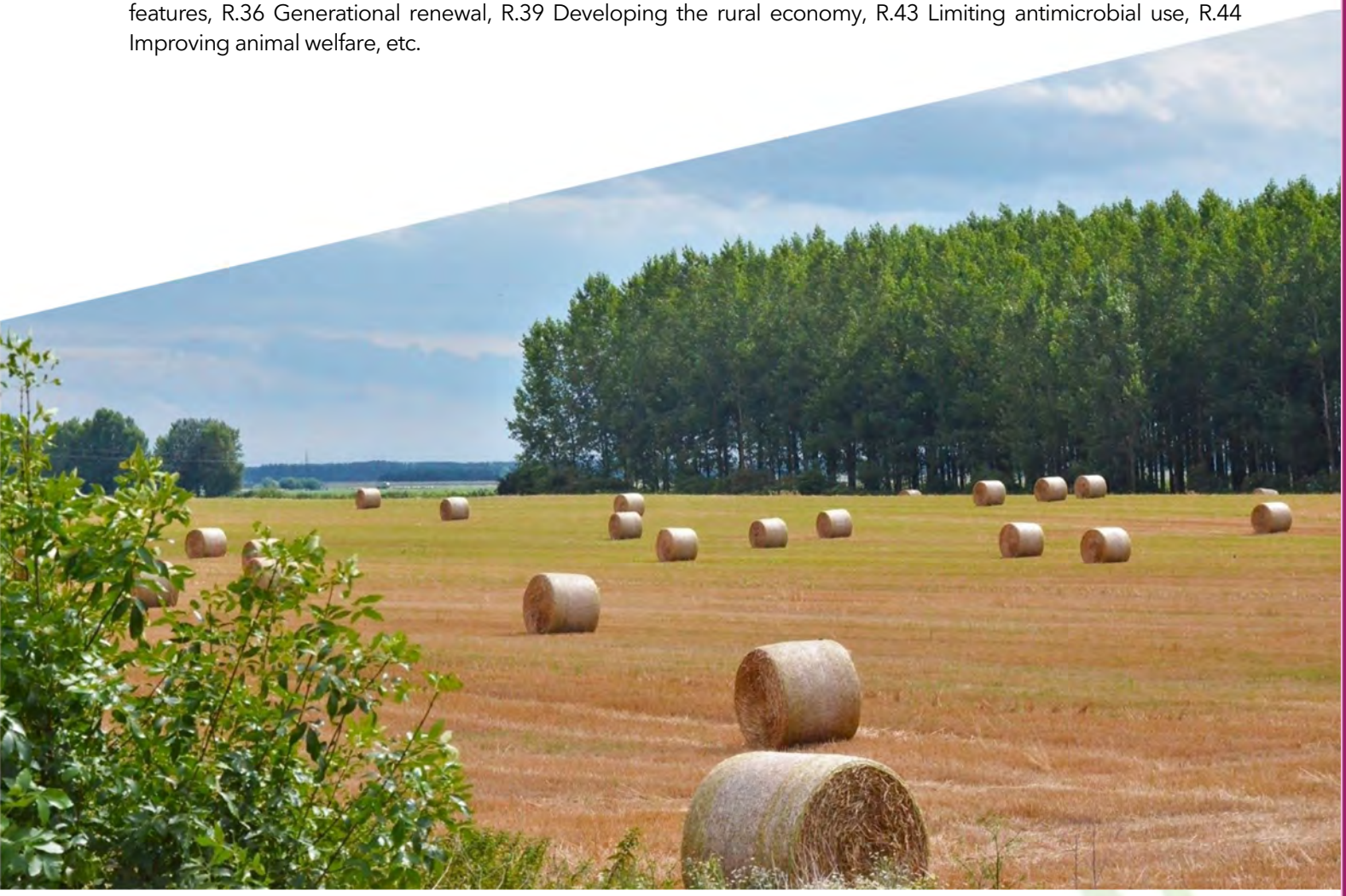
- R.1 **Enhancing performance through knowledge and innovation**: Number of persons benefiting from advice, training, knowledge exchange or participating in European Innovation Partnership (EIP) operational groups supported by the CAP in order to enhance sustainable economic, social, environmental, climate and resource efficiency performance
- R.2 **Linking advice and knowledge systems**: Number of advisors receiving support to be integrated within Agricultural Knowledge and Innovation Systems (AKIS) (for examples[42] of how this can be done, see Annex V of the CCO/AKIS tool[43])
- R.24 **Environmental-climate performance through knowledge and innovation**: Number of persons benefiting from advice, training, knowledge exchange or participating in European Innovation Partnership (EIP) operational groups supported by the CAP related to environmental-climate performance (sub indicator of R.1).

[41] Article 114 of R.2021/2115 as well as other AKIS related articles 3(9), 15, 77, 78, 115(2), 126, 127, and recitals 50 and 85

[42] Examples of interventions contributing to integration of advisors within the AKIS (R.2):
1. Training of advisors (O.33)
2. Back-office work (=specialist support collecting practice knowledge) by advisors (O.33)
3. Advisors' mobility budget (O.33)
4a. Providing innovation support for OG on social care farming (O.2 or O.1)
4b. Providing innovation support for OG on short supply chains in HNV areas (O.2 or O.1)
5. Advisors leading thematic networks compiling knowledge for practice (O.33)
6. Advisors leading on-farm demonstration events (O.33)

[43] link to CCO tool: https://ec.europa.eu/eip/agriculture/sites/default/files/8.1_tool_for_modernisation_-_akis_and_digital_technologies_-_on_circabc_7_oct_2021.pdf

Several other result indicators will also be targeted by specific AKIS interventions, such as R.3 Digitalising agriculture, R.9 Farm modernisation, including to improve resource efficiency, R.10 Better supply chain organisation, R.12 Adaptation to climate change, R.13 Reducing emissions in the livestock sector, R.14 Carbon storage in soils and biomass, R.15 Renewable energy from agriculture, forestry and from other renewable sources, R.19 Improving and protecting soils, R.21 Protecting water quality, R.22 Sustainable nutrient management, R.23[PR] Sustainable water use, R.24 Sustainable and reduced use of pesticides, R.26 Investments related to natural resources, R.27 Environmental or climate-related performance through investment in rural areas, R.29 Development of organic agriculture, R.30 Supporting sustainable forest management, R.31 Preserving habitats and species, R.34 Preserving landscape features, R.36 Generational renewal, R.39 Developing the rural economy, R.43 Limiting antimicrobial use, R.44 Improving animal welfare, etc.



1.7 AKIS strategies in MS' CAP plans as key to a sustainable future

During this 5th mandate of the SWG SCAR AKIS, many exchanges were initiated between MS and AKIS actors on ideas, examples and opportunities to strengthen the AKIS. Overall, the European Commission is very satisfied to have received many draft CAP plans with substantially improved AKISs that emphasise **more and improved knowledge flows** between all organisations, institutes and individuals in the country's AKIS. An abundance of knowledge exchange activities are planned for the next period: innovation support hubs, advisory networks, on-farm demonstrations, knowledge hubs, specialist advisors interconnected with researchers to support the field advisors, training better targeted to users' needs, and so forth.

Below are some examples of draft AKIS strategies by different MS.

1.7.1 AKIS in Flanders - Belgium

Els Lapage (Flemish Government, Department. Agriculture and Fisheries)

Flanders' AKIS is characterised by strong formal and informal interactions between the different AKIS actors. These actors include among others universities, applied and practical research institutes, farmers' cooperatives, and a series of third sector organisations that fulfil different functions within the system (experimental stations, advice, training...). An important dimension of the system stems from the fact that many of these actors are associations whose boards contain representatives of research, public administration and farmers' organisations.

Follow-up support is guaranteed throughout the innovation process: at every stage of the innovation process, from idea to upscaling, support is available so that the process does not stop. The interventions used to that end are:

1. Tailor-made advice
2. European Innovation Partnership (EIP-AGRI)
3. Support for innovative investments on the farm
4. Demonstration projects
5. Vocational training

In the CAP AKIS strategy more attention is given to the early stages of the innovation process. Farmers need help to find their way within the AKIS and especially with regard to advisory services (both public and private). To that extent, an enabling environment will be established. A clear CAP guide for identifying tailor-made and the most appropriate source of funding for farmers and other potential beneficiaries is made available on the website of the Flemish Rural Network. On the same website a collaboration platform is developed with the aim of sharing knowledge and ideas, focused on farmers, advisors and other AKIS actors. They will be able to look for cooperation on concrete calls within the CAP, and to respond to questions from others. Furthermore the Flemish Rural Network organises events to connect AKIS actors and to network, so that they can easily find each other for further collaboration. At these events researchers can share their knowledge with practitioners and learn in an interactive way about the needs and concerns of farmers and advisors.

Thanks to changing the selection procedure toward self-assessment instead of through public procurement, the advisory landscape within the CAP will be enlarged and a farmer will be able to call on a wider range of advisory services. The collaboration between a farmer with an innovative idea and the advisor or the innovation support service, to whom he turns for advice, will be supported. And the funding rules for EIP and for innovative investments on the farm will now allow the funding of the preparatory phase.

In Flanders there is a lot of diversity between advisors. Many advisors are employed at applied research centres and are involved in research activities. Other private impartial advisors have to be better integrated into the AKIS.

The vocational training centres will be stimulated to organise special training courses for advisors. This will support advisors in giving advice on economic, ecological and social themes, incorporating the latest scientifically proven methods and techniques. Soft skills are also part of the training.

Demonstration projects, coordinated by practical research centres, in which both farmers and advisors are involved for giving the demonstrations and/or as a target audience, will get an advantage in the selection, in order to stimulate peer-to-peer learning. Advisors get the research results in a practice-oriented format so that they can incorporate the new knowledge in their advice.

Advisory services are now also encouraged to play an interactive role in compiling operational groups (role as innovation broker/facilitator), the development of an EIP OG project and the dissemination of EIP project results.

SCAR
Standing Committee
on Agricultural Research

EIP-AGRI and OG projects has been influencing Flanders' AKIS since 2014

Since the start of EIP-AGRI, and from the experience with multi-actor collaboration in the first series of CAP funded Operational Group projects, there is more awareness and comprehension in the sector, especially for the researchers, about the added value of interactive innovation, by sharing best practices and demonstrating opportunities. AKIS actors are already extending the EIP principle to other CAP and non-CAP instruments. The diversity of actors involved in the AKIS also increased: many actors from outside the agricultural sector are involved and sometimes also from the agricultural sector abroad. This participation makes the product greater than the sum of the component parts and will be further encouraged in the EIP intervention.

In the next CAP period, the scope of the EIP-AGRI OG intervention will be broadened. The development of innovative methods and techniques will stay important but there will be a greater focus on innovative and lasting cooperation between farmers, or farmers and other actors in the chain, actors with an agro-ecological aim, etc .

CAP funding mechanisms and administrative rules will be further simplified, to embrace the innovation process. Simplified cost options will be used. The bottom-up approach is encouraged by making the EIP intervention more accessible, e.g. submission of a project proposal in two steps, whereby in the first step, a brief sketch of the idea is expected and a project proposal only is developed for the second step.

Additional information on the Flemish AKIS context

Advisory services are provided to farmers by a diversity of organisations: farmers' associations, farmers' cooperatives, private consulting companies… but also upstream and downstream industries. Flanders has strong universities and both applied and practical research centres are working together on practical issues close to farmers' needs. All AKIS actors know each other, and good advisor-researcher links exist, in particular if the advisors are hosted by the applied (sectoral) research stations.

Almost all farmers receive training. Farmers are well educated; they are obliged to take training if they want direct support or support for investments. An innovative spirit prevails thanks to the longstanding efforts of strong and central innovation support services.

Strong agricultural ministry staff understand the needs of AKIS and the EIP-AGRI calls. The calls for support for innovative investments, where innovation advice up to 20% of the project cost is included in the investment support, are very effective. Besides, the bottom-up approach of EIP is extended to other project calls, even not supported by the CAP.

Some shortfalls need to be overcome in the 2023-2027 period:

- There is currently no overview of advisor's interactions or platform to share their ideas;
- The RD advisory measure 2014-2020 was not able to include the trusted advisors, as they are too small for the public procurement process. As a result of this public procurement obligation, we do not have interaction with a lot of advisors;
- We do not reach all our 'hard to reach' farmers, as in many other Member States we are searching for solutions;
- There is insufficient focus by researchers to translate the knowledge into practical understandable information for farmers, incentives should be increased;
- The concept of AKIS is not well known;
- Communication and dissemination, particularly around the education of young people are insufficient.

1.7.2 AKIS in France

Anne Portier-Maynard (Ministère de l'Agriculture et de la Souveraineté Alimentaire)

The French AKIS is made up of well-organised actors who are able to work together in the framework of projects, networks, programming definition, etc. This allows a real continuum between Research, Innovation and Transfer. One specificity of the French AKIS is that it goes beyond the agricultural sector, including other fields such as environment, climate, and food systems.

France has a strong network of agricultural education institutions, providing life-long learning and initial professional training, who are working hand in hand with farmers, researchers, experimentation schools, … To stimulate partnerships between all those actors, some structures have been implemented: UMT (joint technological units) and RMT (R&I transfer unit). The first ones are in charge of mobilising academic research actors and applied research actors; the second ones are mobilising research, agricultural development, education within multi-actors projects.

The EIP-AGRI is supporting both structuration of the actors through OGs and the development of a shared regional innovation policy. Even if these partnerships are quite young in the system, we can easily notice the positive effects they have on the uptake of the innovations in the agricultural field.

There are several policies and sources of funding in France to support actions of agricultural development, not only funded by the CAP:

- "National Programme of Agricultural and Rural Development" (PNDAR) from the French Ministry of Agriculture and its CasDAR44 fund which is an agricultural R&I&D fund fed by a tax paid by farmers
- Regional R&I&D policies are implemented at the regional level and they can be used to co-fund PNDAR's projects
- Private sources of funding

In the CAP National Plan, it is foreseen to reinforce some levers such as a better national coordination between the different tools already implemented (MAA projects from HE, EIP-AGRI, etc.) or a more effective and inclusive national governance (increase diversity of actors, better identification of strategic priorities for instance). France will support more cooperation between all kinds of advisors, improve the communication and strengthen the innovation network to increase the uptake. Eventually, in the coming years, the main aim to strengthen the French AKIS is to make the best of the existing synergies between all the various levels: European, national, regional, local.

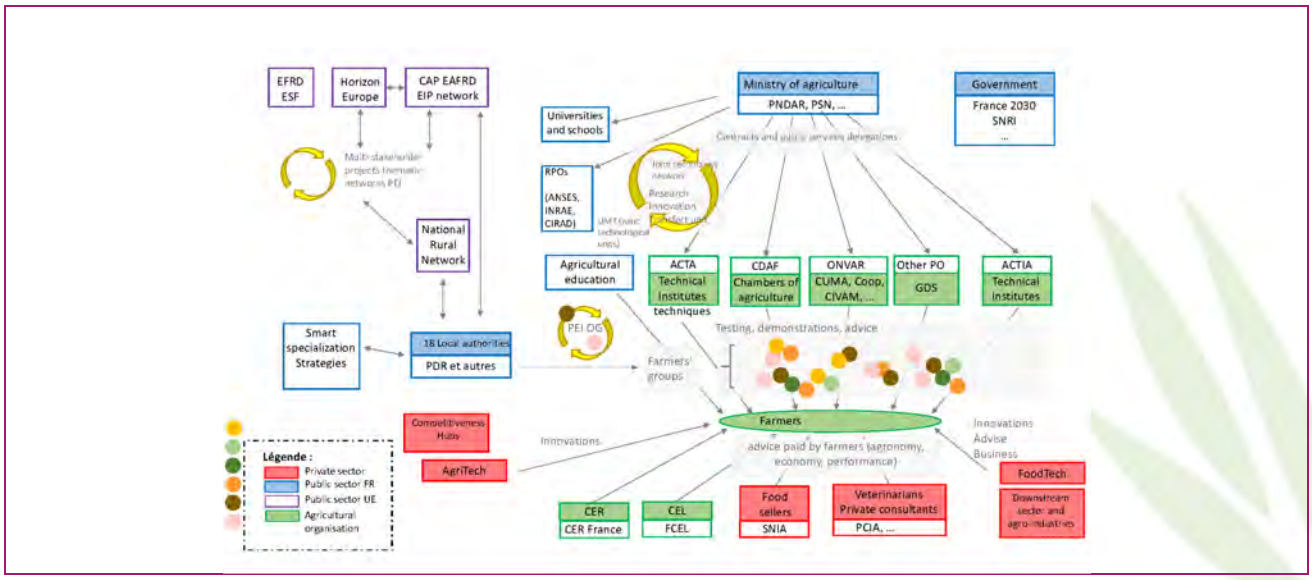


Figure 8 French AKIS landscape (MASA/DGER/SDRICI/BRI/NC, 2023)

[44] Programmes CASDAR - Chambres d'agriculture France (chambres-agriculture.fr)

1.7.3 AKIS in Italy

Andrea Arzeni, Mara Lai (Council for Agricultural Research and Agricultural Economy Analysis, CREA)

The Italian knowledge and innovation system is characterised by a plurality of actors and levels. Given the administrative organisation, 19 regional and 2 provincial AKIS can be identified within the country. Regions/Autonomous Provinces, in fact, have competence in agriculture, advice, education and vocational training; the general rules of school and university education are, instead, the responsibility of the central State, while research is a matter of concurrent competence between the State and Regions/Autonomous Provinces. This organisational set-up implies positive and negative consequences. Among the positives, there is the appropriate availability of services and skills in the national territory. However, the great number of actors causes coordination difficulties and might slow down the diffusion of innovations. This dichotomy between the richness of actors and lack of coordination was the key factor to be considered in the design of the CAP AKIS strategy at national level. The strategy envisages the setup of coordination bodies at regional/provincial level and coordination at national level. The regional/provincial coordination bodies will gather all relevant AKIS actors in charge of organising and providing support to training, advice, digital services, information and research, as well as other actors/institutions that the regional/provincial level considers relevant to improve the coordination of the AKIS. These regional/provincial coordination bodies will be chaired by the departments of the regional/provincial level in charge of implementing the intervention of the NSP.

Collaboration between national and regional AKISs in Italy

The national AKIS Coordination body will be set up and chaired by the Ministry of Agriculture, Food Sovereignty and Forestry. It will include at least representatives of Regions/Provinces, other relevant national institutions (Ministry of University and Research, Ministry of Health, Ministry of Environment and Energy Security), advisors, farmers and of other actors considered relevant to improve the coordination of the AKIS at national level. **The main task of the national coordination will be to improve the coordination of the innovation actions implemented at regional level, to summarise the inputs coming from the regions to strengthen the coordination of different actors, and to liaise with the EU level.** At regional level, existing aggregation of actors around specific geographical areas or sectors will be considered to be important actors, since they might become reference points for the regional AKIS. In fact, the existence of strong links around certain areas or sectors will facilitate the ongoing monitoring of the enterprises' needs, the collection of data to plan local policies and interventions, the support to innovation sharing and the dissemination of information.

The national and **regional/provincial coordination bodies will cooperate with the Interregional Network** of Agricultural, Forestry, Aquaculture and Fishing Research officially recognised (04/10/2001) by the Conference of the Presidents of the Regions and Autonomous Provinces to promote connections and network actions among the regions and autonomous provinces about the definition of EU and national policies and programmes, to support specific initiatives and to highlight specific needs related to research and extension services for firms and territories.

The strengthening of the AKIS will be also supported by the activities of the national CAP Network, support that will complement the action of the national and regional/provincial Coordination bodies. In line with the activities already implemented by the NRN in the 2014-2022 programming period, the national CAP Network will support the EIP-AGRI related interventions by
(I) organising the dissemination of information through Innovarurale, a website dedicated to innovation and research,
(ii) producing methodological documents about planning, managing, and evaluating the participatory approach to innovation,
(iii) organising meetings and exchange events between OGs and experts;

(iv) facilitating the dissemination of documents and technical reports produced or promoted by the EC, and
(v) disseminating the results of relevant national, EU and international research projects.

The strengthening of national and regional/provincial AKIS will in particular be supported by the implementation of the AKIS-related interventions as designed in the NSP, mainly the various OG interventions (Art 127/77) and making use of the knowledge interventions under Art.78. The following interventions will be implemented at regional/provincial level and, when relevant and envisaged, at national level:

- Support to EIP-AGRI OGs (OGs, art 127/77)
- Support to pilot actions and innovation testing (OGs, art. 127/77)
- Innovation support services (OGs, art. 127/77)
- Advisory services (art 78)
- Training for advisors (art 78)
- Training for farmers and other AKIS actors (art 78)
- Information actions (art 78)
- Demonstration actions (art 78)
- Back office

The AKIS strategy aims at enhancing the role of advisors in the innovation process and, thus, in the implementation of the AKIS-related interventions. The competence of organising advisory services is set up at regional level, as highlighted above. However, the national level will work to create synergies and support the regions/provinces in improving the organisation of advisory services. They will be organised according to the method deemed most suitable for responding to the specific needs of enterprises, territories and agrifood industries in which they will operate. The involvement in the AKIS of public and private advisors to ensure access to multiple competence and skills will be promoted, also including professionals from other sectors (engineers, landscape professionals, technicians from other productive sectors, etc.).

1.7.4 AKIS in Hungary

Anikó Juhasz (Ministry of Agriculture)

The overall objective in the CAP plan period is to have an AKIS contributing effectively to the achievement of specific policy objectives by promoting and sharing knowledge, innovation and digitalisation. It is important to develop our AKIS system which encompasses all people, and organisations that generate, share and use knowledge and innovation for agriculture and interrelated fields.
Thus AKIS interventions have been designed in such a way that they can be linked to other interventions in the Strategic Plan during implementation. For example, training and demonstration programmes or consultancy services intervention also contribute to green interventions.

In the Hungarian CAP Strategic Plan we identified four main needs in the case of AKIS where we would like to concentrate on our development program:

- Support for practice-oriented knowledge transfer to support the achievement of sectoral objectives
- Promoting practice-oriented innovation with sectoral objectives
- Development of infrastructure of secondary and higher education institutions, educational establishments, demonstration plants, sample plants
- Development of digital solutions in production and sectoral registers

In the case of the Hungarian AKIS measures, the first level is the Information Services intervention which aims to reach 110.000 small-sised, hard-to-reach farmers with the help of the 600 village counsellors' network of the Chamber of Agriculture. Our aim here is a basic knowledge transfer, but with a large number of participants. It is in our fundamental interest to create a unified AKIS, not only for those farmers who are open to the new, easily noticeable, visible, and have been actively involved in sectoral public life in the past but also for a wide range of farmers.
The second level is the involvement of the otherwise open farmers, with the help of consultants (advisors) in the framework of the Advisory Services general, and the fruit and vegetable sectoral intervention. This measure helps farmers find concrete answers to their specific problems linked to a wide range of challenges in a wide range of sectors.
The third level is to support the increase in knowledge of both farmers and those sharing knowledge through the intervention of Training and demonstration in the general knowledge/advisory intervention and in the fruit and vegetable and beekeeper sectoral programmes.
The fourth level is the most effective way to reduce the gap between farmers (practice), research and innovation services, and knowledge providers through the EIP OG intervention and the CAP Network's Innovation and Digitalisation Support Unit. The unit supporting the innovation and digitalisation network of the CAP will conclude a formal agreement with the National Research, Development, and Innovation Office, which is the National Contact Point of HE, Partnerships and Soil Mission, and the Express Innovation Agency. This cooperation will be the basis for the development of synergies between the CAP and HE.
Last but not least we also plan to continue to support digitalisation of farmers with an investment measure.

The funding of the core AKIS measures (information and advice, training, innovation) would increase from 2.8 % to 3.2 % in the previous programming period, and more than double to over EUR 246 million. For the digitalisation measure, we plan to spend approximately the same amount of 274 million euros as in the 2021 call.

Furthermore, in the case of individual knowledge transfer, innovation, and digitalisation interventions, we always mention the mandatory contribution of individual actors to the work of the CAP Network. The national CAP network is linked to AKIS as a whole, thus ensuring synergy between actors. Because AKIS can only make a difference if knowledge and innovation does not remain in the ivory tower but becomes applicable and understandable. In addition to the results of existing collaborations, there must be no gap between other actors in the sector and society, identifying and responding to new challenges and sharing knowledge.

The main objective of the programme period is to increase the adaptability of our sector, one of the pillars of which is the creation of a knowledge network that effectively transmits information. This is facilitated by the strengthening of the network of village counsellors, the expert advisory base of sectoral professional organisations, the development of the educational farms of agricultural secondary and higher education institutions into a modern demonstration facility, and the involvement of farmers in adult training programmes. To increase innovation, we will provide more professional support to emerging innovation groups, who will mobilise new producers.

One of the most important Hungarian thinkers, István Széchenyi wrote (1830):
"It is not a fertile plan, mountains, minerals, climate that makes public good, but the mind that can use them soberly.
The smaller or deeper science of farmers is the key to the country's agricultural power."

1.7.5 AKIS in Lithuania

Goda Vainienė (Ministry of Agriculture)

On November 21, 2022 the EC approved the Lithuanian CAP Strategic Plan. The 8th chapter of the Plan describes the Lithuanian AKIS strategy and foresees how stakeholders operating in the fields of agricultural knowledge and innovation will be integrated into the system.

The Plan states that the AKIS will be strengthened by carrying out the following activities:

1. The fragmentation of the AKIS will be reduced, with the aim that the implementation and continuity of agricultural knowledge and innovations based on advanced practice and scientific research reach as many Lithuanian farms as possible. That will contribute to increasing the diversity and quality of training and advisory services;
2. A digital collaboration platform is being created, where agricultural knowledge will be accumulated. Innovations, projects, digital tools, contacts, registered needs and feedback will be included;
3. The involvement of the non-governmental sector and cooperatives in AKIS activities will be increased, in order to enable farmers' associations and individual farmers to implement innovations, learn and seek agricultural knowledge;
4. Continuous thematic events will be developed, thus ensuring active exchange, mutual sharing of knowledge, it's dissemination, forming a positive image of the agriculture and forestry sector, increasing the prestige of the profession of agricultural specialists and advisors;
5. Innovative forms of project partnership between scientists, advisors and practitioners will be encouraged in order to involve subjects from different fields and use their knowledge and other resources in creating innovative products and services;6. The activities of EIP-AGRI OGs will be developed, promoting the continuity of projects, the dissemination of accumulated knowledge and innovative progress in the sector, involvement in international projects;
6. The quality of advisory services for agricultural entities will be improved, by including qualified advisors with experience in other sectors and international experience;
7. The advisors' system will provide systematic feedback on the provided advice, in order to increase the supply of high quality services in the market. Such monitoring system for advisory services will be developed in compliance with confidentiality requirements;
8. The infrastructure for e-advisory services will be developed in order to bring the transmission of agricultural knowledge and innovation closer to small farmers operating in remote regions and other interested entities.

AKIS' areas of activity directly include all stakeholders of this system: educational and research institutions, public and private entities providing advice, farmers, foresters, agro-environmentalists, other associated organisations related to agricultural activities, EIP operational group projects. In Lithuania, the function of the AKIS coordination body will be performed by the Ministry of Agriculture together with the Council of Agricultural Science.

The AKIS Strategy in Lithuania's CAP plan contributes to a more successful implementation of all intervention measures of the CAP Strategic Plan. These intervention measures are mostly aimed at strengthening AKIS and contributing to the cross-cutting objective on knowledge, innovation and digitalisation:

- European Innovation Partnership for Agricultural Productivity and Sustainability OG projects
- Demonstration projects and information activities
- Training and acquisition of skills
- Advisory services

Particular attention will be paid to innovation and advanced solutions, targeting a wide range of possible topics, according to the nine CAP specific objectives. These include enhancing the positive impact of farming on the climate and environment, increasing the competitiveness and value added of the agri-food industry and promoting

recycling and zero- and low-waste technologies. More than 45 000 persons will benefit from advice, training, knowledge exchange, or from projects meant to spread innovative practices, led by the EIP-AGRI OGs. More than 17 000 advisors are expected to gain new skills and participate in activities connected to knowledge exchange and strengthening of links between researchers, advisors and farmers. 40 EIP operational group projects will receive support under the Plan.

In Lithuania, not only the CAP, but also national measures contribute to the operation of AKIS. National funds are used to finance farmer advice, applied and international research, knowledge transfer and information activities, including support for educational events, conferences, seminars, as well as national, regional and international agricultural exhibitions and fairs. These activities and events bring together agricultural stakeholders, ensure the maintenance of mutual relations between them, the dissemination of information based on the latest research and advanced experience and introduction of innovations.

Lithuanian researchers, together with partners from foreign countries, participate in the initiatives of the Horizon Europe program, thus contributing to the creation of innovations and knowledge in the field of agriculture in Lithuania.

Important goals and tasks are set for the Lithuanian rural network (CAP network) in the new CAP period. The Lithuanian rural network significantly contributes to the activation of AKIS participants, their involvement in the processes of knowledge exchange and the dissemination of innovations. The CAP network implements these tasks by collecting information on the good practice of AKIS implementation, analysing and disseminating it. It takes care of the publication of the results of the projects of the EIP-AGRI OGs, as well as consultations aimed at strengthening the capacities necessary for the implementation of innovations. International events of various formats organised by the CAP network (to present opportunities to participate in projects of Horizon Europe, as well as to present the results of completed/ongoing projects) contribute to the promotion of multilateral cooperation and allow the interested parties to gain knowledge and experience.

1.7.6 AKIS in Estonia

Helena Pärenson (Ministry of Rural Affairs)

Estonia benefits from the generally innovation-friendly attitude, there are plentiful opportunities to obtain vocational or higher education in the field of agriculture, food, fisheries, etc., the support schemes are available for research and development, knowledge exchange, and innovation. There are several R&D institutions in Estonia, whose thematic scope involves agriculture and food-related disciplines.

The Estonian AKIS has been gradually moving towards a more integrative and holistic approach. In the 2007-2014 period, the Estonian AKIS was characterised as a rather fragmented system[45] During the period 2014–2020, several steps have been taken towards a more integrated AKIS, such as a centralised coordination of supported advice. However, the general logic of the support measures (M16.0 and M16.1/16.2) for innovation cooperation; M1 for knowledge and information exchange; M2 for advisory services held on to the well-defined target groups with their separate activities and little room for joint activities addressing a mixed group of different AKIS players.

In the CAP 2023-2027, building the coherence and linkages between different AKIS players has been set as one of the strategic objectives. The three main AKIS related interventions (supporting advisory services, support for AKIS development, and support for innovation cooperation) have been designed based on a holistic and combinability principle, to which the introduction of the so-called innovation development voucher for innovation cooperation as well as the AKIS voucher (for advice, training, expert consultation, etc) is expected to add even more flexibility.

Although the Estonian agricultural sector makes more and more use of the state-of-the art appliances and technologies, the investment capacity in research, development and innovation of the enterprises continues to be rather limited, so the existing support opportunities for innovation and knowledge exchange are actively used.

In terms of the CAP Strategic Plan, the key actors of the Estonian AKIS include the agricultural and rural entrepreneurs (incl. forestry, food processing) and their representative organisations, advisors (both those rendering the service under the support measure as well as others), research and development institutions, educational institutions (universities, vocational schools) as well as other persons, institutions or organisations involved in training and knowledge exchange.

In addition, there is a need to broaden the scope of advisory services from agricultural production to processing, as to enhance the opportunities for creating added value of the production, for a more efficient use of resources, and acquiring the knowledge necessary for implementation of new technologies. Both in advisory as well as knowledge exchange activities, special attention will be paid to the new entrants and SMEs. In knowledge exchange, consumers as a target group will also be involved in the activities.

In EIP Operational Groups which cooperate on innovation projects, the role of the advisor is expected to increase throughout the life cycle of the project - starting from the preparatory/initiation phase, the actual implementation of the project, up to the wider dissemination of the project results. This innovation cooperation is facilitated also by the CAP network and its innovation strand, who continue to play a central role in promoting the CAP opportunities, activities and exchange of best practices, and liaising with the EU-wide CAP network.

There are a number of very different counterparts active in advisory services and knowledge exchange in Estonia, their interconnectedness varies, and there has been an identified need for a more systematic coordination of their activities. Thus, there will be established a so-called "AKIS centre", which will be responsible for both the coordination of advisory services as well as diverse formats of knowledge exchange activities, facilitating thereby a more systemic and sustainable development of the AKIS and overall innovation capacity of Estonian agriculture. The main objective of the AKIS Centre (a structural unit of the Centre of Estonian Rural Research and Knowledge) is to develop and

[45] (https://430a.unihohenheim.de/fileadmin/einrichtungen/430a/PRO_AKIS/Country_Reports/Country_Report_Estonia_11_07_14.pdf.

coordinate a coherent AKIS system by strengthening the role of advisors in the AKIS, raising general awareness of the opportunities offered by the knowledge exchange and innovation system, and serve as the central AKIS information point.

The planned activities of the AKIS Centre include:

- Promoting cooperation and networking with different parties (Estonian and foreign).
- Analysis of the need for knowledge exchange and advisory services in Estonia.
- Organisation of information and promotion activities;
- Providing a support function for advisors in the provision of advisory services, ensuring the quality and availability of services to the sector and the availability of support services (digital solutions, scientific information, etc.).
- Providing general advice.

The main tasks of the AKIS Centre are as follows:

- To organise knowledge exchange activities;
- To act as an advice support unit, ensuring the provision of a quality advice service accessible to the sector;
- To implement and manage the AKIS vouchers;
- To provide and develop digital services, including the online knowledge reservoir, which will serve as a virtual common space for farmers and other agricultural and rural entrepreneurs, trainers, trainees, advisors, researchers, innovators, etc [46].

1.8 AKIS in the western Balkans

Dori Pavloska (Regional Development Standing Working Group in SEE)

1.8.1 The Regional Rural Development Standing Working Group in SEE (SWG)

The SWG is an international intergovernmental organisation, serving as a platform for policy dialogue, networking and regional cooperation in the area of agriculture and rural development. The SWG vision is to **promote innovative and sustainable agriculture and rural development** through regional cooperation and to improve rural livelihoods in the **South East European (SEE) countries**. Its managing and coordinating body is the Secretariat in Skopje, North Macedonia, and regional offices are located in countries/territories of the WBs: Albania, Montenegro, Bosnia and Herzegovina, Serbia. The governing body is the Assembly comprised of delegates from the member institutions – ministries responsible for agriculture and rural development from: Albania, Bosnia and Herzegovina (state level), Republic of Srpska, Bosnia and Herzegovina (entity level), Kosovo[47*], North Macedonia, Montenegro and Serbia. The observer institutions are ministries responsible for agriculture and rural development from: Austria, Bulgaria, Germany, Hungary, Italy, Slovenia, Croatia, Autonomous Province of Vojvodina, Serbia, Federation of Bosnia and Herzegovina, Bosnia and Herzegovina, Moldova.

Three SWG supports its member institutions in evidence-based policymaking through its network of more than 250 experts and policy makers participating in more than 18 Regional Expert Advisory Working Groups (REAWGs).

[46] Further reading on Estonian AKIS:
https://agriculture.ec.europa.eu/system/files/2022-11/csp-at-a-glance-estonia_en.pdf
https://i2connect-h2020.eu/resources/akis-country-reports/
https://www.oecd.org/estonia/innovation-agricultural-productivity-and-sustainability-in-estonia-9789264288744-en.htm

[47*] *This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

1.8.2 Green Agenda for the Western Balkans

The Leaders from Western Balkans, gathered in Sofia on 10th November 2020, at the WB Summit under the framework of the Berlin Process initiative, and adopted the Sofia Declaration on the Green Agenda for the Western Balkans (GAWB). Thereby, they committed to work towards ensuring transformation of the agriculture sector, minimising its negative environmental and climate impact and safeguarding affordable and healthy food for WB citizens and export markets.

The Action Plan for the Implementation of the Sofia Declaration on the Green Agenda for the Western Balkans 2021-2030 sets an indicative timeframe for all five pillars mirroring the structure of the GAWB: 1) Decarbonisation, 2) Circular Economy, 3) Depollution, 4) **Sustainable Agriculture** and 5) Protection of Nature and Biodiversity. One measure in Pillar 4 (Measure 47) refers to AKIS and states: **cooperation with scientific, education, business and agricultural holdings to facilitate transfer of innovative and environmentally friendly technologies and farming methods**.

The **SWG** has been appointed as the **main regional coordinator for implementation of the actions under Pillar 4 – sustainable agriculture**.

1.8.3 REAWG on AKIS

In order to address the need for cooperation with scientific, education, business and agricultural holdings to facilitate transfer of innovative and environmentally friendly technologies and farming methods (Measure 47 from the Action Plan for the GAWB), SWG established the REAWG on AKIS. It is composed of representatives from ministries of agriculture, higher education, advisory services, research institutions, private sector/chambers of commerce, ministries of science from each of the WB countries/territories.

Some of the identified common objectives for all countries/territories are:

- Finalisation of Smart Specialisation Strategies
- Formalisation of AKIS and its key components (such as advisory services)
- Integration of private advisory services in the system
- Capacity building for the AKIS components
- Farmer awareness raising in the use of knowledge, technology and innovation
- Science internationalisation and external fund raising
- Establishment of new AKIS structures like: National Coordination Board, new institutional structures (innovation centres, centres of excellence, hubs), AKIS local structures (operational groups EIP like and joint local government structures)
- New forms of networking and exchange (focus groups, demonstration and monitor farms, mentoring)
- Upgrading to new forms of linking between the various AKIS stakeholders (bottom-up organisational structure and networking)

The REAWG, through the support provided by the German Federal Ministry of Food and Agriculture and the EC, so far has completed the following milestones:

- Identification of needs, capacities and gaps in research, innovation and technology transfer capacities in the WBs
- Development of a WB regional AKIS map
- Creation of national roadmaps for development of functional and integrated national AKIS systems
- Development of national AKIS plans
- Definition of WB regional AKIS priorities
- Initiation of a regional platform for university cooperation, in the meeting of the deans of agricultural faculties from the SEE, held in Ohrid, North Macedonia, on 12 October 2022.

Some of the proposed future regional interventions are:

- Adjustment of the currently operational REAWGs (Wine, Organic Production, Soil) to bring together all related stakeholders for interactive exchange of research, knowledge and innovation
- Establishment of a Regional Educational and Training Centre for training and accreditation of advisors
- Identification of model monitor farms and establishment of WB region-wide network of host farms for the exchange of organised visits for sharing of knowledge, practices, challenges, and solutions.
- Establishment of an OG for 'AKIS awareness raising' amongst farmers and other agri-food stakeholders.

Some of the draft activities planned to be undertaken by the REAWG on AKIS for 2023 are:

Federation of BiH

- Drafting of the Law on Agriculture, which includes the establishment of AKIS
- Drafting of the Rulebook on support for the exchange of knowledge and innovation (with an included measure of support for AKIS)
- Participation in public consultations related to proposed law solutions
- Promotion of AKIS as a new policy instrument
- Animating potential participants in AKIS

Republic of Srpska

- Sensitisation and mobilisation of various multi-actors on the need to formalise an integrated AKIS system
- Establishing an AKIS Coordination Board (aligned with the measure defined in the Agriculture Development Strategy - Establishment of the Council for Scientific Research in Agriculture)
- Updating and improving the procedure for implementing a measure of support to applied research in agriculture, which is financed from the RS Agricultural Budget

Albania

- Carry out a rapid sector and regional analysis for assessing the potential to structure operational groups in Albania
- Establish a measure of support for innovation with focus on addressing climate change adaptation efforts
- Prepare support documents for the criteria of selection in earmarking the grants for innovation.
- Increase awareness using a campaign for promoting the benefits of the measure
- Support OGs in participating to the call for innovation

North Macedonia

- Introduce a life-long learning programme for advisors, establish Educational Centre for certifying advisors
- Assist in developing a training programme for certifying advisors
- Assist in developing a programme for continuous training of advisors

The activities for the rest of the WB countries/territories (Montenegro, Serbia, Kosovo*) are still to be defined.

1.9 Farm advisors

1.9.1 Connecting advisors to boost interactive innovation in agriculture and forestry

Views from the i2connect project[48] by Peter Paree (ZLTO) and Eelke Wielinga (Link Consult)

Connecting advisors to boost interactive innovation in agriculture and forestry – the i2connect project aims to fuel the competencies of advisors who are supporting and facilitating interactive innovation processes. i2connect brings together 42 organisations, most of them directly involved in stimulating innovation in rural areas and food systems in all corners of Europe, especially in CEE countries. The major European farm and forestry advisory services are partners.

The strategy in i2connect is to use the existing advisor networks and the experiences of success to create a broader network and momentum of change enabling a new culture of bottom-up led innovation support. This resource of over 40,000 advisors is critical to support agriculture and forestry at the level of entrepreneurs and is being inspired by this project to support innovation, especially in EIP-AGRI supported activities such as OGs.

For all EU countries, the AKIS is described including a 1-page overview of all relevant actors per country with a particular emphasis on advisors; these reports are published on the i2connect website. An extensive literature review on the roles, tasks, and functions of innovation advisors, complemented with expert interviews was conducted, and the results disseminated in different platforms and published as a scientific article with the title "Competencies for Agricultural Advisors in Innovation Support" – Sustainability 2022, 14 (1), 182. Focus groups are being organised to analyse how the profile of innovation advisor in theory resonates with the day-to-day practice of the agricultural advisor.

An inventory is being made of topical insights and best practices throughout Europe, and these are being analysed and reviewed in an interactive way to guide the development of approaches and tools. A "reflective capitalisation" is conceptualised as a process of structured stock taking (=capitalisation) of insights resulting from both individual and collective levels of reflection with the aim to inspire, inform and support both practice and theory.

The i2connect Advisory Service database

The i2connect Advisory Service database is an EU-wide directory of advisors and advisory services that provide knowledge services to actors in agriculture, forestry, horticulture, and related fields along the agro-food value chain, as well as to other related actors in rural areas. Through the database, you can either search for an advisor or advisory organisation in the EU or register yourself or your organisation. This can help advisors to become more interconnected across the EU and work together in EIP-AGRI projects. This inventory is also very useful to find advisors abroad to interact with or bring a working visit.

A pool of trainers is being trained to work with these materials in groups and to coach advisors optimally. Attention is also being given to the 'enabling environment': ways in which managers of advisory services, research actors, policy makers and others can create conditions that are conducive for interactive innovation processes. The project is supporting the learning of more than 600 advisors through courses in the main European languages. Training courses include a period of moderated peer coaching on the job for advisors. From every training group, some advisors have the opportunity to join cross visit teams for studying interesting cases abroad.

These activities feed into a professional network with many local branches, at one hand supported by the project through a moderated online platform for mutual coaching and sharing experiences on themes that emerge. At the

[48] https://i2connect-h2020.eu/

other hand, a toolkit with practical schemes and guidelines is prepared, so that advisors find their way in the versatile approaches of interactive innovation.

To make it possible for advisors to implement the new interactive innovation skills in their daily work, excellence classes are organised to make the 'enabling environment' (managers, managing authorities, etc) aware of the advantages of the new models.

I2connect directs itself to education: in summer schools, students over Europe have a deep introduction to be the advisors that support the innovations of the future!

1.9.2 Making better use of social sciences, micro-level concepts and empirical findings to support farm advisory policies

Views from the Agrilink project: Pierre LABARTHE (INRAE), Lee-Ann SUTHERLAND (James Hutton Institute), Catherine LAURENT (INRAE), Geneviève NGUYEN (INRAE); Talis Tisenkopfs (Baltic Studies Centre), Pierre TRIBOULET (INRAE), Noemie BECHTET, Ellen BULTEN, Boelie ELZEN, Lívia Madureira, CHRISTINA Noble, Jaroslav PRAZAN, Leanne TOWNSEND, Eleni ZAROKOSTA, Mark REDMAN (Highclere Consultancy), and Katrin PRAGER (James Hutton Institute)

Summary from the Agrilink Policy recommendations: see annex 4.

Farm advisory services in the next CAP (2023-27) and the contribution of the AgriLink project

Agriculture and rural areas are central to the policy objectives of the European Green Deal. The CAP 2023-2027 encourages farmers and other actors to step up their efforts to accelerate the necessary transition to a fair, healthy and environmentally friendly food system by 2030. In 2020/2021, Member States prepared national strategic plans related to a series of specific and Cross-Cutting Objectives, including one focused on fostering and sharing of knowledge and supporting innovation (art. 6). Functional and effective farm advisory services are an important element of this AKIS dimension of MS plans.

The H2020 project AgriLink (Agricultural Knowledge: linking farmers, advisors, and researchers to boost innovation, 2017-2021) contributed to the debates associated with the role of advice in the CAP. One goal of AgriLink was to better understand the roles played by a wide range of advisory organisations in innovation. Central to AgriLink was the idea to analyse the provision of farming advice from farmers' perspectives, utilising the concept of MicroAKIS (micro-level agricultural knowledge and innovation systems): the knowledge systems that farmers personally assemble, including the range of individuals and organisations with whom they exchange knowledge.

Agrilink interacted with the SWG SCAR-AKIS. This enabled the project to witness presentations of draft national strategic plans and fine tune recommendations to this policy momentum. These interactions resulted in a series of recommendations, including a critical reflection on the notion of 'independent and impartial advice' (Sutherland and Labarthe, 2022b). [49]

[49] More information on "Rethinking the Dimensions of Farm Advice can be found in a special issue of the journal Eurochoices: https://onlinelibrary.wiley.com/toc/1746692x/2022/21/1

Recommendations about advisors' training

The next CAP emphasises the necessity to invest in advisors' education and training to ensure they can support farmers with relevant knowledge and pedagogical methods. This is also shared by some communities of advisors that identified the skills advisors should acquire. Our findings are complementary, starting from farmers' perspectives.

First, we identified gaps in advisors' knowledge, skills and functions in a variety of innovation areas: **gaps related to very new technologies (e.g. digital, new crops to adapt to climate change, etc.), gaps in advice on public goods related issues (such as water conservation, animal welfare, but also social, health and labour issues), and gaps related to communication and trust building (social skills, not only soft skills).**

Second, we consider that an understanding of farmers' microAKIS and an application of the Triggering Change Model (TCM) of farmers' decision-making has potential to frame novel training modules. We consider there is a potential **to better incorporate social sciences on farmers' decision-making** (economics, sociology, psychology, ergonomics) **in education and training modules for advisors**, by:

- Helping advisors to support farmers at specific stages of their decision-making (typically when they assess and implement innovation). This requires better integration in AKIS through concrete back-office activities.
- Using farmer-centric approaches, based on an understanding of farmers' needs and personal networks, to highlight gaps and needs in the supply of advisory services in specific contexts.
- Exploring the heuristics of microAKIS and Triggering Change Model of farmers' decision-making on innovation uptake to train advisors and help them identifying conditions and momentum when their advice would have more impact (e.g. farm succession, territorial issues related to pest propagation).

Agricultural advisory services play an important role in facilitating innovation and sustainability transitions in the agricultural sector. They are key players in AKIS, as organisations and infrastructure which facilitate innovation in European agriculture. The Cross-Cutting Objectives (CCO) of the new CAP (2023-2027) focuses on "fostering and sharing of knowledge, innovation and digitalisation in agriculture and rural areas, and encouraging their uptake by farmers, through improved access to research, innovation, knowledge exchange and training" (Art. 6). Farm advisors are central to this CCO.

Recommendation about inclusiveness of advice

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Increasing social cohesion is a key objective of European agricultural and rural policies. Reducing the inequalities of access to advisory services and relevant knowledge provides an important target to strengthen social cohesion within the European farming community. Based on AgriLink's findings, we argue that the

situation of unequal access to advice is a complex issue that requires detailed attention. Our findings indeed show that if a part of these "hard-to-reach" populations for advisory suppliers are well known (small farms, part-time farmers, new entrants, women), other rural and agricultural populations are less often considered in debates about inclusiveness. This includes the population within the family workforce but also beyond (salaried workers, contractors, posted workers). We consider that there is a need to better understand who the hard-to-reach populations are and what their needs are regarding different types of innovation, by:

- Using bottom-up approaches to better understand who are the "hard-to-reach" populations for advisory services in specific contexts but also in specific innovation areas;
- Integrating in the scope of advice some categories of actors that are often overlooked in innovation studies. Some of them relate to structural transformations of agriculture (farm workers, contractors). Others relate to farmers who decided not to adopt or to drop innovations.
- Framing policies that go beyond financial support, that can be necessary but is not sufficient to promote access to advice for hard-to-reach populations. Here again, AgriLink's key concepts of microAKIS and TCM could support advisors in exploring needs and designing new services.

Recommendations about integrated advice

An assumption upon which AgriLink is based is that there is not an automatic, systematic and positive relationship between innovation and sustainable development. Some innovations will have positive impacts on certain dimensions of sustainability along with negative impacts on other dimensions. In other words, there is a need to invest in situations characterised by uncertainty, gaps, and controversies. This calls for holistic advice provision that enables an assessment of the various dimensions of an innovation and that brings together different types and sources of knowledge. This is in line with the CAP 2023-27 promoting an integration of advisory services into broader AKIS, based on multi-actor networks. However, the coordination of fragmented AKIS and pluralistic advisory landscapes is a significant challenge. The contribution of AgriLink is to help managers of advisory services and policy makers to identify situations where the integration of advice could be pushed forward and contribute to the transformative change of farmers' practices for sustainable development at different levels.

- At the farm level, we propose to use the TCM model to identify triggers as entry points to develop integrated advice with farmers.
- At a more global level, we identified conditions where co-design might be applied, based on our reflexive implementation of Living Labs.

Transversal elements between the four AgriLink policy recommendations

Overall, some transversal elements can be highlighted between these four policy recommendations:

- The first one relates to the importance of public support to the back-office of farm advisory services.
- The second transversal element stems in the potential to make more use of advances of social sciences in public policies dealing with farm advisory services.

1.9.3 Who are advisory services leaving out? A critical reflection on 'hard-to-reach' farmers.

Farm advice as a key instrument of more inclusive European agricultural policies

Europe's CAP has broadened its objectives to integrate social issues related to cohesion, labour conditions, occupational health and inclusion. At the same time, farm advisors have gained further importance in the CAP. However, the Agrilink project found some evidence that several groups of farmers and workers are still left aside or even ignored by advisory services and associated policies. Reducing inequalities of access to advice by connecting to hard-to-reach groups has a strong potential to enhance the economic and social cohesion of European agricultures. In Agrilink's research, over 1000 farmers across Europe were interviewed. It revealed features of hard-to-reach groups that are often overlooked. They relate to new labour arrangements in the sector (e.g. more employees), but also to the variety of engagement rationales into farming (e.g. career changers/new entrants) and to farmers' relations to innovation. From this angle, the project critically reflects on the social cohorts who are 'left out' of advisory service provision, and how they can better be reached. A paper clarifies the pluralism of actors of the advisory landscape (Knierim et al. 2017), defining "linked" and "independent" advisors; that is those who are linked to or independent from sales of inputs or technologies (Sutherland and Labarthe, 2022). This enabled to make concrete recommendations about how to engage advisors with hard-to-reach groups, with approaches which are suited to different national contexts of AKIS. These recommendations may contribute to the "AKIS dimension" of National Strategic Plans of the new CAP (2023-27).

Who are hard-to-reach social categories for farm advice?

It is well established that the use of advisory services is highly variable across Europe, both within and across the diversity of national AKIS. Some of these differences are well established. Research from Ireland, for example, has demonstrated that farmers at the extremes of the age spectrum (i.e. older and younger) are often 'hard-to-reach' for advisory services (Kinsella 2018). Farmers operating smaller-scale farms also find it harder to access advisory services (Labarthe and Laurent 2013), and are similarly not considered to be 'good clients' to private advice providers. The same applies for some new entrants to farming (Sutherland et al. 2017). Female farmers may not be identified as priority cohorts or 'authentic' farmers by advisory services (Prager et al., 2017; Trauger, 2010). However, not engaging with advisory services does not necessarily indicate that there is a lack of need or access to professional advice. As Jansen et al. (2010) pointed out, hard-to-reach farmers are diverse. Some may not be engaging with advisory services because they are working directly with researchers and technology developers; these are frequently very large farms who have the skills and resources to bypass traditional advisory services and go straight to the source of innovations. Our analysis supported these findings. They also confirm that financial aspects and advisory costs are not the only reasons for the difficulties in accessing advice. Lack of access also reflects inertia in the social construction of the relations between demand and supply for advice.

The project identified new cohorts who are often overlooked by advisory services and less well recognised in the academic literature: farm laborers, new entrants or 'career changers', and later adopters. These advisory gaps relate to the increasing fragmentation of farmers' cohorts and farm labour organisations.

The first 'hard-to-reach' cohort are **farm workers**. Recent decades have seen an increase in the average size and complexity of European farms. While small-scale and family farms remain, the growing complexity of large-scale farms poses a number of challenges to advisory service provision (*Laurent and Nguyen, 2022*). First, the appropriate candidate for advice becomes blurry. Farm owners may have hired managers, contractors and numerous employees. Enrolment of migrant labour has become common in some regions; these workers are important for uptake of innovative practices, particularly those involved in sustainability transitions. These individuals are disconnected from advisory services, both in relation to their practices on-farm, and knowledge about their rights as employees on farm. Information on human resource management, in particular how to effectively manage migrant labour, is also absent. Advisory services are not meeting the knowledge needs of either farm employers or workers, and a growing proportion of workers are invisible in policy debates, especially casual workers employed by foreign and domestic service providers. Oversimplified representations of the labour patterns at farm level can be highly

misleading for policies related to advisory services. Statistics should be improved, and advisory policies should not only target traditional family farms.

Another category are **new entrants to agriculture**. New entrants in farming are an important group to support in the CAP from various perspectives: the broadening of a knowledge base for innovative farming, the change in the sociodemographic profile of the farm, the uptake of the new environmental and social functions embedded in Europe's green policy course, and the development of new rural-urban connections to make food systems healthier and more sustainable.

Newcomers who have been employed in other sectors (i.e. 'career changers') may have diverse professional backgrounds, including information and communication technologies, engineering, medicine, and they may also come from an urban environment. For instance, findings of research implemented in Latvia suggest that the gap between knowledge needs and services is being filled by new entrants through the creation of professional networks amongst this new cohort, together with industry experts and customers and also to a lesser degree with formal advisory services *(Žabko and Tisenkopfs, 2022)*. However, newcomers to agriculture are often disconnected from traditional AKIS structures, and operate businesses with knowledge needs not typically addressed by advisory services (e.g. short food supply chains, *Kilis et al. 2021*).

The final category relates to the behaviour of farmers regarding innovation. Many innovation studies and advisory policies are still based on diffusionist perspectives following Rogers' early work (Rogers 1963; Rogers et al. 2014) which suggest supporting pioneers and followers would be the most effective means to disseminate innovation. Our results challenge this perspective. We purposely sought farmers with variable profiles regarding adoption - including pioneers **but also non-adopters and droppers** *(Sutherland et al., this issue)*. Although the situations of non-adopters often revealed some gaps in the delivery of advice, there were less expected profiles. Decisions not to adopt an innovation can be related to novel advisory networks that might transcend local boundaries. In other words, these farmers cannot be systematically considered as laggards or as resistors to changes. Some of them are whistle-blowers who highlight sustainability issues related to innovation. These issues might be addressed with better access to advice, but farm advice also needs to be integrated with environmental and social legislation that provide direction to these services (Klerkx et al. 2006).

Our analysis of draft national CAP strategic plans revealed challenges faced by central administrations of Member States. They shared the need to have a better understanding of who is offering advice (on what and to whom). There was also a recognition in several countries that a better understanding of the needs of farmers is required, which would contribute to making advice more inclusive and considerate of farm diversity *(Labarthe and Beck, 2022)*. At various AgriLink workshops *(Leloup et al., this issue)* some advisors also admitted they lacked knowledge about the situations of certain farmer and worker cohorts. Advisory policy context and history are important in that respect. We acknowledge there are situations where advisory suppliers are willing to engage with "hard-to-reach" populations (mostly public actors, farmers' organisations, or NGOs), and other situations where there are not. Options were discussed with advisors and policy makers in these different contexts.

In situations where advisors are willing to engage with "hard-to-reach" groups, public funding could be used to enhance their knowledge and skills by:

- Better integrating farm diversity into advisors' education and training. In France, for instance, some agricultural vocational schools use pedagogical modules whereby students (and thus potentially future advisors) have to engage in comprehensive interviews with randomly chosen farmers and describe their farming systems.
- Providing simplified methodological tools derived from social sciences (e.g. AgriLink's microAKIS concept) to understand farmers' personal networks. Different models of giving advice, adapted to specific needs could then be considered (e.g. mentoring schemes, including digital options). This could help to reinforce information flows beyond the limits of local advisory services.

There are other situations where there might be no actors willing or able to take steps towards including hard-to-reach groups. This might occur when advice is mostly provided by "linked" advisors, which are advisors who provide their advisory services jointly with other activities (including trade of inputs, outputs, machinery, digital solutions). This is the case in many European regions after decades of privatisation. In such situations, policy makers might consider other options:

- Make use of compulsory interactions with farmers (bookkeeping, CAP s for subsidies) to understand farmers' situations and needs and propose appropriate advisory schemes.
- Make use of knowledge about on-farm triggers to identify opportunities when these categories of farmers might be willing to look for advice, such as during farm succession.
- Support initiatives from trade unions or non-governmental associations to improve training and advice provision for national and migrant salaried workers.

Integrating social sciences for more evidence-based advisory policies

There is a need to better understand who are hard-to-reach groups and deploy innovative public policies and actors to engage with them. Potential roles can be explored in the context of CAP's national strategic plans. These roles should aim to (but not be limited to) subsidising access to services. Public actors need to support training schemes on specific advisory skills (soft skills, relational competences) and content (labour rights, etc.). Public administration should also support the production of both statistics and qualitative data about farmers and workers' needs and access to services, for instance through the coordination and monitoring of publicly funded advisory services at the regional level. In other words, there is an urgent need to go toward more evidence-based advisory policies to design services that fit the diversity of needs (Klerkx et al. 2017). In that respect, there is a strong potential to make better use of advances of social sciences, in terms of understanding advice as social interaction and to bolster inclusiveness of public policies.

1.10Underpinning innovation processes and innovation networking

Patrizia PROIETTI (CREA) and Simona CRISTIANO (CREA)

1.10.1 Innovation Support Services

The new CAP Regulation (EU) 2021/2115 requires EU Member States to provide support for innovation, in particular for the preparation and implementation of projects of the EIP-AGRI operational groups. The expected result is a general improvement of connections between actors, policies and programmes/projects, knowledge and experiences, methods and instruments to speed up creation of innovative solutions.

Innovation support services (ISSs) represent a novelty from a policy perspective and, therefore, require governance models, approaches, competences, and tools that foster their effective implementation and embedding in the respective national/regional AKIS.

The term 'innovation support services' became mainstream a few years ago, and was clarified in the CAP 2023-2027 framework. They are described in recital 50, Article 15(4) and 114 of the CAP regulation 2021/2115.

To date, there is no in-depth analysis concerning the actors providing the services, their linkages with other actors and the support they provide to innovation processes. Furthermore, there is little awareness of the skills and competencies needed to improve service delivery.

The previous EU SCAR AKIS report (2019) listed the activities that should be provided by ISSs. Faure et al. (2019) referred to innovation support as "services that make innovation happen by fostering interactions and constructing knowledge". This description included both innovation networking (as by CAP networks 2023-2027) and individual innovation support to develop an innovative idea into an innovation project (as in Art 15(4)) and 114). It covered a wide range of activities aimed at creating the conditions for identifying and discussing solutions, opportunities, and

new ideas by combining perspectives, knowledge, experience and resources. They encompass the facilitation of networking, access to financial resources, support for actors to articulate clear demands, institutional support for niche innovations and scaling, capacity building of innovation actors, awareness raising through dissemination and knowledge exchange and the provision of general advice and backstopping (Mathé et al., 2016).

1.10.2 Actors

ISS providers so far differed considerably across EU Member States depending on whether advisory systems are public/privatised, integrated/fragmented, centralised/decentralised (Faure et al., 2019).

Recent studies have found that traditional agricultural advisory services are not the only actors to support innovation processes, despite their historical role as intermediaries (i.e. knowledge/technology carriers) between agricultural research and farmers.

Innovation support functions may be performed by a variety of providers and according to different policies/strategies, depending on the specific innovation/project, the phase of the innovation process, the characteristics (governance, funding, competences, etc.) of service providers and the context in which these processes take place (Proietti and Cristiano, 2022; Faure et al., 2019; i2connect AKIS reports, 2020).

The rise of pluralistic advisory landscapes, the agricultural innovation policies promoted under the EIP-AGRI framework and the need to provide solutions to complex problems have led to the rise of new actors, either public or private, belonging both to the agri-food sector (upstream and downstream industries, rural networks, cooperatives and consortia, farmers' organisations, Local Action Groups, etc.) and to other sectors (administrative services, project design and management services, strategic advisors, Non-Governmental Organisations, banks, etc.) (Proietti and Cristiano, 2022; Faure et al., 2019). Some actors who did not play an advisory and mediating role, but had experience in the management of research projects (e.g. universities, research centres), have developed new capacities and competences (soft skills) to support multi-actor innovation processes within Rural Development Programs (Proietti and Cristiano, 2022).

The transition scenario taking place among ISS providers has also been fuelled by the former 'vacuum' left by traditional agricultural advisors, who often lacked the right attitude and competencies (especially social) to take on new roles as well as the willingness to abandon their 'comfort zone' (Klerkx and Jansen, 2010). However, recent studies show that efforts are ongoing, even among freelancers, to strengthen these capacities and reorganise services in order to broaden the range of services provided as ISS (Proietti and Cristiano, 2022). They can use CAP 2023-2027 support to do so.

Evidence shows that different actors can coordinate with other ISS providers to provide better help to farmers, as well as to be engaged in the same interactive innovation process contributing, by performing different functions, to achieve successful outcomes (Proietti and Cristiano, 2022; Faure et al., 2019). Indeed, often, there is not a single service provider responsible for driving the whole innovation process. This is because the services which are needed evolve along the innovation process and might require different actors to be involved in a particular phase (Beers et al., 2014).

Furthermore, innovation processes can be pushed not only by providers who have a specific mandate to provide services, but also by other actors, that are not specialised in the provision of services (e.g., farmers' organisations, farmers, public administration, etc.) who are interested in pushing the innovation process forward (Proietti and Cristiano, 2022; Faure et al., 2019; Cristiano and Proietti, 2014). This is particularly true for innovation networking and intermediation activities which can be provided by a variety of actors acting at different phases of the innovation process to facilitate linkages and dialogue.

On the other hand, in those countries characterised by an integrated agricultural service system and a limited number of service providers, one dominant service provider can be responsible for a wide range of ISSs functions (e.g. Teagasc in Ireland) or largely support innovation processes by interacting and coordinating other service providers (e.g. the farmer-based organisation Seges in Denmark and ZLTO in the Netherlands) (Faure et al., 2019).

1.10.3 Functions and activities

Within the AgriSpin project, the diversity of services provided to contribute to innovation processes were summed up into 7 functions (Mathé et al., 2016), that were later refined by Knierim et al. (2020), Faure et al. (2019) and Proietti and Cristiano (2023): awareness-raising and knowledge dissemination; advisory, consultancy and backstopping; demand articulation; networking facilitation and brokerage; capacity building; enhancing/supporting access to resources; institutional support for niche innovation and scaling mechanisms stimulation (Table 2).

As stated by Faure et al. (2019), innovation contributions depend on the phase of the innovation and each function entails a wide range of activities.

The support needed in each phase cannot be pre-defined or clearly identified, because the development of needs depends on and evolves according to a variety of context and innovation-related factors. Nevertheless, in some phases, the provision of specific services is a necessary and imperative condition. For instance, during the initial phases of an innovation process (individual innovation support services), the support must provide the space and resources needed for key actors to innovate. Therefore, it focuses mainly on triggering exchanges, generating new knowledge, facilitating access to seed funds and the setting up of informal and flexible networks. Likewise, after the interactive innovation project has delivered its outcomes, there is a need for services aimed at ensuring the scaling and institutionalisation of the innovation, both at farm, value chain and territory level. Besides traditional training and dissemination services, intermediation and institutional dialogue are key to ensure adequate embedding of innovation in value chains and in local territories and to design and enforce new arrangements towards institutionalisation (Faure et al. 2019; Kivimaa et al., 2018).

As a part of the i2connect project, a study is currently ongoing in order to deepen, together with EU ISS providers, the functions proposed in previous projects/studies and to articulate the main activities encompassed by each of them, with the final goal of identifying a methodology for the simplification of innovation services costs to be applied in the framework the new CAP interventions. An early articulation of innovation process activities according to Faure, Knierim and Mathé until 2020 is summarised in Table 2.

The first results of this study confirm that the function "Awareness-raising and knowledge dissemination" is in almost all the phases of the innovation process, reflecting, as already stated by Faure et al. (2019) a general need for actors to access and exchange knowledge. Indeed, this function seems to be one of the most important, at least in terms of resources committed. It encompasses the dissemination of technical and scientific knowledge and information to farmers and other target groups, including advisors, through the use of a wide range of methods and tools (website, brochures, webinars, workshops, demonstration events, study visits, etc.), including 'knowledge transfer' approaches. The most demanding activities concern the upstream phases of dissemination, i.e. the selection and evaluation of information and its 'transformation' into usable knowledge for the different target groups (Proietti and Cristiano, 2023).

"Advisory, consultancy and backstopping" encompass on-demand services aimed at solving complex problems and co-construct solutions. They are characterised by the high content of soft skills and the ability of the advisor to 'handle' the production process, facilitating the connection with other services. The soft management of production processes, which entails communication, ability to listen and to value farmer's insights, combined with technical capacities and interactional expertise (Ingram, 2008), as well as the ability to collaborate with different kinds of actors and develop adequate practices (Nettle et al., 2017), also underpins the development of multi-actor project pathways.

The function "networking, facilitation and intermediation" is transversal and, contributing to/facilitating the other functions, it is crucial in all phases of the innovation process. Networking, in particular, is a strategic function that takes up a large part of the efforts in innovation processes and is fundamental in triggering and finalising innovation pathways. As already pointed out by Faure et al., (2019), the function takes different forms depending on the phases, the number, the type and the capacities of the actors involved (Klerkx and Leeuwis (2009)) and their needs.

The "support to access to resources" function plays an important role, especially with regard to access to financial resources, relations with funding bodies and project management, as well as the "demand articulation", which includes key activities to build a multi-actor process from the ground, starting from needs analysis, through to the development of a common vision and the creation of bridges with users and other actors to make the need concrete, defining its contents, specificities and costs (Proietti and Cristiano, 2023).

The provision of 'services aimed at enhancing the capacities of actors' according to these sources (till 2020), would not seem to be a key function and their role is described here as being minor compared to information and dissemination activities.

Finally, 'support for niche innovation and the stimulation of scaling mechanisms' is mainly offered as dialogue and intermediation activities at various levels, horizontal, supply chain, institutional and community levels. This function, which may include authorisation processes that are needed to allow an innovative product to the market (standards, intellectual property, patents, etc.), may be crucial for the embedding of innovation. Faure et al., (2019) argue that there is no specific type of service provider that is solely responsible for this kind of service, but multiple actors (farmers' organisations, private firms, cooperatives, etc.) can perform the function, either coordinating or not. Proietti and Cristiano (2022) found that, in many cases, there is a lack of awareness of scaling mechanisms that are often confused with dissemination. On the other hand, the scaling function, meaning the shift from the first circle of users/co-innovators to a wider circle of user, entails iterative processes that extend beyond the lifetime of projects and, therefore, requires a dedicated budget and the capacities to interact with different systems at multiple levels. This could be considered when implementing the interventions of the new CAP, where incentives (rewards) for follow-up projects could be established, with a specific focus on scalability of the results of previous projects. In particular, the involvement of end-users in the multi-actor development of the outcomes of the interactive innovation project is key in this regard, to speed up implementation. The involved end-users will influence their peers and increase applicability as well as wider scale application.

In particular, the achievement of a higher degree of diffusion of innovation at multiple levels can be hampered by resistance to change and may require specific services and policy support (Brunori et al., 2011). Therefore, in implementing the interventions of the new CAP it might be appropriate to envisage a specific institutional support for scaling functions (e.g., a specific ISS provider with a public mandate or the CAP Network), especially in Member States with a privatised and decentralised advisory service system.

Recent advances in the comprehension of innovation processes will be further explored under the project "ATTRACTISS - AcTivate and TRigger ACTors to build a deeper understanding of Innovation Support Services", which has been launched in October 2022 and will run until the end of 2028.

Table 2. Innovation process activities

Function (based on Faure et al., 2019; Knierim et al., 2020; Mathé et al.; 2016)	Activity
Awareness-raising and knowledge dissemination	Dissemination of information (website, brochures, magazines, newsletters, bulletins, webinars, etc.), organisation of exchange visits, organisation of demonstrations, etc. • Selection and evaluation of information • Transformation of information into documents (targets: advisors, farmers, etc.) • Language translation
	Meetings
	Communication of project results
	Supply of knowledge and technical information for innovation (knowledge transfer) • Selection and identification of know-how and transfer of knowledge /technologies

Advisory, consulting and backstopping	Articulation of advisory needs / specific need to provide a more targeted support • Data and information gathering • Design of tailored advisory packages
	"Management" of the innovation process (soft skills) • Support to find specialised advice
	Organisation of backstopping pools (research / advisory / SME / etc.) to find a solution to a complex problem
Demand articulation	Needs analysis
	Strategy and vision development
	Feasibility analysis
	Searching for ideas and solutions
	Building bridges with users and intermediary organisations to make the need concrete, defining its contents, specificities and costs
Networking, facilitation and brokerage	Partner identification and aggregation
	Internal: facilitation, mediation and conflict management (construction of the project proposal, definition of objectives, roles, knowledge exchange, collective learning, etc.)
	External facilitation: facilitation, mediation, network strengthening and conflict management • Mediating the relation with the MAs/Granters • Mediating / building bridges with stakeholders and potential users • Brokerage along the production chain
Capacity building	Traditional training/Face-to-Face individual training
	Peer-to-peer facilitation/Coaching
	Experiential learning
Enhancing /supporting access to resources	Facilitating access to facilities and equipment (technological platforms, laboratories, etc.)
	Facilitating access to inputs (seeds, fertilisers, etc.)
	Facilitating access to financial/insurance services
	Facilitating access to funding o Application preparation and submission to grants (e.g. OGs, HORIZON-EU, …)
	Project management
	Negotiation with authorities to create 'protect' space for experiment
Support for niche innovation and scaling mechanisms stimulation	Provision of incubators and experimental infrastructures
	Support for the design and enforcement of norms, rules, funding mechanisms, etc. that facilitate the diffusion of innovation
	Exploitation strategy and action plan design and implementation
	Brokerage along the production chain
	Supporting intellectual property (patents) and patent authorisation processes
	Negotiation with people affected by the innovation

Source: Proietti and Cristiano, 2023

2. Achieving greater impact in the MAA

2.1 The multi-actor approach as a basis for interactive innovation

Natalia Brzezina (DG AGRI)

The interactive innovation model is based on a **multi-actor approach** (MAA) that involves all relevant actors with complementary backgrounds and expertise to co-create and share knowledge, best practices and innovative solutions responding to the needs of the users, farmers, foresters and advisors, in a bottom-up approach. The MAA in the Horizon Europe work programme[50] is considered as a form of responsible R&I, aiming to make the R&I process and its outcomes more demand-driven, reliable, and relevant to society.

The most recent **definition and requirements of the MAA** are included in the **introduction** of the Horizon Europe Cluster 6 **Work Programme 2023-2024**[51].

Within the EIP-AGRI, the interactive innovation model is being applied in Horizon-funded MAPs, ANs and TNs, as well as CAP-funded OGs. While MAPs and OGs are co-creating new knowledge and solutions, focusing more on tacit knowledge of the practitioners and real needs on the ground, the ANs and TNs aim to share knowledge and innovation as widely as possible among the practitioners. By engaging users and key intermediaries when defining specific needs and designing the project and its activities, it is more likely that appropriate innovative solutions will be put forward and quickly applied in the field (Feo et al., 2021).

multi-actor projects aim to have the outcomes implemented more extensively. This entails more than just widely disseminating a project's results, or listening to the views of a board of stakeholders. A multi-actor project ensures the genuine and sufficient involvement of a targeted array of actors, which serves the objectives of the project. These actors include: i) researchers, ii) farmers / farmers' groups and associations, iii) foresters / foresters' groups and associations, iv) aquaculture producers, v) fishers / fishers' groups and associations, vi) advisors, vii) food and bioeconomy businesses, viii) other businesses, ix) consumer associations, x) local communities, xi) citizens, xii) civil society organisations including NGOs, and xiii) government representatives.

Co-creation, co-ownership and co-operation in multi-actor projects

Building blocks for the project are expected to come from science as well as from practice: it is a 'co-creation' process. Practitioners and (end) users are to be involved, not as a study-object, but to use their practical and local knowledge and/or entrepreneurial skills to develop solutions and create 'co-ownership' of results for (end-) users and practitioners. This will contribute to and speed up the acceptability and uptake of new ideas, approaches and solutions developed in the project.
Which key actors are relevant to participate depends on the objective of the project. They are essentially the (end-) users of the project results who are backed up by any other useful intermediaries and actors who can contribute with further expertise and innovative ideas relevant to the project's objectives, and support communication and dissemination. The genuine and sufficient involvement of such actors should take place all over the whole course of the project: from participation in development of the project idea, planning and experiments to implementation, communication and dissemination of results and to a possible demonstration phase.

[50] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/cluster-6-food-bioeconomy-natural-resources-agriculture-and-environment_en

[51] Horizon Europe Cluster 6 WP 2023-2024, p. 21-23: wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2023-2024_en.pdf (europa.eu)

Requirements for multi-actor projects

MAPs have further requirements that have been spelled out in detail in the Horizon Europe work programme[52]. More specifically, a multi-actor project must include the following elements:

- It must demonstrate how the proposed objectives and planning are targeting the needs/problems/challenges of and opportunities for the (end-)users of the project results;
- It must demonstrate how the description of the project concept and in particular the composition of the consortium reflects a balanced choice of relevant key actors who have complementary types of knowledge (scientific, practical, etc.), and must ensure that project results which should be ready for practice are broadly implemented;
- It must demonstrate how the project intends to use existing practices and tacit knowledge. This should be illustrated in the proposal with a sufficient number of high quality knowledge exchange activities outlining the precise and active roles of the different non-scientific actors in the work. The cross-fertilisation of skills, competencies and ideas between actors should generate innovative findings and solutions that are more likely to be applied on a wide scale;
- It must demonstrate how the project will facilitate the multi-actor engagement process by making use of the most appropriate methods and expertise;
- It must demonstrate the project's added value: how it will complement existing research and best practices;
- It must demonstrate how the project will result in practical and ready to use knowledge, approaches, tools or products, that are easily understandable and freely accessible;
- It must demonstrate how these outputs ready for practice will feed into the existing dissemination channels most consulted by the (end-) users of the project results in countries and regions.

In addition, to ensure EU-wide communication in all areas related to the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) and the common agricultural policy (CAP) specific objectives, in particular agriculture, forestry and rural development, this knowledge must also be summarised in an appropriate number of 'practice abstracts' in the common EIP-AGRI format. For areas falling outside the remit of EIP-AGRI and CAP specific objectives, other similarly effective solutions ensuring dissemination at EU level should be sought.

Where applicable, it is strongly recommended that interactive innovation groups, such as EIP-AGRI Operational Groups funded under Rural Development Programmes, become involved.

[52] https://scar-europe.org/index.php/akis

2.2 CO-FRESH, an example of MAA in food related systems

Views from the CO-FRESH project, Edelbis López Dávila (Ghent University)

The co-creating sustainable and competitive fruits and vegetables' value chains in Europe (CO-FRESH) project[53] is a Horizon-funded project under the Topic RUR-06-2020. CO-FRESH proposes developing techniques, tools and insights for re-designing agri-food value chains. Through collaborative and systemic approaches, the tools and formats will be applied in 7 pilot cases representing diverse fruit and vegetables agri-food value chains (including protein crops for food and feed) across Europe.

CO-FRESH brings together, in its consortium, all the actors engaged in agri-food value chains: farmers (ZOE, PILZE, FLORETTE Horticola Navarra), farmers' organisations (CONFAGRICOLTURA, CRAPDL, EKOWOOC, COEXPHAL, UNICA Group), food industry (FLORETTE), SMEs (ZOE, PILZE), traders & distributors (TPC; EUCOFEL KIS, COEXPHAL, EKOOWOC, FSCI) Consumers (EUROCOOP), Environmental and social non-governmental organisations (OMKI; COOPSEUROPE, EUROCOOP). In addition to the consortium members, other private companies, NGOs and public agencies (CRAPDL, ACTALIA CNTA, CREDA, TCA, UHOH, UGENT, UNIBO, WULS WUR, UAL) are involved through the 7 pilot cases[54], actively involved in the Pilot Case working groups that guide the (re)design and implementation of innovative approaches in the pilots.

CO-FRESH takes advantage of the multi-actor approach by engaging all relevant actors of the agri-food value chain in co-creation at the different phases of the project and at different levels (policy, rural development, socio-economic etc.).

Moreover, the consortium is built from several key actors that have complementary expertise and play a role in different parts of the agri-food value chain. CO-FRESH consortium reflects the multi-actor approach to the project: in order to assure a systemic approach when assessing the current situation and co-creating more sustainable and efficient value chains within the CO-FRESH Pilot Cases. An overview of the CO-FRESH partners' specific expertise is given below.

[53] https://co-fresh.eu/
[54] https://co-fresh.eu/pilotcases/

Figure 9: Overview of the multi-actor approach (MAA) in the COFRESH H2020 project

In addition, several multi-actor participatory activities are being carried out during the project to enhance the exchange and co-creation such as participatory technical workshops (2); with partners from different RUR-06 and 7 projects [55] (sister projects) to advance on specific agri-food value chains assessment methodologies; technical workshops (1) in Slovakia and (7) linked to Pilot cases combined with cross-exchange visits for other RUR-06 and 07 projects, as well as a final event in Brussels engaging key actors along the value chain (farmers and farmers' organisations, input and food industry, SMEs, traders and distributors, food-related services, consumers, environmental and social non-governmental organisations, and public authorities).
As an ambition, CO-FRESH will closely collaborate with multiple actors engaged in the 7 Pilot Cases, and explore, together with these actors, the innovation potential of both technological and organisational changes. CO-FRESH will explore and test non-traditional forms of cooperation and collaboration, both within value chains and between value chains and external actors (including ICT-based platforms, multi-actor cooperatives, community-supported agriculture, cross-sectoral associations), and how these forms of collaboration relate to sustainability objectives.

Expected Impacts

Long-term, win-win economic relationships between actors from agri-food chains which effectively collaborate towards common sustainability objectives:

CO-FRESH will organise technical workshops for farmers and their food chain partners in France, Hungary, Italy, the Netherlands, Poland, Slovakia, and Spain. These multi-actor workshops will present best practices and experiences of effective collaboration for sustainability in agri-food value chains. In addition, new business models (resulting from the 7 Pilot Cases) will be presented and discussed in these workshops. These workshops will increase the replicability of CO-FRESH findings beyond the project boundaries, making results reproducible and operational in other food systems in Europe and in other regional and local food systems around the EU.

Community building, social empowerment, and cross-sectorial networking: If the multi-actor bottom-up approach implemented in the project is a good means to collect well-founded information and to ensure an effective

[55] https://co-fresh.eu/networking/

anchoring of project outputs in the reality of the field, it is also an end in itself, since it contributes to community building and actors' empowerment, fosters networking and initiates cross-sectoral collaborations.

The project will define operational and multi-actor WGs for each Pilot Case, as well as a detailed methodology to be used in this "Collaborative redesign of agri-food value chains in the Pilot Cases". It will also organise the interaction with other H2020 multi-actor projects, such as the related H2020 thematic networks and the OGs within the EIP-AGRI. As a result, it will produce a joint policy report with the SWG AKIS and the SWG Food Systems. In addition, CO-FRESH will connect with projects such as the H2020 EUREKA which created a multi-stakeholder community through the creation of a common EU-wide European Knowledge Repository for best agricultural practices.

To ensure adequate involvement of key actors, CO-FRESH partners have involved agri-food SMEs in the proposal phase to ensure their buy-in. In addition, the direct involvement of agri-food clusters as partners offers greater pan-European access to relevant actors, ensuring replication.

2.3 Best practices for an effective MAA

2.3.1 The Multi-actor thematic network

Views from the EURAKNOS H2020 project[56]

The MA TN is **a partnership between key actors** who share a **common challenge** or opportunities on a particular agriculture or forestry 'theme' and have the need, capacity, and motivation to work together to find practical solutions based on existing knowledge. The TN partners need to be from at least three EU MS and from a **variety of organisations** e.g. advisory, research and farmer organisations, as well as enterprises, education, NGOs, administration, and regulatory bodies, all with different but important complementary knowledge and expertise required to solve the issue.

To build the right TN consortium, a **network analysis and/or actor mapping** at the beginning of the project to identify all AKIS actors involved in the challenge and related opportunity the TN wants to is a good It will allow to identify not only who should be involved, but also how different actors should be involved, and which not-so-obvious but essential actors that might be missing. Actors can be engaged in different ways to actively contribute to the project and its outcomes. Whilst project consortium partners are defined to co-conceptualise the project, the TN must be **flexible and open to relevant actors joining the network** at any stage as the theme of the TN evolves in participatory activities. In the context of Horizon projects, an **actor** is a 'partner **taking an active part in project participatory activities**' while a stakeholder is a 'person expressing a view/ stake at a certain moment during the project. Actors therefore take an active role within the TN, influencing its direction and contributing to outcomes; whereas stakeholders have a stake in the outcomes of the TN, they do not invest time and energy in the collaborative process.

The formation of the project consortium can start with a few actors who have a specific interest in the theme, are motivated and engaged, and can inspire and advocate other actors to join. This initial group will have **vision** and

[56] From the EURAKNOS Deliverable D1.4_MA_Data_BestPract_WP1.pdf (eureknos-eureka.fra1.digitaloceanspaces.com) and Explorer's Guide 2021_12_21_EnglishExplorersGuide_FINALREVISION.pdf (euraknos.fra1.digitaloceanspaces.com)

ownership to drive the direction of the proposal. It is essential that all partners, **including relevant users and user organisations**, are involved in the **co-design** of the project. Assigning **roles** and dividing responsibilities across partners in the conceptualisation phase according to the different but complementary knowledge each actor contributes to identify whether any key skills, relationships or capacities are missing. For example, **professional communication and dissemination** is crucial for raising awareness and reaching a wider audience and therefore your TN's success. Achieving gender balance, ethnic diversity and geographical representation (including Eastern Europe) within the consortium is also important.

What is the MAA?

The MAA is all about bringing people together, with unique, complementary skills from science and practice, to work together to co-create knowledge ready for practice by farmers or foresters on a specific theme within agricultural research and innovation. Building trusting relationships between organisations and individuals is, therefore, key to the success of your MAA. Collaboration between all actors in the project is key to combine these different sources of knowledge, experience and perspectives. Your TN's goal is to generate practice-based solutions to current challenges faced by farmers, foresters and other users, jointly developing solutions together on a local, regional or national scale. Key to the success of your MAA is a facilitator whose role is to maximise the inputs from all actors and keep the TN functioning as a dynamic, co-learning and co-creating knowledge ecosystem. In a TN, the MAA is implemented on two levels: 1. The consortium level with the formation of a MA TN involving all actors relevant to the purpose of the TN, for example advisory, research, farmer and forestry organisations. 2. The project implementation level where project activities revolve around working directly with users to co-create ready for practice knowledge to ensure uptake by users directly involved in the TN, and dissemination and exploitation of results to the wider farming and forestry community

2.3.2 What is the right size of my TN?

There are no hard and fast rules on the size of the consortium. It may depend on the objective of the TN, the capacity of its partners and the project budget. Your TN should be made up of a diverse group of partners who all have their own institutional history and culture, priorities, and modes of working. Carrying out team building exercises to **collaborate, build trust, engage and create ownership** for all partners over the direction of the TN is key and Investing time and capacity to facilitate this process and make the TN function as a **healthy living network** throughout its lifetime. Part of this process should include a co-created memorandum of understanding or codes of conduct agreed by all partners as to how to work most effectively, and how to keep up engagement, motivation and energy throughout the lifetime of your TN. In several TNs a **professional facilitator** is appointed to streamline communication between the partners for effective teamwork.

2.4 Strengthening the enabling environment for multi-actor process facilitation

Views from the Horizon 2020 LIAISON project (see annex 6 and annex 7)

The LIAISON 'How to Guides' shed light on the tasks, roles and responsibilities that **co-innovation facilitation** covers in order to deliver an efficient and effective process management with and for an innovation project group or network. The five key issues addressed by the LIAISON 'How to Guides' are: Coming Together, Good Planning, Healthy Partnerships, Connected Partnerships, and Achieving Impact.

The preparation of these Guides was based upon evidence from case studies undertaken across Europe and in many different rural contexts. Since innovation process management and facilitation tasks change with the progress of a co-innovation project, the Guides refer to three common phases that consortia pass through when co-designing their innovation (Figure 10): Partnership building, Co-creation, and Dissemination/exploitation, while Networks represent the centre of all interactive innovation activities. The five 'How to Guides' are supported and complemented by two further Guides: • 'Participatory Methods for Facilitating Co-innovation projects'[3] presents lessons learnt from multi-actor projects when it comes to the facilitation of group processes and the management of the collaboration within the innovation group or with external stakeholders. At the same time, it is the gateway document for the facilitation methods and tools (20) for the particular purpose of multi-actor project facilitation. The other Guide leads the user to the 37 tools for the 'Evaluation and Impact Assessment of Co-Innovation'[3].

2.4.1 Coming Together

LIAISON's How to Guide 'Coming Together' highlights tips and tricks for co-innovation practitioners who have a shared idea and aim to work on it together. It explores the early phases of working in partnership, including ideas generation, ways of accessing networks in order to create a partnership for co-innovation, and relevant considerations around funding. An idea for a co-innovation activity does not appear out of nowhere but may originate from: an individual person or organisation (an actor); a formal partnership such as a project consortium; an informal partnership such as a cluster or network; a call for proposals on a certain subject by a funding body. Usually the core group knew each other from e.g. earlier collaborations, membership with the same association, or they studied together.

Public institutes can provide support based on an innovation support programme. For example, the RISS Programme TRUE project LIAISON case studies help to shape an idea, to build a multi-actor partnership or the preparation of a project application. Such an innovation brokerage service can explain who else is interested in a certain topic and find out whether there is potential for joining another group. Other types of support can be provided to groups that finalised a project. They will need information on a follow-up programme that provides funding for e.g. the commercialising of their 'invention' as the example of the shows. These two, as well as others, show that co-innovation groups tend to emerge from existing formal or informal networks. Various forms of innovation networks exist but they all bring together people with common interests and/or common problems, e.g. farmers' associations or other NGOs, cooperatives, official rural networks, study courses, village/industry initiatives, and friendships. For policy makers, two aspects are important in this context:

- Existing networks, which are delivering knowledge exchange and innovation, are excellent seedbeds for new and diverse multi-actor projects. However, these networks need continuous management, which requires funding. Since membership fees are often insufficient for the personal costs, a form of institutional funding might be needed.
- It can be difficult for less connected individuals or smaller organisations to find out about and gain access to such networks. Publicly funded innovation support services with such connections can help to find the right networking opportunities for these.

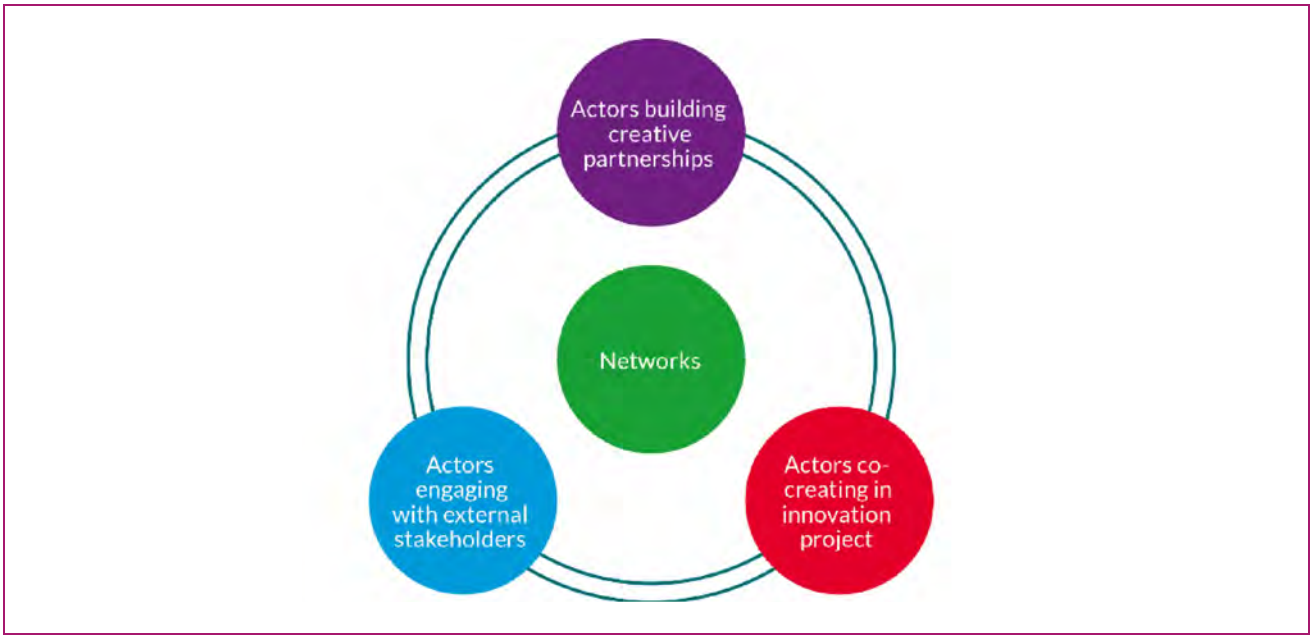


Figure 10 Characteristic Phases of multi-actor projects emerging from and amalgamate into their local or sectoral networks

2.4.2 Good Planning

The How to Guide 'Good Planning' explores the ways to lay a strong foundation for working together in multi-actor projects with a focus on establishing models for group structure and leadership, adopting clear and well-matched roles and responsibilities, fostering trust and good communication, and planning ahead for monitoring and evaluation. The responsibility for this challenging step of effective and efficient planning for future co-innovation lies within the groups. In particular, the leaders of such initiatives have to apply participatory methods that help everyone in the group to express and share their ideas, fears, expectations, agreements and disagreements in greater depth, and thereby agree upon common goals for the project. Good facilitation skills foster mutual understanding and help to build trust - an essential foundation of all partnerships.

Policy makers and officials in the field of agri-food, forestry, rural development and the related education and training institutes can help to overcome related challenges for making the interactive innovation approach a success. Decision makers in policy and education can make sure curricula are enriched and trainings offered for the formation of a) Interpersonal skills for managing difference of opinion and to facilitate decision-making; b) Technical skills for the development of innovative approaches; and c) Functional skills for the engagement in co-innovation. Functional skills refer to leading (contributing) to longer-term group processes and understanding partners' interests and motivations. Learning to speak 'different languages' is of particular importance. This refers not only to foreign languages such as English, but also to the languages used by scientists, farmers, foresters, value chain businesses or administration where misunderstanding or lacking communication are often hampering cooperation.
A common success factor of consortia, which are practicing interactive innovation, is the genuine sense of involvement and encouragement experienced by participants. The leaders or facilitators in charge, therefore, need

to have a good understanding of participatory methods to recognise and value the differences and diversity of all project members.

2.4.3 Healthy Partnerships

The How to Guide 'Healthy Partnerships' highlights key learnings from LIAISON that can help improve the quality of collaboration, communication, and coordination in multi-actor partnerships. An effective leader is a critical driving force for coordinating the co-innovation process all along the duration of a funded project. Competencies needed include both 'hard' technical and 'soft' functional skills, in order to have the ability to guide partners, and to engage with different target audiences. It is the responsibility of the project management team to monitor the quality of the interactivity of those working on the envisaged outputs.

Both, an effective and encouraging project management, and the related facilitation tasks and skills are the two essentials for the steering of this special type of innovation projects. The rather technical project management skills are based on training and work experience of the management team. However, agriculture, forestry and related studies or training often hardly cover the topic of project management. For that reason, the provision of support (e.g. funding) for the training of actual or future multi-actor project coordinators can improve the delivery of co-innovation projects. Such well-targeted training addresses the organisation of the complex processes from planning, organising, managing, and controlling, to budgeting, monitoring, testing, and realisation of the interactivity as well the delivery of the foreseen technical, organisational or social innovation. The facilitation tasks and skills can, but do not have to, be delivered by the management team. External facilitators or skilled consortium members are needed. LIAISON studies highlight that the tasks and skills in facilitation involved vary greatly from group to group. The facilitation skills required to work with a short-term, farmer-led initiative are different from those needed to co-ordinate a long-term multi-stakeholder project with international partners. In most cases, providers of innovation support services working under a tender for the Ministry are not able to help with the project management and project-related facilitation tasks.

2.4.4 Connected Partnerships

LIAISON's How to Guide 'Connected Partnerships' explores the opportunities and barriers to cooperating effectively with other individuals or organisations from the wider network because effective innovation is enriched by knowledge sharing through continuous dialogue not only within the consortium but also with a set of external stakeholders. This engagement starts with the early phase of coming together and lasts throughout the lifetime of the project or even beyond e.g. during the commercialisation of the innovation.

It is good that many funders already expect – or officially require – that not only the findings but also the activities during the working phase of the project have to be shared with others outside the co-innovation project, especially the potential users of an innovative solution. This requirement might be subject of an interim review done by the funder. In order to comply, however, the beneficiaries need to have sufficient resources (and time) reserved for an encompassing stakeholder engagement. It would help less experienced applicants for a co-innovation project when the funders raise awareness for these particular resources, which the consortium will probably need and might have overlooked. It would be good if consortia could be encouraged to make such adjustments during the negation phase with the funding in preparation for the official granting.

At the beginning of the project, the teams need to carry out the exercise of identifying and involving relevant external stakeholders, and also periodically reflect on, amend and update this task as the project activities develop and new opportunities arise. Officials from policy, administration (managing/granting/funding authorities) and from relevant publicly funded networks can help by bringing together those public servants working in the same thematic field with the consortium. In many contexts, public servants do still not see themselves as active players within the AKIS, but they could have many opportunities to enhance the impact of innovation projects.

Co-innovation does not only involve collaboration within the group of fixed members but can even include the effective involvement of new cooperating partners throughout the project. In such cases, funders can contribute by allowing for flexibility and encouraging the project management team to undertake an amendment in order to address the unexpected needs of a co-innovation consortium.

For the various situations, the project managers and/or co-innovation process facilitators need participatory tools. LIAISON offers a toolbox with facilitation tools for the stakeholder involvement (see Participatory Methods and Tools[3]) and for the assessment of their ongoing work (see Impact Assessment and Evaluation Tools[3]). In any case, the use of the 'right' language is crucial not only for the internal communication (see above) but also for the engagement of others from outside the project.

2.4.5 Achieving impact

The How to Guide 'Achieving Impact' explores ways to maximise impact of the outputs and achievements of co-innovation projects. It focuses on the sharing and disseminating as well as the creation of a legacy from the co-innovation activity. It highlights that project groups will benefit from having a clear and well-planned dissemination strategy for its results and innovative solutions.

As highlighted for the early phase of building the group, well-functioning knowledge and innovation networks play a key role again because the results and lessons learnt from experiencing co-innovation will feed back into the formal and informal networks again. This embedding of achievements reached by the co-innovation activities is crucial for the emergence of new ideas and additional co-innovation groups. Well-working networks, maintained by an ongoing facilitation, require funding in order to fulfil the task of ensuring the dissemination and long-term impact of the outputs delivered by co-innovation projects.

The official requirements for the consortia to deliver a strategic plan for the communication about the project, for the dissemination of interim and final findings as well as the exploitation of results is common for EU framework MA projects. This is helpful and could be an example for other funding programmes supporting co-innovation. However, the preparation of meaningful and supportive plans, including the related risk assessment measures, is a challenging task in particular for less experienced project leaders and their teams. Programme designers and/or granting authorities as well as official or privately commissioned innovation support services could offer information and training on how to develop and implement these strategic plans. Communication, dissemination and exploitation will always be different between projects. There is no standard template to be used which makes individual training and learning even more important. Moreover, the hot topics of the protection of intellectual property and related competitive advantages and the related Open Access rights are areas that require professional advice from a public institute. Otherwise, the consortia have to commission very costly external consultancy services (e.g. a public relations agency or a solicitor), which they can often not afford. At this point, public support could be provided by the new funding measures for various forms of advice for farmers, foresters, and rural entrepreneurs.

Policy and administration can also help a co-innovative consortium to achieve impact by the provision of timely guidance to new or other funding. Important is also to allow for synergies between different funding programmes. For example, if an innovative activity requires an investment, access to funding will be a key for the innovation's adoption. Such groups might explore where funding can be accessed and how it can be combined with the currently used programme. Access to (new) funding often turns out to be an extra and unforeseen 'project' for the project teams. For that reason, they will profit from e.g. a funding guide, mentoring or business incubator programme for co-innovators who are planning to enter a new market.

Granting authorities or other officials in charge for a co-innovation project might find the technical reports less satisfying as they had expected. It appeared that project participants – in particular, those with a practical point of view – tend to be challenged by identifying and describing the impact of the innovation they had created together. To understand such reasons, however, might help the officials to provide well-targeted support. Co-innovating consortia may find it difficult

- to recognise and appreciate the value of their activity to the wider (and distant) community, who are not directly involved in the innovation.
- to change people's mindsets and support the creation of attitudes that are receptive to change.
- to assess societal or environmental benefits. In contrast, economic benefits are easier to assess (and more immediate).
- to value their personal role in contributing to societal goals such as the mitigation of climate-relevant emissions.
- to measure and show their success with a convincing quantitative or qualitative measurement.

Public institutes engaging with co-innovation consortia can point the project management teams to the methods and tools for the assessment of co-innovation processes, of linkages within the group or with external stakeholder networks, and the impact assessment for the project's results.

Closely connected with the five How to Guides, which show good practices from various types of groups or project consortia applying the interactive innovation approach, LIAISON teams have developed an encompassing toolbox for the facilitation of interactive innovation and evaluation and impact assessment. Two dedicated Guides help users to identify and select suitable tools for their particular needs. These hyperlinked brochures provide access to the individual tools.

3. The role of education in the EU AKISs

3.1 The underestimated importance of educators in interactive innovation projects

Views from the Liaison project, Susanne Von Muenchausen (HNEE) and Anna Haering (HNEE)

3.1.1 Introduction

Educational institutes are one of the key players listed when an AKIS analysis presents AKIS actors and analyses the connections as well as knowledge and information flows between them. The debate surrounding the role of educational institutes in co-innovation in agriculture and forestry tends to focus on the need for educational institutes to further develop the skills of AKIS actors, especially farmers and foresters; the role of universities in (international) research projects, and of other tertiary educational institutes in national/local (applied) research projects.

ISCED-levels

Education for cooperation, communication and co-creation starts early. Competences are built throughout the educational system from primary school up to lifelong learning of post docs or professors. In order to allocate the SCAR-AKIS topic of education and the role of educational institutes in the AKIS, it helps to go back to the levels of International Standard Classification of Education. These rank the diversity of educational activities by seven levels. With the particular focus on professional education in the farming and forestry domain, the ISCED levels 4 to 8 are of interest for the enhancement of co-innovation.

Childhood and secondary education	*Professional education*
ISCED 0 = Early childhood education ISCED 1 = Primary education ISCED 2 = Lower secondary education ISCED 3 = Upper secondary education	ISCED 4 = Post-secondary non-tertiary education ISCED 5 = Short-cycle tertiary education ISCED 6 = Bachelor's degree or equivalent ISCED 7 = Master's degree or equivalent ISCED 8 = Doctoral degree

The following paragraphs aim to shed light on the potential of educational institutes in helping to close the gaps in the AKIS and in supporting co-innovation groups and networks to reach their milestones. The analysis is based on case study work of the LIAISON project, that was expected to contribute to the SWG SCAR-AKIS. The horizontal analysis of LIAISON case studies focusing on the (potential) roles of educational institutes in the AKIS was one of these contributions.

The analysis of the universities and their role in the AKIS was not as straightforward as foreseen due to the institutes' mixed roles of education and research. Universities, universities for applied sciences, agricultural colleges' etc. do both (applied) research and education in parallel and often even at the same time! Professors, lecturers, and senior scientists act simultaneously as researchers and teachers. This blending of teaching and co-creation for innovation depends on personalities, curricula, strategy of the institute and available resources. For that reason, an assessment of the institutes' impact on the AKIS through education and training OR research will be difficult, if not impossible.

3.1.2 Role of educational institutes in the AKIS: Four Pathways

The case study analysis revealed four pathways of involvement for educational institutes:

1. Education and training of future participants by imparting the capability of co-creation for innovation of students and university staff.
2. Maintaining a lively network of diverse agricultural actors and helping innovative ideas and co-creation groups to emerge.
3. Acting as full partner in a local or EU co-innovation project.
4. Providing particular innovation support services such as brokerage, proposal writing, engagement in a board of experts.

Pathway 1. This is the most obvious task for educational institutes in the AKIS: they build the capability for co-creation. The CDAIS project is a global partnership on capacity development for agricultural innovation systems, run by Agrinatura, which includes strong educational institutes and the FAO's. This cooperation provides capacity building for local groups in Africa, Asia and Latin America. Erasmus+ is another encompassing EU-funded programme that allows education activities to support co-innovation and the strengthening of the AKIS. For example, the ERASMUS+ project 'SPARKLE' focuses on co-creating a training programme for the purpose of building farmers and agriculture's business manager of the future. Idea stems from the experiences made at the University. The teachers identified a mismatch between the curriculum and skills needed for the future of farming. For that reason, they established a close relationship between university staff and the "agripreneurs". The funding is secured with the help of a private consultancy firm with knowledge of the funding mechanism.

Pathway 2. Universities and other tertiary education institutes function as seedbeds for new or follow-up innovation projects because they offer many opportunities for partnership formation. Educational institutes (especially vocational and further educational colleges) have unparalleled networks of former students (farmers, foresters, advisors, supply chain stakeholders), see example of HNEE below. Moreover, they are well connected with other AKIS organisations on the local, regional, national or even international level.

Pathway 3. When educational institutes are involved as partners in a co-innovation project, they can provide "complementary knowledge' or facilities to the partnership. Often students are involved in such projects, which can result in capacity building. The professor can use the experiences and findings from the innovation project in teaching. Moreover, the institute's team can disseminate the knowledge from the project through any "extension' activities associated with the institute. When the educational institutes are coordinating a co-innovation project or network, the persons in charge are able to provide know-how to others e.g. on how to apply for future funding, prepare partnership agreements and other legal documents (including IPR). The coordinating task will allow the other partners to benefit from the administrative capacity and experience to coordinate such partnerships. They themselves might benefit from the trusted relationships with the different AKIS actors in their project, especially (local) farmers and foresters. This can be very fruitful for example when planning practice-related activities for the students. Moreover, the coordinating educational institute members can enhance trust among the AKIS actors in the partnership, which can lay the ground for e.g. a business cooperation.

Pathway 4. Some educational institutes provide specific support for co-innovation projects. The example of LIAISON's case study in Hessen (DE) shows that delegates from the agricultural universities in the region join the board of experts helping with the selection of OG projects, and provide guidance to the commissioned Innovation Support Service (ISS) when these project groups need particular scientific or research support (see also section Policy Brief for Capacity Building). A case study from Flanders (BE) presents a co-innovation project that emerged from a programme that KU Leuven set up aiming to bring together producers and processors. Some other educational institutes provide specific support for co-innovation projects. Another interesting example is the concept of the Royal Agricultural University (UK), where a unit of engaged people is offering innovation brokerage. These teams and individuals have capabilities and particular competences, and they are aware of relevant policies, regulations and funding programmes.

3.1.3 Concluding thoughts

When reflecting about education and training in the AKIS and the role of educational institutes, it is important to distinguish between the different types of capacities and skills. AKIS actors engaging in co-innovation need a) technical skills for the development of innovative approaches, and b) functional skills for the engagement in co-creation for innovation such as

- Leading (contributing) to longer-term group processes;
- Understanding partners' interests/motivation;
- Speaking 'different' languages (science, practice, admin. …);
- Facilitation / moderation of innovation workshops.
- Guiding through and engaging in self-assessment and critical reflection; and
- Spreading the news (communication, dissemination).

The analyses of the LIAISON teams revealed the lack of functional skills of AKIS actors to be one of the most important hampering factors for the optimisation of the implementation of the interactive innovation approach. However, this gap has not yet been addressed systematically by training and education and the related policy programmes. For that reason, the team developed 'Capacity building' based on a framework that could help addressing and to building capacities, which stakeholders need on all levels, the European, Member State and regional or sectoral level (see annex 6 of this report).

Educational institutes are THE location for capacity building. They are also national, regional and local knowledge hubs, and they maintain networks with former students and other relevant stakeholders in the AKIS, which is a particular asset. Examples indicate the potential that educational institutes can help close the gaps in the AKIS and support co-innovation groups and networks. However, the analysis also revealed that educational institutes already provide substantial direct and indirect support for co-innovation partnerships and the AKIS in general, but these functions remain insufficiently studied and recognised.

Each AKIS actor just one piece of the jigsaw

LIAISON's presentation of different AKIS actors representing each a piece in jigsaw
When looking at optimising co-creation for innovation, it is never only about the role of educational institutes, research centres, advisory services, Innovation Support services or professional media. Whatever and whoever is in the focus of a detailed investigation and the specific role in the AKIS, it will always be only one part of the bigger picture.

3.2 Perspectives of MS and Switzerland

3.2.1 The knowledge e-wallet in Flanders (Belgium)

Els Lapage and Maxime Bolle (Flemish Government, Dpt. Agriculture and Fisheries)

The Knowledge e-wallet (the so-called "Kennisportefeuille") is a measure that provides subsidies for active farmers to purchase advice and training in order to support the further professionalisation of their farms. Trainings and advices about several ecological, economic and social topics are eligible for support if they are provided by registered advisory bodies and training centres.

All the active farmers in the Flemish region will have access to the Knowledge e-wallet.

Support can be obtained for the following two pillars:

- Training attended by active farmers, their employees and the family members that live on the farm, with the aim of improving the current or future operation of the farm.
- Advice is intended to improve the functioning of the farm and enables active farmers to take correct and fundamentally informed decisions for their farms. Legally obligatory and periodical advisory opinions are excluded from aid.

Farmers can choose freely whether they spend the subsidy on advice and/or training. They are free to choose their preferred service provider(s). The Knowledge e-wallet contains a fixed amount of money that can be spent during a certain period. The aid percentage is fixed. Farmers pay the invoice to the service provider and afterwards they can reclaim a percentage of the cost by using (a part of) the amount from their Knowledge e-wallet.

3.2.2 Education and training in CAP AKIS plans in Estonia

Helena Pärenson (Estonian Ministry of Rural Affairs)

There are many ways or considerations that can serve to make training and education more attractive.

If the education program is **useful**, then it is attractive. Attractiveness is linked with the overall quality and the practical focus of the programme. **Flexibility** is also important as it goes hand in hand with the lifelong learning principle. In the new CAP period, we intend to introduce a voucher system that would cater better to the individual needs and knowledge gaps of a farmer. Learning processes can take diverse forms, ranging from active participation in a seminar or study group to watching videos and browsing written publications on one's own, made available by the national knowledge reservoir.

Advisors can play a role, they are educators anyway. For example, there are cases of university staff working part time as advisors, which is a good combination. Besides, advisors can encourage their clients to take up a course. The training groups could be formed based on a mixed participation, e.g. a group consisting of advisors and farmers - together they all are in some way students, learning from each other.

A huge motivation for participating in a training course is the aspect of **accessibility**. For this reason, the online tools are useful because there is no requirement of keeping a set time free, reserving time and budget for travel etc. The courses are always there, there is no schedule, nor travel needed. While planning physical events there is also a need for geographical balance, e.g., if an agricultural university is located in the southern part of the country, the events should not be concentrated around it, but take place across the country. . The time allocated for training and getting back home is an important aspect to consider.

The input for selecting topics will come from a combination of three sources: the Ministry, the participants, and the so-called AKIS centres. The Ministry (AKIS Coordination body) takes care of a national/strategic perspective and defines the national priorities. The participants of a seminar (the target group) are always asked what are the topics they would like to be addressed in the next seminar or training day. A lot of information comes from participants. The AKIS centre will act as the middle ground between the sector, the educators and the Ministry, mapping the needs of the sector. In their work, the centre needs to consider the specifics of the given target groups (field of activity, level of expertise, regional specifics, such as remote areas or areas of non-Estonian speaking audience). We want to address not only the middle levels of expertise, but also the top level having an advanced knowledge in their field as well as the beginners level of new entrants in the field.

About the practical aspects (who & where): we need diversity. The more different topics on the table, the more opportunity to correspond to the individual needs. Partly linked to the aspect of accessibility mentioned above, we have been witnessing the online content increasing. It is also possible to check in to a course online. Also, online courses will remain later available for the non-registered people, who can watch the course videos or other materials in their own time. Study trips have been asked for; indeed, a bus can be a useful learning environment l, with a lot of people going from one point to another, communicating with each other in a confined space). You can even have a lecture on the bus, so a "bus seminar" t is good for time management.

Accessible locations are also important. Timewise, there is a tendency to have all courses in November, but it is better to spread it a bit across the year for a better balance. It is useful to have an events calendar on the website, with all AKIS-related activities on that calendar.

3.2.3 "EPA2" – "Teaching for a different farming", a French case study

Anne Portier-Maynard (Ministère de l'Agriculture et de la Souveraineté Alimentaire)

The "Teaching for a different farming" plan (EPA 2) was designed to support the agro-ecological and food transitions in the territories. The plan aims **to align support to transitions with the missions of agricultural education by mobilising all technical and higher agricultural education institutions.** Teaching agroecology requires rethinking the educational system with new contents and methods. The plan is organised in 4 pillars, each aiming at structuring the mobilisation of educational institutions for the agro-ecological and food transitions.

Pillar 1 aims at encouraging learners to voice their concerns and opinions and at encouraging learners' initiatives in favour of transitions and agroecology through:

- Preparing the youth for debate to strengthen their engagement
- Supporting the dynamics of the network of eco-responsible focal points[57]
- Developing active participation of the learners in the construction and management of projects
- Recognising and valuing all learner's skills related to agroecological transitions

Pillar 2 aims at mobilising the educational community to teach agroecology and prepare for transitions through:

- Integrating the concepts of transition and agroecology into institutional projects
- Continuing the renovation of teaching programmes
- Accompanying and training the educational and pedagogical teams in the renovated teaching programmes
- Setting up a platform of educational resources accessible to all stakeholders of agri-educational system

Pillar 3 aims at increasing the mobilisation of school farms and technological platforms (TP) as a support for learning, demonstration and experimentation on the agroecological transition, through:

- Developing and implementing a harmonised diagnostic of school farms and technology platforms as to their current position in the transition trajectory
- Mobilising school farms and platforms to achieve the agroecological transition
- Contributing to multi-site experimentation and demonstration projects
- Identifying and involving innovative farms at local level

Pillar 4 aims at stimulating and boosting interactions with local stakeholders in view of the dissemination of innovative practices through:

- Strengthening and developing partnerships at local levels
- Highlighting and sharing the initiatives related to agroecological transition implemented in schools
- Implementing the objectives of the French EGALIM law[58] in the field of collective catering
- Developing and structuring thematic partnerships with various stakeholders

The implementation of the plan lies on a well-structured national network (https://chlorofil.fr/eapa) involving 130 regional referents to support the schools in their plan implementation, five institutions labelled "ENA = Etablissement National d'Appui"[59] , several TNs[60], regional offices of the Ministry (DRAAF), all working to define and build regional dynamics.

Here are some concrete examples of actions triggered by the EPA2

"EPA 2" in action with the project I-site Cap 20-25 (Clermont Ferrand University, INRAE, VetagroSup : Analyze and remove hurdles to Agro ecology transition in 7 school farms.

Development of the farm school plans was conducted as a collective multi actor exercise: directors and school farms staff, INRAe researchers, teachers from the 7 vocational schools (Aurillac, Rochefort-Montagne, Brémontier-Merval,

[57] Ecoresponsible focal points are learners engaged in ecological actions and acting as relays with their peers.
[58] The EGALIM law contains various dispositions related to a better functioning of food value chains, among which an obligation to supply collective catering with high quality food, produced in a sustainable manner (agroecology, organic, etc…)
[59] ENAs are education organisations whose mission is to support « ordinary » agricultural schools in the implementation of projects and in the modernisation of teaching contents and methods
[60] thematic networks of the agricultural education system consist in groups of teachers and other staff established at national level, coordinated by the Ministry of agriculture and tackling each a specific topic, often linked to agroecology

Ahun, Rethel, Château-Salins, Besançon), network facilitators from the Ministry of Agriculture were involved as a collective.

The methodology consisted in: identifying the nature of the hurdles (beliefs, habits, technical, economical aspects, …); studying the specific cases, identifying sound answers to overcome the hurdles and finally, explain the « Whys » and the « Hows » to interested stakeholders.

Results: a business and implementation plan for the farm school was collectively designed.

Another example related to food transition is the project on **Vegetal Proteins, supporting short chains and vegetarian meals in schools catering**. The project was part of a larger territorial project in Eastern France, « PAT 54 », contributing to the implementation of the EGALIM law.

Actors involved were of various types: more than 500 learners, 25 teachers, 50 catering staff and more than 25 local producers. The vocational school supported the training of the Chefs (5 modules for training) of the catering services of schools and of retirement homes. The objective was to get a strong commitment towards vegetarian meals in schools catering. The project promoted legumes, and developed a serious game « EniGm'Alim » to explain the EGALIM law to the stakeholders. One -among others- benefit from this project was to re-anchor safe, sustainable and fair (available for all) food produced locally.

3.2.4 Agricultural education and training in CAP AKIS Plans- Italy

Simona Cristiano (CREA)

The question is: "How to make education and training attractive for farmers?". Based on past experience, vocational training was a condition to receive CAP support for a farmer in Italy, but training was not considered by farmers as an added value, it was just a precondition to access CAP funding. Vocational training related to access to CAP aid is indeed often considered by farmers as an additional work commitment and not a real need. It is not just an attitude that derives from a lack of entrepreneurial culture but arises above all from previous training experiences that are not very effective and engaging. Training cannot be experienced as an administrative requirement, a constraint imposed by the funding body but must be considered a tool to improve one's professional skills.

How to make a training activity attractive?

Making a training activity attractive to professionals who are already very busy is not easy, but careful planning of the contents and methods can foster participation and interest. The training action to be planned should satisfy the following questions:

- Are the contents adequate and do they meet the real or latent training needs of farmers?
- Do the methods of use of the contents allow participation considering the distances from the workplaces and the times of agricultural activities?
- Are customised support services available during the learning paths?

The first point is critical as we often start from the objectives of the policy to define intervention strategies and therefore stimulate the action of stakeholders in this direction. In this context, professional training is a tool to support policies that may not favour the **meeting between training supply and demand**. Although farmers are increasingly aware of their role in the context of sector policies, they are primarily entrepreneurs committed to achieving adequate economic sustainability. If they fail to achieve this primary goal, the others (e.g., environmental, and social sustainability) will be considered of little relevance. **Each training action should therefore consider the farmer as an entrepreneur and not as a mere executor**, or provide him with the training objectives clearly defining the knowledge and skills that he will be able to learn and what are the effects on business management. For example, a course designed to comply with regulatory standards (e.g. safety at work, animal welfare, use of chemicals) cannot be limited to listing the rules and related constraints but should stimulate the active and responsible participation of the farmer as a decision maker. In this context, the inclusion of real business experiences is an effective teaching tool.

For the second point, **ICT technologies are greatly favouring the accessibility of actions and training contents, but face-to-face activities are irreplaceable for the interaction between learners and teachers, for carrying out practical experiences, and for socialisation in general.** E-learning, asynchronous lessons, social channels, video tutorials and other tools for remote access to training content are still a valid support for farmers' learning because they are more compatible with their professional commitments. This support can be preventive or supplementary to an in-person training action, allowing for example to assess in advance whether the issues addressed are of interest or to strengthen learning with additional or summary content. However, these new training tools increase the risk of disseminating low quality or even incorrect training content, a risk that is still present even with traditional tools.

A valid training path cannot be separated from the presence of a tutoring able to accompany the learning process by monitoring the effectiveness of communication between teacher and learners and the interaction between participants. The tutor can make a training activity more responsive to the needs of farmers, providing the teacher with useful information for the refinement of information content and reporting any problems. Tutoring is also functional to the collection of training needs and to the training of sufficiently homogeneous groups of recipients in terms of interests and previous skills.

Consultants can play different roles in training farmers. They can collect and stimulate training needs by evaluating for example which entrepreneurs can be recipients of an innovation by inviting them to participate in a seminar and/or a more structured course. **Consultants in AKIS can also contribute to the training offer by involving the functional skills to create a product or service aimed at farmers**. For example, they can involve and put in contact the researchers who have experimented with a new technique to combat a phytopathology, the computer scientists who are able to create the app that detects it, the technicians who manage the agrometeorological and sensor network in the territory, to implement a business consultancy project in which training for interested farmers is also functional to the refinement of the intervention system. Finally**, the consultants can be directly tutors and also teachers**. In the first case it would certainly be a qualifying and attractive element of the training activity because consultants often have a trusting relationship with farmers although at least in the Italian case there is the limitation deriving from belonging to the main professional organisations. For teaching, it is not enough to have the adequate knowledge and skills to be transmitted to the learners, but it is also necessary to have the adequate communication skills that can in any case be learned by training the consultants concerned.

The involvement of consultants in the training system could be favoured by the creation of virtual spaces where to meet other AKIS subjects interested in working on specific issues. The experience of the information brokers for the construction of the OGs could be the starting point for systematising the meeting between demand and supply of knowledge needs between farmers and other AKIS subjects and consultants could play the role of connection between them. For example, a computerised information sharing service could be identified, possibly public to avoid conflicts of interest, where to organise meetings on specific topics and facilitate the exchange of information. The consultant could take on the role of facilitator of the thematic group which aims to build a project proposal where training, information, consultancy and technical support actions are integrated, preparatory to the implementation of a subsequent executive project co-financed with public resources.

As indicated above**, the motivation to participate derives from the farmers' and consultants' awareness of the usefulness of the new knowledge to be learned**. Each recipient responds to different stimuli according to his professional role: for example farmers are more sensitive to the achievement of results that produce positive effects on company management in a short time, consultants instead are interested in increasing their ability to respond to requests from their customers.

In general, therefore, the more the training course is customised to a specific profile, the more the recipients are interested in participating and above all, if the course is effective, it will attract further participants in subsequent editions.

The personalisation of a training course does not only concern the objectives of interest to the recipients, but also the level and progression of the contents, the examples and teaching tools, group management and interaction with the teacher and tutor.

Particular attention must be paid to the dynamics of the group where it is easy for competitive processes, more or less explicit, to be triggered, which risk weakening the credibility of the training contents.

The teacher and the tutor must be able to select the appropriate contents for the audience and facilitate their sharing through appropriate participatory techniques.
Among the latter, group educational games can also be adopted which not only stimulate active participation and discussion but also facilitate the expansion of individual relationships which can also prefigure professional collaborations.

For farmers, participation in on-site activities is made difficult by their commitments on the farm, so it should be concentrated in certain periods of the year depending on the production cycles. Often one opts for serial hours but at the end of a working day it is difficult to keep concentration high. A balanced combination of face- to-face and on-line (blended) lessons could favour constant participation, also stimulated by practical demonstrations and company visits.

It is easier for consultants to identify some training moments, especially if remote training is used. On the other hand, it is more difficult to build a homogeneous class in terms of experiences and skills which can hinder the effectiveness of the learning path. In particular, there is a certain amount of competition among consultants operating in the same area, resulting in a certain reluctance to carry out group activities and to share information.

In all cases it is essential to set training objectives strictly connected to the professional profiles of the participants so in practice both farmers and consultants must be able to check in advance what the purposes of the educational path are and assess whether they have been achieved.

In the AKIS context, training could also offer the opportunity to exchange experiences, for example through company visits or other meeting occasions in which trainers and tutors also act as facilitators, managing small groups of people with different professional profiles.

3.2.5 Agricultural education and training in Switzerland

Anton Stöckli (Swiss Federal Office for Agriculture)

As in most other sectors of the economy, Swiss agricultural vocational education and training can best be described as a dual system. During their three-year apprenticeship, apprentices are employed on a farm [see Figure 11, "host company"] and usually attend agricultural college ["vocational school"] one day per week. After successfully passing the final examination, they receive the "Federal diploma of vocational education and training".

Those who want to deepen their knowledge in specialised technology or in business management may attend modular further education courses. After having passed this examination ["Advanced Federal Diploma of Higher Education"], they become so-called "master farmers" and may in turn train apprentices.

In a federal country like Switzerland, various actors are responsible for vocational education and training:

- The federal government sets the legal framework, approves the educational ordinances and curricula of the individual professions, and finances part of the costs.
- The cantons provide the college-based education ["vocational schools"] and supervise the apprenticeship contracts.
- The so-called professional organisations (in agriculture: the farmers' associations) define the contents of the curricula and stipulate which topics are to be learned where (on the farm, in the agricultural college or in inter-company branch courses).

In addition, each canton runs an advisory service. Depending on the canton, this is part of the agricultural college (staff are both teachers and advisors) or it is run by the cantonal farmers' association. The advisory services provide information, help with solutions, run innovative projects for the benefit of agriculture and offer further training courses. In this way, they contribute to lifelong learning.

Topics to select for education and training

On the one hand, the topics should be adapted to real life agricultural situations (technical and economic skills, animal husbandry, crop production, work load). On the other hand, they must take into account the public concerns (resource efficiency, use of plant protection products, biodiversity, animal welfare, protection of landscape and water bodies).
That is why the curricula are developed by the professional organisations which know best what is needed for trained farmers. It is advantageous if operational issues of the farm and public concerns are worked on the same topic at the same time. For example, in the case of plant protection product use, not only the correct products, applications and dosages are taught, but also indications of their effects on the environment (fauna and flora, water bodies, biodiversity), and alternative applications are discussed.

Intrinsic and extrinsic motivation for education and training

Intrinsic motivation can be promoted by an attractive training content, well trained "master farmers", demo plots (run on colleges or, by advisors, on farms) and a well-developed job-related continuing education and training offer. Practical field experience of advisors is welcome as part of the vocational education. Farm and field visits are attractive methods for showing new techniques under real life situations. Cross-farm visits, where farmers explain their farm and management in detail, provide profound insights and show possible alternatives for the visitors. Such visits should preferably take place between farms that do not know each other, rather than between neighbours. Courses of short duration should also not take place during busy times in the day or during the year.

Extrinsic motivation can be promoted by subsidising training courses or by a voucher system (not in place in Switzerland). In addition, education may be a mandatory element. Swiss farmers must present the "Diploma of Vocational Education and Training" if they want to be eligible for general direct payments. Also, those who want to use plant protection products must complete a refresher course every few years (mandatory as from 2025).

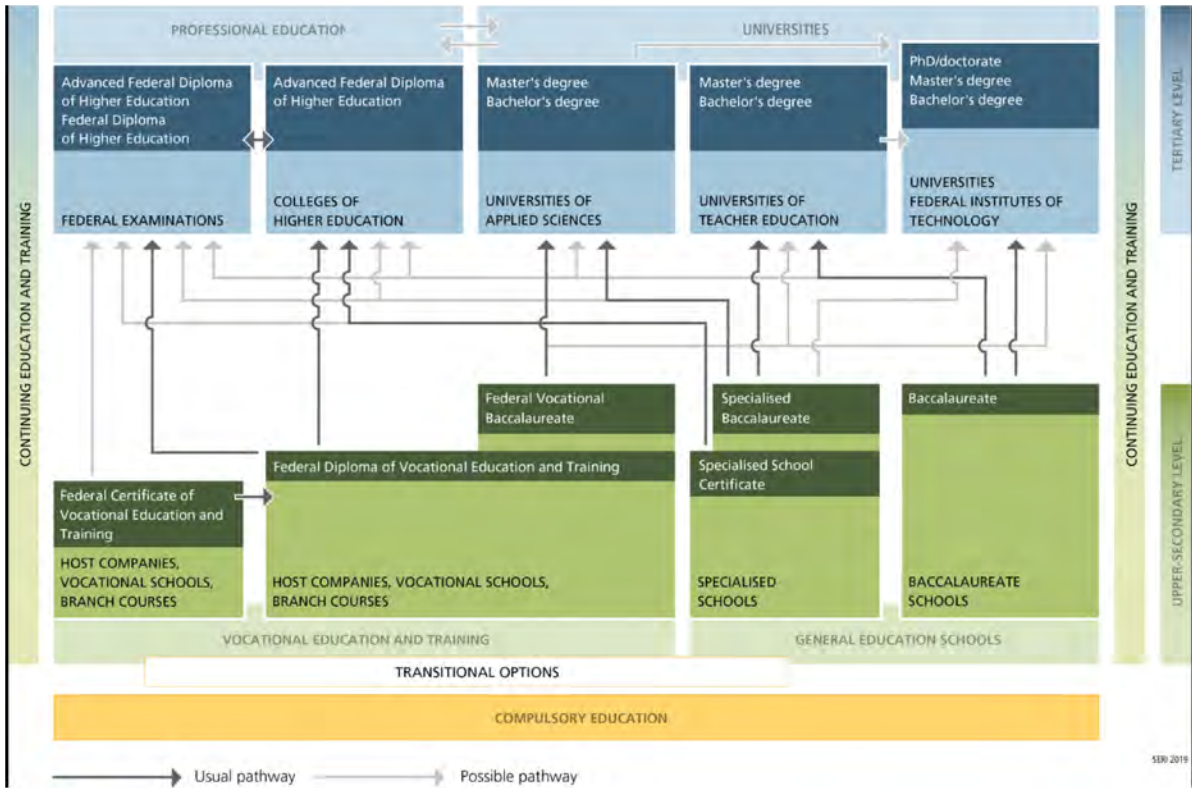


Figure11: Graphic Swiss Education System, © State Secretariat for Education, Research and Innovation[61]

3.3 Strengthening advisory services

3.3.1 CECRA Advisory training in Galicia

Elena Lopez (USC), Florentinp Diaz (USC) and Pablo Asensio (EUFRAS)

EUFRAS is a rather young association, founded in 2013 with rural advisory members. At present in total 48 advisory organisations are involved, some of the representatives are SWG AKIS members involved in the founding of the organisation.

The EUFRAS Board also decided to give advisory training in Spain, CECRA. The German Advisors use the method of IALB, not to reinvent the system, and are license takers from IALB. There has been a territorial split, IALB is responsible for German-speaking languages; for other (non-German talking) regions, EUFRAS is responsible.

There are 7 or 8 countries outside the German Speaking area who are involved. Latvia is quite active, the EUFRAS office is also there, at LAAS. The CECRA train the trainer courses gives accreditation to trainers.

The EUFRAS Activity Plan of 2022 entails several activities amongst which: a redesign of the EUFRAS website (homepage); a EUFRAS&YPARD Mentorship program for young advisors and submission of Erasmus+ application; active participation with knowledge dissemination activities in Horizon 2020 and Horizon Europe program i2connect, Nefertiti, EU Farmbook, ClimateSmartAdvisors; the 61st IALB|11th EUFRAS|8th SEASN International Conference 2022 in Galicia (ongoing now); a networking event and field trip in the fall of 2022 possibly in Belgium; EUFRAS CECRA coordination; CECRA Train the trainer programme; as well as initiatives from the members and the newly elected Board.

[61] https://www.sbfi.admin.ch/sbfi/en/home/education/swiss-education-area/swiss-education-system.html



We did a case study with the next generation: the daughter wants to do direct marketing. We need good advisors not only technically but also methodologically, CECRA offers training modules.

CECRA offers accreditation for qualified advisors. The benefit for the advisors is the qualification. Farmers are quite demanding. CECRA combines a seminar series of various method training modules including familiarisation with rural advisory networks in other regions and structures (visit to an advisory body) and offers cross-border networking opportunities. Trained advisors are more effective and flexible. They can use their methodological skills in various settings, e.g., for organising and leading farmers' experience exchange groups. Farmers realise quickly if someone can help them individually. They need professional and experienced advisers. Professional advisers are specialists. They use methods systematically to apply their knowledge, organise know-how transfer, and support innovation development.

Training institutions widen their portfolio and can skip the development of a method training program. Within the CECRA competence development, two degrees can be achieved, CECRA Basics and the CECRA certificate. The CECRA program consists of 2 compulsory modules and 15 elective modules. Advisors get the full certificate after 5 modules of training, Attendance at a event (face-to-face or online) in another country, a visit of 2,5 days to an advisory service or Centre in another country and a thesis work.

Since 2018 several advisors have been trained in Ireland (468), Spain (708), Latvia (467), Slovenia (46), Serbia (121) and Greece (166). Moreover, training was provided in collaboration with the I2Connect Horizon 2020 project.

The CECRA training in Galicia started in 2016 with a pilot group of 30 Galician Rural Advisors, researchers, and teachers. 2 teachers linked to EUFRAS, Enrique Arbones, and Elena López from USC followed the 'International CECRA Trainers Program' (2017-2018, Germany) and the 'Train of Trainers in Understand and Support Innovation in Agriculture In Slovenia in 2018'. At that time, in Galicia, only training on technical aspects was delivered, not about methodology, this was new. International trainers from Germany and Switzerland have joined and 6 modules were developed between 2016 and 2017.

In 2017 there was also the IAL/EUFRAS Annual Conference in Munster (Germany) and an exchange visit, a group of 20 advisors, to the Agricultural Chamber in Northern Renania-Westfalia.

In 2018 USC became one of the first Certification Bodies and content providers in a non-German speaking country. Same year The Galicia Regional Government adopted the CECRA standard as a compulsory training for all rural advisors. The USC CECRA Team now consists of 7 people, in total there are 4 Spanish trainers and 3 German trainers. We delivered 54 CECRA modules between 2018 and 2020. More than 710 certificates were issued and 330 participants who have followed the courses. The degree of satisfaction at the end of the courses is quite good.

In the middle of COVID, the USC Cecra team had to redesign the courses in online modules, because of the COVID lockdown. Two on-line modules were delivered through the USC MS Team platform. The experience was very successful, and students and trainers developed new useful ITCs skills.

At the beginning of 2020, besides the training of Galician advisors, other people around the region got interested in the CECRA certificate as a good tool to improve soft skills.

12 managers from 6 Local Action Groups involved in the Leader Programme, contacted USC to follow the Cecra training program. As most of the staff of those LAG have economics, law, or architectural background, the courses had to be adapted because they don't have an agricultural background.

3.3.2 A new European project – CORENet – to strengthen connections between advisors, farmers, and consumers, to nurture sustainable food supply chains.

Fedele Colantuono (University of Foggia) and Patrick Pasgang (Innovatiesteunpunt)

CORENet is not only a Horizon Europe project (*call: HORIZON - CL6-2021- GOVERNANCE -01-27*) but a community initiated several years ago with the SKIN project (Horizon 2020), whose legacy is still vibrant being the EIP-AGRI TN on the short food supply chain.

CORENet is interconnecting Short Food Supply Chain advisors across the EU in a dedicated EU Advisory network, now building on the SKIN project.

Short Food Supply Chains (SFSCs) enable more inclusive, resilient, and sustainable food systems. Yet, institutional and regulatory barriers and farmers' knowledge gaps hamper SFSCs from scaling up in the marketplace. To overcome such drawbacks, there is a need for targeted and impartial SFSC expert advisory services able to identify solutions and advice for boosting SFSC performance and impact.

The CAP post 2020 has underscored the importance of adopting knowledge acquisition, sharing and transfer tools as a cross-cutting objective. Advising farmers and other beneficiaries of CAP support has to be included in the CAP plans. The advisors need to be integrated in the AKIS in an inclusive way. They need to cover economic, environmental and social dimensions and to deliver up-to-date technological and scientific information developed by R&I (van Oost, I., 2020)[62].

"Creating an EU-wide peer to peer learning and mutual support network of advisors is the central aspiration underlying the CORENet approach."

Integration of SFSC advising and advisors' diversity into national AKIS plans is essential if AKIS strategies are to succeed in fostering the knowledge flows and links between research and practice, enhancing cross-thematic and cross-border interactive innovation and supporting the digital transition in agriculture (EU SCAR AKIS, 2019) .

Farmers and small-scale food producers operating as part of SFSCs cannot rely on conventional advisory systems which focus largely on production and processing, as they must also deal with logistics, compliance issues, finance, marketing, distribution and sales. Moreover, advisory systems constructed in line with the division of labour of the conventional (long) food chain are not well adapted to SFSC advising needs, which need to be **holistic, systemic and emphasise improving collaborative effectiveness**.

SFSC advising needs are qualitatively different to those of longer food chains, as those involved must address all the different aspects from farm to fork simultaneously. They often need to look for alternative ways of doing things, alternative to the conventional supply chain, with collaborative working constituting an essential skill.

Improving SFSC performance in the market place and increasing the impact of SFSCs on the food value chain is increasingly a function of IT infrastructure and how this is used to cover the functionality of the intermediary. Digitalisation, participation in digital ecosystems and digital readiness all demand new knowledge, skills and competencies on the part of producers, consumers and SFSC advisors.

[62] Van Oost Inge I., 2020. COMMON AGRICULTURAL POLICY Post-2020 #FutureofCAP AKIS, Farm advice and Innovation Networking.

COREnet will deliver good practices and success stories on the SFSC theme and support the systematic development of more effective SFSC guidance; this will be possible through a pan-European peer-to-peer learning network for SFSC experts.

Project activities will foster knowledge exchange, disseminate innovative SFSC solutions and know-how, and engage farmers, local players, and consultants until they reach consumers.

Open network of *Golden Cases* and associated advisors (exemplars of SFSC models that have achieved success in the marketplace as a consequence of advisory support), European Roadshows highlighting the significance of advisory practices and services for SFSC success, Lighthouse projects and associated advisors will represent initiatives and experiments using COREnet outcomes as resources to modelling advisory services into improved SFSC performance and increased impact in the market place across the EU-27.

Furthermore, COREnet acknowledges the role played by AKIS relevant to SFSC growth and sustainable development. Thus, the project will promote and integrate the SFSC advisory and advisors' diversity into national AKIS while supporting their work with new tools.

The COREnet project, coordinated by the University of Foggia (Italy), involves 13 partners who represent the concept of "multi-actor" within the agri-food chain and have strong expertise in SFSC advisory and practice-oriented services from across the EU-27. COREnet has been indeed **co-designed with SFSC advisors, farmer and proactive consumer representatives** with the aspiration of improving different SFSC advisory systems to be found in EU member states and the variety of organisations that animate practical learning exchange, action and experimentation related to improving SFSC environmental, social and economic performance and mainstream SFSCs in the food value chain. Many COREnet partners are part of the SKIN network. Bridging old and new partners, to pursue a holistic, systemic, and collaborative approach aimed at helping SFSCs achieve greener market impact.

To increase impacts and enlarge exploitation among EU-27, the COREnet project has already started a cooperation with the twin project EU4Advice (funded under the same call), finding a common strategy and methodology on mapping SFSC advisors and good practices at EU level avoiding overlapping and merging efforts for the development of one **European peer-to-peer network of SFSC** advisors.

The project started in mid-September 2022 and will last for 5 years.

3.3.3 EU4Advice

Louise Mehauden (Innogestiona)

EU4Advice ('Multi-actor collaboration dynamics and capacity building network inside and between AKIS to foster the upscaling of SFSCs across Europe') is a 5-year coordination and support action (CSA) project, kick off in October 2022. Its ultimate goal is to foster the development of short food supply chains (SFSCs) models that empower producers and consumers, reduce the environmental footprint of food systems, and enhance the competitiveness of the agri-food system. To do so, EU4Advice bets for the capacitation of SFSC actors, through effective and relevant advisory services, well-integrated into their national AKIS, and through multi-actor networking dynamics across Europe.

EU4Advice conceives "advice" as an interactive and multi-disciplinary process, driven by bottom-up dynamics and peer2peer interactions, breaking away from top-down unilateral schemes of knowledge transfer. It includes a broad diversity of profiles and fields of activity. The project aims at including social, legal, and economic aspects of SFSC advice in the AKIS, incorporating solutions and innovations related to cooperative models, processing, social enterprises, public catering, digital tools and online sales, and other activities related to food production such as rural tourism and pedagogical activities.

Project rationale relies on six specific objectives:

1. Identify and characterise SFSC advisors across Europe
2. Connect SFSC-advisors from the 27 MSs in a European network
3. Contribute to the understanding of the main issues and challenges of European AKIS
4. Integrate SFSC advisors and contents into national AKIS
5. Interact with relevant national/regional/local policy makers
6. Replicate and disseminate innovations on SFSC

The strategy to achieve these objectives is supported by four complementary methodological pillars:

- A comprehensive analysis of the national AKIS, SFSC ecosystems and regulatory frameworks, as well as of the existing SFSC advisory services and networks, formal and informal, will identify key stakeholders and their needs, and characterise the main success factors and barriers influencing the integration of SFSC-specific advice into national AKIS, and other regulatory issues.
- The development and testing of guidelines for SFSC advice will provide advisors with useful contents and didactical tools, based on a previous analysis of existing ready-for-use material, and identification of knowledge gaps, knowledge transfer dysfunctions, and needs of end users (SFSC practitioners).
- The four living labs (Spain, Hungary, Ireland and the Netherlands) will allow for real life testing and validation of the innovations, involving all relevant stakeholders. It will support the implementation of innovative governance models in national AKIS and to pilot SFSC-related advisory services, connecting producers, advisors, policy makers, researchers and consumers in an interactive co-construction process.
- A four-level networking dynamic: networking between living labs, EU network of SFSC advisors, network of policy makers, and network of projects.

Zoom on the four-level networking:

The **living labs** will be the place for in-depth experimentation, within the project, to test the innovations produced by the different activities. Living lab leaders are partners that are very well aware of the challenges of their national SFSC-advice system, and that have the mobilisation capacity to involve the relevant stakeholders in the project, to tackle some specific and relevant issues. This MA co-creation process, addressing project topics from a multi-disciplinary and very practical perspective, will be led in parallel in four countries, following the common framework of the living lab methodology (AMS Institute). Addressing the same issues in four different contexts in terms of AKIS organisation and SFSC ecosystem, while at the same time tackling different specific problems in each country, it will bring contrasting perspectives and cross-fertilisation opportunities. Living lab stakeholders of each country will meet at least 3 times along the project, during multi-actor workshops, in order to co-create and implement their roadmap for action, ultimately aimed to contribute to the enhancement of the capacitance of SFSC actors through specific advice. Living lab leaders will regularly meet between them to allow for sharing of experience and peer-to-peer learning, and will also organise thematic workshops and cross visits, in order to exchange on more specific topics. This approach, strongly grounded into the different local realities, will provide a real-life testing space and a unique opportunity to bring together key stakeholders to look into key issues for SFSC in terms of advice, as well as an opportunity for these stakeholders to learn from other countries. This will ensure that project innovations are relevant, adapted and replicable in other contexts.

The **network of SFSC advisors** will connect experts from the 27 MS. It is conceived as an innovation ecosystem, composed of 27 SFSC advisory networks directly linked within the EU member states, aiming to support the (co-)creation and sharing of knowledge and good practices, foster peer-to- peer learning and support cross-fertilisation. The network of SFSC advisors will be supported by online platforms, and will be dynamised according to the Gamification model (AMPED). Thematic workshops on specific issues, relevant for stakeholders, will be organised, as well as field visits in different countries.

Specific networking tools will be used to interact with relevant local/regional/national and EU **policymakers**, based on twinning activities, visits, and thematic workshops, to foster the exchange and uptake of best practices, cross fertilisation, peer-to-peer learning, etc. Workshops will be organised on AKIS governance and other relevant regulatory issues (such as food safety, public procurement, trade law, etc.), where selected policy makers will present their best practices and have the opportunity to exchange solutions and synergies between different policies.

Finally, a lot of different **projects** worked and keep working on topics related to the improvement of AKIS and food systems. Synergies will be developed between them in order to optimise their impact.

3.3.4 Case study: the Association for Agricultural Business Consultants (NL)

Paul Daniëls (Vereniging Agragrische Bedrijfsadviseurs- VAB)

The Association for Agricultural Business Consultants is founded on three principles: (1) personal membership, (2) a strong network and (3) stimulating members to excel in their field of profession. The principle of lifelong learning has become more and more a priority. The membership rules are that (1) one has to have a university degree (that can be applied sciences), (2) only full membership after 4 years of experience (you have to grow into the association, have to reach certain seniority (being a generalist) and you have to be specialised and (3) more than 50% of your customers have to be primary agricultural producers.

The Advisory register (initially Farm Advisory System[63], in NL: BAS, Bedrijfsadviseringssysteem) held all advisors that are recognised in one or more specialised fields. In other words, when an advisor is recognised, the advisor can enter the system. Only recognised advisors can redeem the vouchers from the SABE[64] system. The rules for being registered are (1) being an independent advisor (not linked to any product selling organisation), (2) being dedicated to lifelong learning and (3) be examined for quality in specialist fields of the advisory register. This examination is supervised by the BAS-board (BAS-commissie) consisting of five members that examine candidates on their general expertise as advisors. Board members are not members of the VAB and the board is an independent entity. In the exams they are supported by experts in the requested BAS-specialist field that examine this. If a candidate ends this exam successfully, he/she is recognised in that field of the advisory register.

In NL, the advisory landscape is fragmented. Farmers are surrounded by all kinds of advisors, so farmers need to strive for a like-minded management team. They try to connect all of these different kinds of advisors within the association (network). Certified members of VAB receive the title "AB" (Agrarisch Bedrijfsadviseur). This AB certification means that these advisors are senior advisors and through personal development within this four year project they obtain a helicopter view on farm oriented advisory skills. So to sum up, there are three different groups of advisors, (1) the AB certified members of VAB, (2) the BAS-registered advisors and (3) other VAB members. The third group are more general advisors, sometimes with equal knowledge and skills, but for example working for product selling organisations or aspirant members, that are still growing to full membership. Another example are advisors on real estates in rural areas; they do not have relation with any of the specialist fields of BAS.

The lifelong learning is quantified by permanent education (PE). In the board for accreditation and education (Commissie Accreditatie en Opleiding), there are three people. The AE-board is partly composed of members of the VAB itself. They screen all PE-activities based on their value in PE-points. These points can be validated on knowledge or skill sets, as well as appointed to the BAS-specialised fields.

[63] The Farm Advisory System (FAS) was the advisory approach in the CAP period 2014-2020. It has become obsolete and was replaced in the CAP 2023-2027 by a broader scope of advice. A number of specific obligatory elements were added, such as the impartiality of advice, the training of advisors, the provision of innovation support services and the integration of advisors in the Agricultural Knowledge and Innovation System (AKIS), see Annex 1 and 2 (Art 15(2) and 114)

[64] SABE: "Subsidiemodule agrarische bedrijfsadvisering en educatie": subsidy for agricultural advice and education, a voucher system

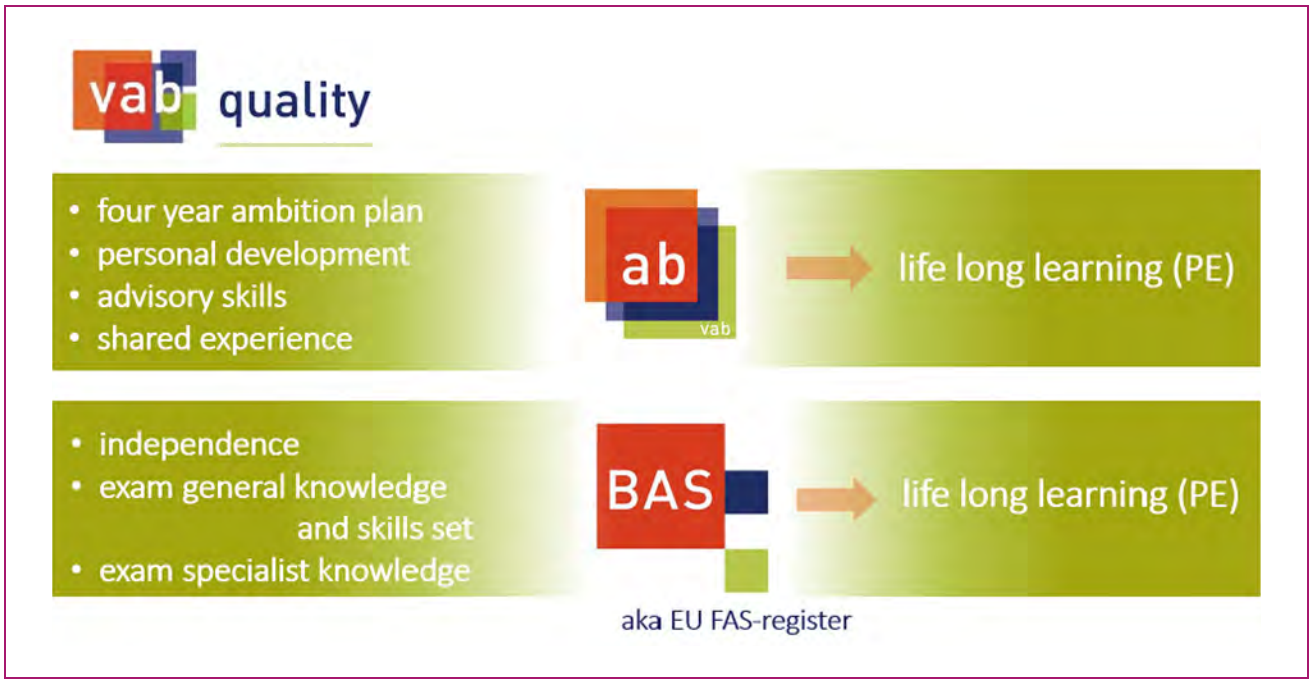


Figure 12: VAB quality scheme of the lifelong learning programmes for advisors

The VAB itself also organises a set of knowledge and skill-building activities. For this the association bureau is supported by several working groups that consist of members. They meet (online) six to eight times per year and talk about the hot topics, such as climate change, sustainability, N and nutrient management, which is at present very important in NL. The association bureau then organises and facilitates these training workshops, study groups and seminars and the AE-board screens them for PE-value. In doing so, the VAB stimulates advisors to excel in their profession. In the past (from 1999 until 2012) the quality of PE was accredited by the Lloyd's certification system (AB certifications).

Independence of advisors remains a point of discussion. Dependent, at this moment in time, is determined as giving advice and at the same time working for a product selling organisation. Dependent advisors cannot be registered in the BAS. This is checked by the BAS-board before the examination. For this, advisors need to fill in and sign an advisor's statement. There is more or less an easy check between dependent and independent: when the advisor is listed with an SBI code (Chambers of Commerce, Standaard Bedrijfsindeling), it is mentioned what kind of activities that the company does. Whenever the company sells products, it is regarded as dependent, and the company is not allowed in BAS. This also means that only independent advisors are able to redeem Sabe vouchers from farmers.

The goal for the future is an optimal connectivity between all stakeholders (BAS-registered advisors, other advisors, (green) knowledge institutes (universities including applied sciences), research institutes, agri & food businesses and government institutions. This is a kind of circular system that surrounds the farmer, his family and their farm, i.e. a circular system for advice on the farm. The VAB tries to provide bridging connectivity in the centre of this circle.

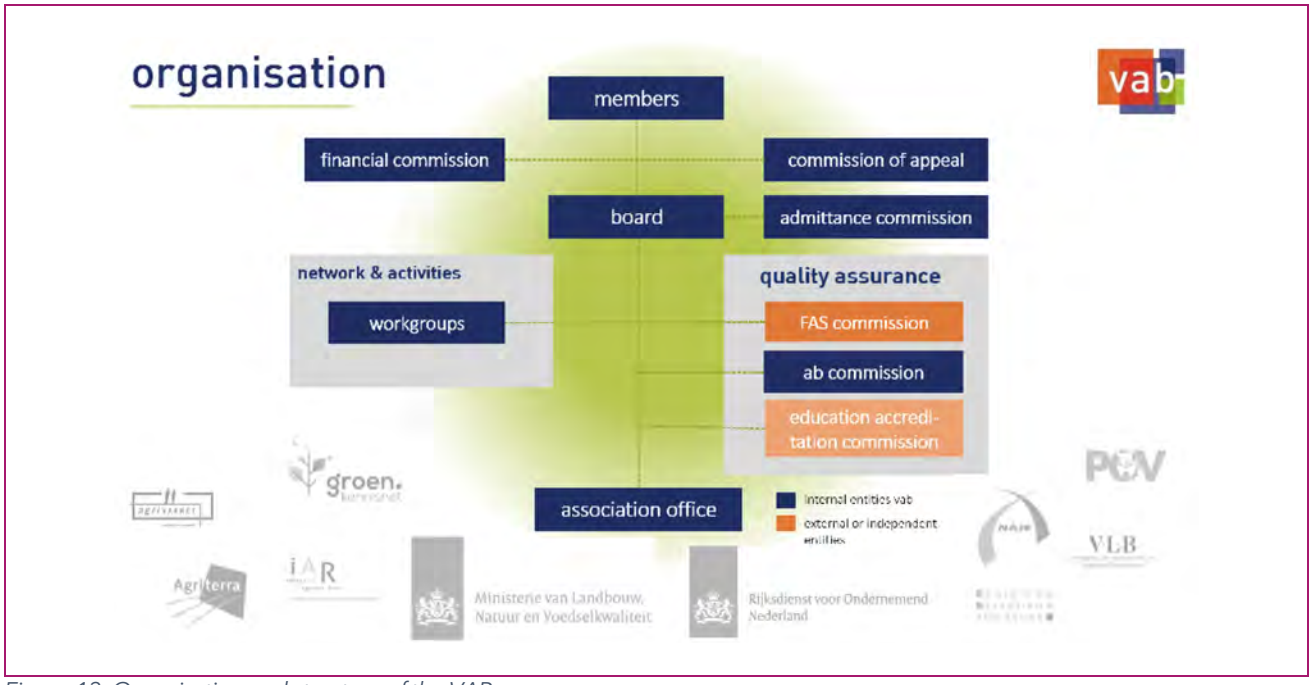


Figure 13. Organisation and structure of the VAB

3.3.5 Case study – New strategies and education linkage from 'Proefstation for Vegetable Production' (BE)

Els Berckmoes (Proefstation for Vegetable Production-PSKW)

PSKW is a private organisation, a practical research centre with a broad range of outdoor crops and 10 hectares of outdoor fields. PSKW also has greenhouse crops with 1.7 hectares of greenhouses.

The research station counts 61 employers. Its main activities are oriented to practical research, and almost half of the income is based on funded projects. Besides funded projects, private research activities are perfomed. This research may be for big fertiliser companies or seed companies. Based on PSKW's fields of expertise activities for networking, advising growers, and innovation support are combined.

The five themes of the research are 1) growing future-proof crops, which is the centre of all our research 2) using future-proof inputs; 3) growing in harmony with the environment; 4) growing smarter and more automated; 5) supporting feasible business plans based on all this. Through focusing in these major themes, PSKW is preparing itself for 2050, makin a stop-over in 2030.

PSKW was established in the 1960s to provide practical solutions to farmers. At that time there was not a big difference in strategic thinking and the way PSKW has acted till recently. Taking into account current challenges it was to urgent to get Board members and researchers out of their comfort zone and start thinking out of the box as to tackle the current and future challenges of horticulture and come up with innovative solutions for the sector based on a bottom-up approach

It is not so easy to increase the dialogue and interaction with farmers. COVID has caused a massive gap, and fewer farmers are visiting the research station. Also, new viruses came for tomatoes restricting farmer visits to the research greenhouses. When a farmer cannot see the crop with his or her own eyes, the interest of these farmers is lost.

From the station's perspective, one of the main challenges is that the average age of our farmers is increasing fast, 57 years old, meaning that most of them will be retiring soon. Some farmers only have 1 person who works for them, and for others with 800, needs may differ a lot. From the growers' expectations, economics (economic crops &

economic business plans) have to be ready for the next generation, which raises a lot of questions about research and what they want to do.

Our mission and vision of the strategy are focused on vegetable production. PSKW wants to be a leading knowledge and innovation centre for international vegetable production where growers, industry, education, research, and government work together and investigate, innovate, exchange knowledge to make vegetable production of the future possible.

Therefore PSKW needs to focus on the future, being some steps before the growers: 'It does not matter what you do, but make sure that we can grow vegetables as it is of major importance to feed the population, was the main answer that we got from our growers, 'assure that we can do our job'.

To define PSKW's future activities we started from the farmers' needs. A farmer needs practical knowledge, skills, technologies and products (such as fertilisers, plant protection products, …) advice, a surrounding (consumers, politics, …) that accepts the farms activities and way of producing. Till now, research is the main activity, but based on the needs, activities will be broadened to: supporting innovation, supporting private initiatives (suppliers, start-ups, innovators, farmers, …), advising and networking, and also tailor-made training.

The challenges that growers are facing are quite ambitious, for example, the reduction of 44% of CO2 emissions by 2030. Funded research activities alone will not be sufficient to meet the objectives set by 2030. Tailor-made training will be crucial to meet the goal of 2030 and provide the necessary skills. PSKW will also invest in new energy projects to speed up and actively screen the market, support young start-ups to bring promising technologies to the sector, and collect new knowledge to give to the farmers by connecting with other sectors, using ecosystem services. All the knowledge from other related sectors will be collected to get a faster solution. To assure that farmers will be able to use all this knowledge and technologies, there is a need for tailor-made training and advice, teaching crop managers and farmers to grow with reduced energy inputs, and teaching about using a mixture of energy sources e.g. solar panels with heat pump installations. Labour is expensive and a lot of workers left the sector and went away to have better work in other sectors. Robotised greenhouses will be there in 2030, technology suppliers want to come on the market with several robots. Training, and advice are crucial to teach farmers how they should use robots, how to manage their work plans, and train on safety. Related to outdoor crops, we have research activities using GPS technologies, but we did not succeed in making the farmers use these GPS technologies so far. Tailor-made training is necessary so that farmers and workers can use GPS-equipped tractors.

Horti Skills and Experience centre

In the near future PSKW will implement the **Horti Skills and Experience centre** which is a place where farmers learn skills by experience, where they meet, learn from each other and from the centre. Within the centre the focus will be oriented to specific types of farms, the range of profiles that are working in these farms and the skills that are needed. There is a shortage of skilled profiles. Besides, demonstrations are not sufficient. Learning by experience is crucial and farmers are also short on time. Also secondary schools are invited as they do not always have the same materials and infrastructure. For example, horticultural schools do not plant energy intensive crops because of the energy crisis, students do not build experiences with these crops.

To develop the Horti Skills and Experience centre we are in close contact with companies (AI-technology), schoolteachers, and employment agencies. PSKW is looking for CAP measures and instruments of Flanders to support farmers to take part in the Horti Skills and experience centre. PSKW wants to be in close contact with farmers, advisors, suppliers, and service providers. The centre is a useful way to get them back to the research station. PSKW has skilled personnel available, and is used to work at different levels, including infrastructure, broad networks for support, schools, teachers, technology providers, employees who are experts, and all kind of technologies.

For example, for energy, Artificial Intelligence (AI) will be needed for the farmers, and PSKW wants to offer a training tool. In 2023-2024 we should be able to offer this to our farmers.

3.4 Link with digitalisation

3.4.1 Oper8: Technological advances for mechanical weeding

Spyros Fountas (The Agricultural University of Athens-AUA)

Oper8 is a self-sustaining TN spanning across the EU, designed to facilitate the exchange of knowledge and solutions for alternative weed control. **The network leverages the knowledge and outcomes of eight OGs to stimulate collaboration and knowledge sharing among relevant stakeholders**. By focusing on OGs, this network is able to tap into the existing needs and gaps at national and EU level and tailor its efforts to specific local contexts.

Specifically, the OGs in France and Italy have implemented cover crop-based solutions to promote sustainable farming practices, particularly with the growing interest in organic farming. In France, under row cover crops have been utilised in vineyards to reduce the need for mechanical weeding and tillage, resulting in time and fuel savings, as well as improved soil health from the addition of organic matter and reduced compaction. On the other hand, in Italy, self-seeding under row cover crops have been employed in vineyards to minimise tillage intensity and herbicide use in the intra-row. By allowing the cover crop to self-seed and regenerate annually, farmers can avoid disturbing the soil, resulting in reduced erosion, enhanced pest control, and less dependence on pesticides.

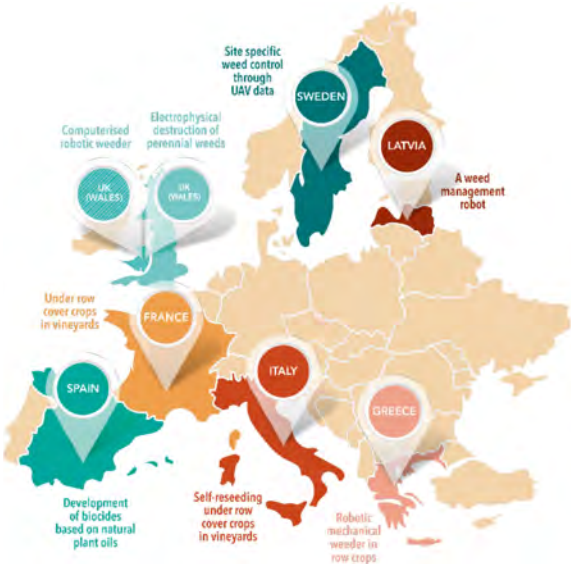


*Figure 14 SEQ Figure * ARABIC 8: Geographical distribution of the Oper8's OGs*

As an increasing number of farmers adopt organic farming practices, the need for effective, non-chemical weed control methods is becoming more urgent in Spain as well. Considering that the country works towards fulfilling the Farm to Fork ambition of having a rate of 25% organic farms by 2030, the production of natural plant oils to act as herbicides can offer an environmentally friendly alternative to conventional herbicides, providing farmers with a viable option for weed management. The need for resilient farming practices is crucial for the UK, as agricultural policies should be aligned with the EU policy, and promote sustainability by reducing the environmental impact of the farming practices. **Innovative solutions developed by the involved OGs include a computerised robotic weeder in horticultural crops and an electrical weeder for electrophysical destruction of perennial weeds, to help reduce the reliance on pesticides and promote biodiversity.** These innovations can also help address the challenges of high manpower costs and lack of labour, which are important considerations for farmers in the UK. Similarly, in Sweden, the high cost of manpower poses significant challenges for farmers. This has led to the development of innovative technologies such as automated equipment and precision farming techniques for site specific weed control to help reduce labour costs and increase productivity in cereals. In Latvia, a weed management robot was developed for vegetables, as an innovative solution that can help reduce the high costs associated with manual labour in vegetables, while also improving the accuracy and efficiency of weed management in organic farms. Towards reducing labour costs and minimising the environmental impact of traditional weeding methods, the Greek OG solution focused on a mechanical weeder for row crops. By developing and implementing this technology, small-scale farmers could also benefit from access to the latest technological advances, helping to level the playing field with larger, more industrialised farms.

The OGs' solutions demonstrate the importance of innovation and sustainable farming practices in addressing the challenges facing agriculture in different regions. In addition to embracing OGs, the Oper8 network places a strong emphasis on training. **By providing training opportunities to individuals and organisations, the network is helping to build capacity and empower local communities to take ownership of their agricultural practices.** This training can also be linked to digitalisation, as the network aims to leverage digital tools and platforms to support training and knowledge sharing. In order to accelerate uptake of best practices in alternative weed control and ensure long-term conservation of produced solutions, the project will translate existing practices into an easy-to-understand language for farmers and advisors and will use different complementary dissemination channels for better outreach. A series of actions (e.g. demonstration activities, policy recommendations and training sessions) for integrating project results into the CAP National strategic plans[65] will be implemented, strengthening the AKIS, ultimately, paving the way towards a sustainable agriculture in adherence to the Green Deal and its Farm to Fork strategy. **Online training material, especially targeting young practitioners** (who can boost, through training, the peer-to-peer dissemination of innovations, addressing also older and more conservative farmers) **and advisors/researchers both in the countries participating in the project and beyond, will be developed and delivered.**

Figure 15: Combining a bottom-up and top-down approach to streamline the solutions created by the Oper8 OGs

Audio visual material, including videos and podcasts, infographics, educational material, as well as practice abstracts and Factsheets in the common EIP-AGRI format **will be elaborated and translated into 7 national languages to increase outreach**. Dissemination channels, such as the EIP-AGRI (Newsletters, Agrinnovation magazine, EIP-AGRI events) will be employed, while the project will leverage the established dissemination channels and networks of the 8 OGs (farmers, advisors, businesses, other OGs, national networks, and public authorities) to create network multiplier effects so as to maximise impact and reach.

Overall, the Oper8 network's focus on both OGs and training is a powerful combination that can help to drive sustainable agricultural development and improve the livelihoods of farmers and communities around the world. Through the Oper8 network, OGs can share knowledge, exchange best practices, and collaborate on projects that address common challenges. This allows for the scaling up of successful initiatives and the dissemination of innovative solutions throughout the EU.

[65] https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-strategic-plans_en

Figure 16 Trial demonstration of utilising a) hot foam to reduce weed biomass, b) UAV for weed monitoring, c) precision forestry techniques to maximise growth and optimise the use of resources.

3.4.2 Case study: Yuverta and the Digital Nomads (NL)

Karen Elferinck, Bjorn Hildebrandt, Isabelle Van Eijk, en Tatjana Fens (Yuverta)

Background

The world changes quickly. Digitalisation has taken a flight and is involved in all aspects of life. Not only in working places and automatic processing, but also in our personal lives. An example of this is the Digital Nomad. The nomadic lifestyle takes full potential of modern technology. This change of working habits and lifestyle balance takes a new approach in how to build a living. On the other hand, society is changing. Major events such as war and crises or challenges such as sustainability, (work)migration, polarisation aren't only issues of a single country but are greater than our national borders.

In 2020 Yuverta TVET college in the Netherlands did a project on Digital Nomads in education. A Digital Nomad is a person who earns a living working online while travelling around the globe. Basically a modern nomadic lifestyle. Thirteen students from different green courses and two teachers took their backpacks, their projects/assignments and travelled for a month in Europe while they kept working on their schoolwork that they normally would do in a school building. The group prepared their own travel plan, budget, internal and external network. During the travels the expectations of motivation and learning on-the-spot were much higher than dreamed. Themes such as democratic values got much more meaning in dialogue with other Europeans. Working on their school projects took less effort than normal and got more impact because they could integrate reality in their learning. Unfortunately, Covid-19 caught up on the group and sent them home early. Now, two years later, the preparations of a new group of Digital Nomads is going strong and in March 2023 a new group will leave for at least a month.

Foundation of core and the goal of the project

The project Digital Nomads combines two major challenges of modern society: digitalisation and socialisation into a modern way of education. In this project a group of international students will be traveling together from one place to another while working on projects/assignments from their own school back home. In the preparation of the project, the group will be challenged to work together to make a travel plan, group rules, budget, plan ahead and work out personal goals. While traveling, students will be working on their projects that they would normally do in their school. This brings some new challenges for practical courses, so students need to network in order to get access to practical areas in the countries they are visiting. During these travels the group of international students will be challenged with projects about modern society and how we could solve these challenges.

One of the goals of the Digital Nomads is to travel around in an international community and to meet European students in different countries, to work as a digital nomad and to work on problem solving of cross borders issues. Students do all this while working at their home-curriculum. By the time of 2024 or 2025 we are hoping to set up international groups of Digital Nomads of various nations combined.

The dream of the project

While we are creating a community of Digital Nomad students, the next step in the project would be to create the first international school for vocational education. A border crossing school where students could travel between different schools in various countries while they work on the same curriculum. For example, they could get credits for a project in the Netherlands and the next place is an assessment in the Czech Republic. In the end a student has enough credits to get a diploma in one or more majors and minors, a lot of European friends and an international network as a start of his/her career.

3.4.3 Digital education – the EU-Farmbook digital platform

Pieter Spanoghe (Ghent University)

The EIP-AGRI uses the MA project approach to bridge the gap between science and practice. Such MA projects are funded under both a) the Horizon R&I programme and b) the second (rural development) pillar of the CAP of the European Union. This MA approach foresees a process of co-creation and co-ownership of project outputs with the users of these outputs. It puts emphasis on innovation and not just on research.
The most effective way to obtain a genuinely sustainable global food production system can be summarised in a quote: '**Sustainable Farming: Education of the Future Generation**'. Keep also in mind that the value of a knowledge object is in the learning experience associated with creating it. Today, the **nature of education and training is changing**, and fast. The EU-FarmBook **digital platform** will equip users with the latest **approaches, materials and tools; knowledge and skills** to understand knowledge objects and to prepare users for a digital future that is happening now.

To **strengthen learning environments** and support the **empowerment** and **development** of individual and **collective capacities** in a dynamic way EU-FarmBook will ensure the effectiveness and circularity of processes of knowledge creation and learning.

Efforts are undertaken to understand needs and opportunities for improving **digital agricultural education** and **training materials**. Indeed, scientific results are usually presented and/or published in the form of a scientific article with a typical structure and a very detailed and scholarly description of the rationale, methodology, presentation, and interpretation. This usually makes them so specific that they are rarely read by farmers, technicians, advisors, or the general public. Use of **participatory approaches** improves the engagement of practitioners in the **creation of (digital) knowledge**. It leads to a more desired outcome. Indeed, to reach practitioners, the (digital) message must be focused on their problem or issue of interest, it must be short, clear and easy to understand, but at the same time, it must not oversimplify.

Educators and trainers are key in (digital) knowledge transfer and make the outset clear about what is being offered to practitioners. They maintain a constant **exchange of knowledge** with key actors and stakeholders and know their needs. They are able to effectively **integrate the practical knowledge material** into **tailor-made education**, **training materials** and **models**. For example, a summary of the highlights and practical implications, making use of audiovisual aids such as infographics, factsheets, videos, or podcasts, which can make project research output more visual, accessible and comprehensible. Similarly, while it remains important for project researchers to share the information about scientific result(s) through professional channels such as ResearchGate and LinkedIn, or even to attract attention through social media such as Facebook or Twitter, the most effective communication with farmers remains through personal contact.

EU-FarmBook foresees **easy-to-use digital tools** to provide straightforward access to knowledge outputs. It will define appropriate approaches and methods for integrating EU-FarmBook materials within education and training programmes. This will entail the identification of challenges that limit the use of already existing knowledge repositories and e-learning materials/platforms. Demonstration days organised where the knowledge collected in EU-FarmBook will be demonstrated in practice through a peer-to-peer approach and interaction with a pool of experts will further enhance uptake of the digital knowledge in practice. **Farminars** which are master classes for farmer-to-farmer education and training are on the EU-FarmBook planning. In co-design new digital education and training curricula for universities, secondary schools, advisors, farmers and demo farms are worked out.

3.4.4 Digital advisory tools and services

Tom Kelly (TEAGASC), Peter Paree (ZLTO), and Patricia Fry (HAFL)

FAIRshare is a Horizon2020 CSA mainly about getting action at the farm and advisory level. Exposure to FAIRshare project: 2 major parts: 1. the creation of a Permanent Networking Facility (PNF) which includes an inventory of digital tools and services (DATS) used by advisors, 2. Supporting advisors through 42 user cases in different communities across Europe. Each of the user cases takes people through a specific digitalisation challenge and process.

Aim of the FAIRshare project: support advisors in the use of digital tools, also the services that use these tools, shared through the PNF and DATs inventory. There are different formats, different types of DATS, and training materials. The core of the FAIRshare project is the **DATS inventory** and the digital services it promotes. Most of the DATS have been used by advisors and this provides the quality control (one not better than the other). People who want to find specific DATS can engage with those and share their DATS.

Work Package (WP) 2 promotes good practices. **20 good practices** were collected and condensed into storyboards. They will be published as videos in different languages. This example of 20 different user cases with 20 different practices was discussed with the advisors during the EUFRAS-IALB conference in June 2022.

WP3 looked at the barriers, engagement, and incentives for the uptake of DATS. Many barriers were related to access to digital tools. One of the main barriers however was training.

WP 4, 5 and 6 was built around **42 user cases**. User cases were a challenge faced by a group of advisors'. Within each user case, a strategic plan, action plan and roadmap were developed to provide a viable digital solution and this was supported with project funds of up to 90 000 euros. A strong business case outlining the adoption process, costs and benefits was a vital component. There was a focus on training that addressed diverse knowledge and skills gaps, e.g. a modern digital communication tool, MURAL. Now, many advisors use it and know how it can be used. This was part of the training in the digital environment.

Digital tools are very good entry points for advisors providing new/better services, they can be used on the farm and the office. An example is the Mastitis Cost Calculator which gives an automated calculation of financial losses due to mastitis in cows and dairy herds. Data is entered manually by an advisor on the farm and results are presented through visualisations in reports to the farmer. Also, the area of decision support systems (DSS) is expanding. An example is the DSS Rise, with 48 questions for 10 fields of sustainability. The real value lies in the supporting interaction between the farmer and the advisor, when looking at a complex issue, this feature of good practices is key.

DATS and selected training were sorted by type (communication, calculation, and DSS). The training module inventory is available on the official website[66]. The inventory represents a wide variety of training courses for different agricultural branches and different purposes.

[66] https://fairshare-pnf.eu/training-frameworks.

Train the trainer (TtT) activities in Task 6.5 aimed to support trainers and advisors in the use or implementation of digital tools and services. Four pilot 'Train the trainer modules' were delivered with partners from all four regions addressing their gaps and their needs: (1) *"What DATS are and can do for you"* (2) "*How advisors and farmers can be motivated to engage with DATS"* (3) *"Develop your own project to implement DATS"* (4) *"Reflect on deployment and enhance knowledge exchange*".

These trainings were based on adult learning principles, exchanging experiences, and building on them.

Aims of Module 1: make expectations and first experiences of participants visible: get to know the goal of FAIRshare: get to know the range of DATS; understand the three categories and the varying degrees of complexity of DATS; reflect on possible benefits for the farmers; know success factors in connecting with applications of DATS, implementation of DATS needs a good relationship with the farmer and a so-called 'safe space' so questions can be asked freely.

Experience the successful use of DATS: choose DATS with lots of experiences and a good training. An example is RISE 3.0, calculation and visualisation of farm sustainability. Several aspects are considered: soil use, animal husbandry, materials, and environment; water use; energy and climate, biodiversity; working conditions; quality of life; economic viability, and farm management.

Aims of Module 2: reflect on the selection of new DATS from the inventory FAIRshare; get to know the current behaviour of farmers; understand motivations and barriers for farmers and advisors; learn how farmers/advisors can be motivated; get to know the range of Good Practices; practical training: assignment for module 3: look at different trainings with a good framework and reflect what would be used when and how.

Aims of Module 3: (on learning and teaching): chose trainings with a good framework and reflect on how to use them in "Train the Trainer" concept; reflect own motivation as a trainer and empower yourself for transformational education; understand principles of adult learning and develop your own TtT project on that basis.

Aims of Module 4: learn from examples and develop them further; learn how to work with testimonials; find suitable knowledge sharing networks in countries and develop them.

'View of a farmer' is a testimonial, movie, about data security but also how to build trust. Farmers must be able to implement what they learned. Also, a mural exercise was done on the successful use of DATS by farmers ('Go through the Mural, test the method, and learn from it'). The group reflected on the benefits for the farmer, the successful use and typical struggles, the background, and the type of DATS (communication, calculation, and DSS). Co-design and development are important success factors and peer exchange is extremely motivating. Among the barriers are the fear of making mistakes, skills, and connectivity in the field, and intrinsic motivation. Gathered from the training group: go through challenging situations, go through the value chain.

Conclusions:

'Pilot training' and 'practical focus' were important. Choosing as practical a focus as possible and challenging the trainees to be interactive. Leaving plenty of space for exchange of experiences stemming from the trainers, and the advisors or give room to testimonials coming from farmers, advisors, and developers. Adult training principles and use testimonials were the main methodical input. Booklets "methods and know-how" were produced so the inputs during the training could be kept short. The personal stories of each participant, exchanged, at the beginning was key. The learnings were checked at the end of the training. Giving people time to tell their stories, to voice opinions and experiences. Advisors need to understand the motivations and barriers of farmers to be able to plan a training.

Next steps of the FAIRshare project (runs until October 2023):

Based on these four pilot modules, the training modules were adapted and developed further. The main part was developing training with selected DATS in the training group based on adult training methods and learning from that. The main training modules 1 to 4 of were held from October 2022 until March 2023, where all the user cases could participate. The project will continue supporting advisors to support farmers using DATS. The training embedded in the user cases will run until the end of the project.

In Task 6.6 the training will be evaluated. Evaluation and adoption are from the start. We learn from the training and trainers learn from us. Most will get precise results, include all results, and extract best practices.

Communication and dissemination activities are to follow, including recommendations like: advisors enable a combination of knowledge sharing and personal involvement! FAIRshare will keep those qualities and facilitate and deepen the exchange and augment interaction.

3.5 Skills, training and life-long-learning

3.5.1 How can ESF+ support skills training to farmers, incl. digital training for farmers

Tiina Polo and Raphaelle Bologni (DG EMPL, EC)

The European Social Fund Plus (ESF+) is the EU's main instrument for investing in people and supporting the implementation of the European pillar of social rights. With a budget of almost 99,3 billion euros for the period 2021-2027, the ESF+ will continue to provide an important contribution to the EU's employment, social, education, and skills policies, including structural reforms in these areas (Home | European Social Fund Plus (europa.eu). As part of cohesion policy, the ESF+ will also continue its mission to support economic, territorial and social cohesion in the EU – reducing disparities between Member States and regions.

Support under the ESF+ is mainly managed by Member States, with the Commission playing a supervisory role.

Funding therefore takes place through:

- The shared management strand - implemented by Member States in partnership with the Commission. These resources have a budget of roughly EUR 98.5 billion for the programming period 2021-27

- The Employment and Social Innovation (EaSI) Strand - implemented by the Commission with a budget of close to EUR 762 million for 2021-2027.

Shared management principle is key for the shared management strand: at the beginning of each seven-year programming period, the Commission and MS agree on key priorities for ESF+ investment (for example: youth unemployment, or improving the state's education system), based on the country reports, national reform programmes and relevant country-specific recommendations issued in the framework of the European Semester. These priorities are defined on the basis of each MS individual challenges and needs, and are then set out in national or regional programmes.

Once the programmes are agreed, MS are responsible for implementing the planned actions – including selecting concrete projects for funding and paying project organisers. Member States allocate funding to a wide range of organisations – public bodies, private companies and civil society according to the partnership principle. The Commission monitors implementation, reimburses expenditure, and is ultimately accountable for the budget.

Besides, a key principle of ESF+ shared management is co-financing that allows that both the EU and a Member State's budget contribute to the total budget of an ESF+ programme. Depending on the area of investment and the development level of the region in which the activities take place, the EU co- financing rate can vary between 50% and 95%.

For the 2021-2027 programming period, Member States have submitted 157 programmes with ESF+ allocations to the Commission and all of them were adopted before end of 2022: out of EUR 136.1 billion (of which EUR 91.5 billion is the Union contribution), EUR 43.4 bn are directed to employment, EUR 44.8 bn to social inclusion, EUR 42.7 bn to education and skills and EUR 5.3 bn to material deprivation.

The ESF+ finances the implementation of the principles from the European Pillar for Social Rights. Ambitious targets have been set for employment, education, and skills, in particular adult learning and participation, 60% of all adults should participate by the year 2030. The ESF+ will support implementation and national structural reforms in these fields, thus contributing to MS's efforts to reduce unemployment, advance quality and equal opportunities in education and training, and improve social inclusion and integration. The horizontal principles should be considered in every project.

In all its investments, the ESF+ will promote the horizontal principles of gender and equality, respect for fundamental rights, equal opportunities, and non-discrimination. MS will use the ESF+ to tackle the socio-economic crisis caused by the COVID-19 pandemic. The Fund will support the EU's green, digital and resilient recovery from the crisis by driving investment in jobs, skills, and services. ESF+ support to skills and education covers a broad range of activities: improving the quality, effectiveness, and labour market relevance of education and training systems; promoting equal access to and completion of, quality and inclusive education, life-long learning, re and upskilling, anticipating change and new skills requirements. The ESF+ also supports the implementation of the European Skills Agenda: strengthening sustainable competitiveness as set out in the European Green Deal; ensuring social fairness and putting into practice the first principle of the European pillar of social rights (access to education, training, and lifelong learning for everybody, everywhere in the EU); building resilience to crises, based on the lessons learned during the COVID-19 pandemic.

How to get involved?

Calls for proposals and project selection are in the hand of national & regional managing authorities. Member States and regions are responsible for the implementation of ESF+ funding and can largely decide how they wish to organise the implementation of the ESF+. In agreement with the Commission, Member States may choose to have only a single national ESF+ programme, implement the ESF+ through a set of regional programmes or combine both approaches. ESF+ managing authorities then select projects based on their relevance to national and/or regional programmes. To contact your ESF+ managing authorities, please consult: https://ec.europa.eu/european-social-fund-plus/en/support-your-country

Project examples in the digital sector targeting farming: e training in new technologies for more productive, sustainable farming in Italy, response to digital demand in the labour market in Spain, Cybersecurity4SME in Belgium, and Engaging young entrepreneurship in Croatia's promising organics farming sector (see ppt for links to the projects and other useful links).

3.5.2 Pact for skills is in the Agri-Food system

Brawnen Miles (COPA-COGECA)

The **agri-food ecosystem** is by far the biggest employment sector in Europe; it has a significant impact on rural and urban communities. It is made up of 10 million farms and 22,000 agri-food cooperatives in the EU creating jobs for a workforce of 20 million employees. More than 294.000 food processing companies provide jobs for 4.8 million people. Family farming remains the dominant type of farming in the EU. In 2016, nine out of ten agricultural workers were either farm owners or family members.

Since 2011, there has been a big increase in both intra- and extra-EU migrant agricultural workers, while the overall labour outflow from the EU agricultural sector was almost entirely due to the movement of MS national workers.

The agri-food ecosystem is facing **major transversal challenges** such as globalisation, climate change, urbanisation, changing consumer demands, generational renewal, and strong competition from EU third countries. The COVID-19 pandemic has accelerated these challenges and disrupted the effectiveness of the agri-food value chain while increasing labour shortages. Despite this, there are some opportunities for the ecosystem through digitalisation and the transition towards a more circular and bio-based economy.

The Pact wants to **reinforce, upscale**, and make the **rural areas** more attractive. The purpose is to **upskill and reskill the current workforce** to make the agri-food system more attractive to young people while providing a life-long learning perspective.

Workers in the agri-food ecosystem are likely to be unskilled, aging workers or third-country nationals have sometimes lower levels of qualification. The ecosystem is also dependent on mobile workers, such as cross-border or seasonal workers. There is a **need** for adequate Science Technology Engineering & Mathematics **(STEM) skills**

and high-skilled workers such as agronomists, machinery and contact material specialists, sustainability experts, circular and biotech experts, food scientists, food technologists, and high craftsmanship in the different sub-sectors.

There is often a **skills gap** between the curricula offered by **universities** and other **vocational schools**. At the same time, there needs to be commitments from the agriculture and food industries and companies to train apprentices on the job. There is an increasing demand for transversal hard and soft skills: leadership and communication, business management, financial, marketing, reporting, team management, and quality management skills, which are often challenging for SMEs, etc.

Food Drink Europe and Copa-Cogeca were invited to coordinate the Food Pact Skill initiative with support from DG AGRI, DG GROW and DG EMPL. In the beginning, Copa-Cogeca and Food Drink Europe respectively utilised their internal organisation to prepare this. In Copa-Cogeca this included a joint task force made up of COPA, Cogeca, and Geopa members as well as CEJA to start. A similar working group that takes place is FDE.

Last year, the EC tendered a support service for **the wider Pact4skills** which will be managed by ECORYS and other consortium partners. They will be providing support to all the various partnerships that are ongoing, including the agri-food ecosystem. There will be a core group made up of the signatories of the partnership who will act as the steering committee, and in addition, a new Erasmus project iRestart will be supporting the partnership when it comes to the KPIs and piloting the EU observatory on agri-food skill needs.

Pact4skills brings together all types and sizes of businesses, including EU umbrella organisations, social partners, vocational and education training providers, and public authorities. To achieve this, the partnership aims to set a joint strategy to design and implement a sectoral education, training, upskilling, and reskilling framework, maximising the competitiveness of all the actors involved. The partnership is expected to develop the means to monitor the specific Key Performance Indicators (KPIs) that will measure progress towards these goals and help overcome the challenges identified. On top of that, it's important to reach all the relevant stakeholders in the agri-food ecosystem. It is also expected to provide actions accompanied by KPIs to assess its impact. Therefore, those who have currently joined the pact, and support the commitments, are outlined here. They are not all included, but they support the establishment of a skills partnership for the agri-food ecosystem; the importance of establishing a culture of lifelong learning; furthermore, they agree to support partnerships between education and training organisations and innovation actors as well as businesses; and finally, but just as important is to utilise and build upon jointly achieved outcomes and tools through past and ongoing relevant European projects and initiatives.

The partnership aims to ensure that the agri-food ecosystem delivers and will develop the means to monitor the progress towards the goals outlined. Some of the specific KPIs will include things like the number of stakeholders involved and coverage of MS and regions; the Number of participants in up-skilling actions in the remit of the partnership etc; as well as the Stakeholder engagement in sectoral drivers of change, such as Digitalisation; Sustainability; Life-long learning schemes; etc.

The Ecosystem is still in its early stages, mapping the current state of play when it comes to the Food industry and Agriculture, and looking at what KPIs will be included. The timeline here shows the launch of the Pact for skills back in 2020, and the launch of the agri-food ecosystem took place back in February this year.

Recently the Erasmus project, iRestart, has started[67]. The project will support the reskilling and upskilling of the workforce in the agri-food and veterinary sectors and will include retraining employees for the agri-food sector as well as material to support students that were to enter the agri-food labour market, improve their digital skills and facilitate the transition to the GD initiative. The signatories of the agri-food ecosystem, by signing the pact, these organisations align with the objectives of the partnership and commit to supporting its ambitions. An important aspect of the partnership is to have a wide range of different actors and stakeholders in the agri-food ecosystem involved, and that also includes working with public authorities, and departments.

[67] Home - i-Restart (erasmus-i-restart.eu)

4. Social innovation and inclusiveness

4.1 Social innovation as an integral part of AKIS

Sylvia Burssens (Ghent University)

When taking into account the broader view of local contexts in AKISs, the importance of social innovation comes along. Social innovation is widely recognised in agriculture, forestry and rural development as one of the main drivers (Bock, 2012). Rural areas are not residual, passive spaces dominated by societal demands articulated in urban centres, but are equally nodes of social change and may substantially contribute to a more sustainable and resilient future (Schermer and Kroismayr, 2020).

Social innovation involves rural communities (including communities of farmers) finding creative solutions to the complex social challenges they face (SWG SCAR-AKIS, 2019). These challenges are linked to location, generational renewal, status, lack of willingness to cooperate, poor infrastructure and rural services, lack of skills for picking up new opportunities such as development of smart villages, care farming, consumer-producer short supply chains, agritourism, rural commons etc. Social innovation is an important aspect of innovation projects implemented under LEADER, EIP-AGRI and Smart Villages initiatives and also an important topic for continued exploration via HE projects (e.g. SIMRA, NEWBIE and BOND projects currently funded under H2020). Challenges include social entrepreneurship and the development of new social business models, as well as consumer-driven innovation and the urban-rural dimension (urban farming/forestry and social innovations in food chains, as well as topics which also engage urban areas such as agroecology).

Three main interpretations of social innovations may be distinguished: the social mechanisms of innovation, the social responsibility of innovations, and the innovation of society (Bock, B., 2012). All aspects are strongly intertwined with AKIS. For example, social mechanisms are related to digitalisation and connectivity, knowledge sharing and education or training of farmers and advisors. By linking AKIS actors and enhancing their connectivity, social mechanisms may be enhanced and vice versa, on the other hand different social mechanisms may underpin a well-functioning AKIS. Social responsibility can be seen as an enabling factor for capacity building in AKIS e.g. social responsibility within AKIS will also contribute to welfare and environment and support the transition to sustainable agriculture and forestry. Social transformation or innovation of society in rural areas concerns aspects such as rural population, young farmers, women, and generation renewal. The social impact in agriculture and forestry pertains to farmers and foresters in the bio-economy value chain and worker's conditions, including safety but also aspects such as food safety, and quality, food waste and local production.

Social Innovators need to have both local and extra-local networks that work together to facilitate knowledge exchange and connect new markets and collaborators together (Bosworth et al., 2020). To address this issue the EU CAP Network has recently launched a FG that had its first meeting in January 2023. The FG will discuss how social innovation can contribute to innovation in agriculture while strengthening the multi-functional role of agriculture and connecting people from the urban and rural areas[68].

[68] Social Farming and Innovations | European CAP Network (europa.eu)

4.2 Towards a stronger AKIS for social innovation

Views from the Horizon 2020 funded project SIMRA and from Mark Redman (Highclere Consultancy)

4.2.1 Introduction

Social innovation is a well-established concept within EU policy and as formulated[69] on the website of the DG for Internal Market, Industry, Entrepreneurship, and SMEs:

> ***"Social innovations are new ideas that meet social needs, create social relationships and form new collaborations. These innovations can be products, services or models addressing unmet needs more effectively".***

Social innovation is widely regarded as an essential element of rural innovation (including agriculture and forestry) and was first considered by the Collaborative Working Group (CWG) of the SCAR (forerunner of the SWG SCAR-AKIS) more than 10 years ago. One of the outputs of the CWG was a paper[70] by Bettina Bock (Wageningen University) published in 2012 that continues to provide a useful introduction to the subject.

More recently the H2020 SIMRA project[71] took a particular perspective on social innovation in rural areas by defining it as:

> ***"…the reconfiguring of social practices in response to societal challenges which seeks to enhance outcomes on societal wellbeing and necessarily includes the engagement of third sector actors."***

4.2.2 Types of Innovation encountered in rural areas

Social innovation is commonly encountered in rural areas as a grassroots response to social, economic, and environmental challenges and/or opportunities where traditional market mechanisms, public policies and/or practical approaches have proved inadequate. Social innovations therefore often arise from crisis situations where previous ways of acting are no longer practicable or key actors are blocked, for example due to lack of capacity or access to resources.

Throughout rural Europe, there are thousands of examples of innovative, locally designed responses to a very broad range of issues such as:

- The loss of village shops and other basic local services
- Providing social welfare for vulnerable and disadvantaged groups, including care for the elderly
- Integrating migrants and refugees
- Mental health and well-being, including of farmers, farm workers and farming families
- Tackling the rising cost of energy for local households and businesses
- Loss of young people due to a lack of affordable housing
- Facilitating generational renewal amongst farmers and other local businesses
- The purchase and communal management of local environmental resources
- Dealing with local recycling, emissions reduction and water quality

[69] https://single-market-economy.ec.europa.eu/industry/strategy/innovation/social_en

[70] https://studies.hu/wp-content/uploads/2019/05/2199.pdf

[71] http://www.simra-h2020.eu/

- Novel forms of association and cooperation
- Dealing with the impacts of climate change (e.g. floods and wildfires)
- Learning new skills for new opportunities, such as care farming, short supply chains and farm-based leisure and recreation activities
- Making novel use of digital technologies in local schools, and so on.
-

For further inspiration see the SIMRA database of social innovations[72] and collections of social innovations related to different themes[73].

4.2.3 How is social Innovation different from other forms of rural innovation?

It is widely acknowledged that social innovation has a number of characteristics which differentiate it (to a greater or lesser extent) from other forms of innovation:

- Social innovation is often community-based and focused on 'social well-being' rather than the 'economic well-being' (productivity, profitability, efficiency etc.) of enterprises. It is, for example, more common to encounter social innovation in the context of 'village level development' than 'farm level' development and this places it outside of the scope of interest/activity of many typical AKIS actors, such as farm advisors. Equally many of the issues where social innovation might be applied directly at 'farm level' (e.g. regarding the mental health well-being of farmers and farm-workers) are also well beyond the competencies of most existing AKIS actors.
- Many social innovations in rural areas involve the active participation of actors not usually associated with the AKIS. For example, unpaid local authorities (e.g. village councils), NGOs and civil society organisations (e.g. youth groups), as well as individual volunteers, schoolchildren etc., who have the willingness to commit to supporting their community in ways that transcend economic reasoning or market logic.
- Social innovation commonly involves very diverse groups of local people working in partnership to mobilise their creativity, benefit from mutual learning and generally take advantage of the positive social dynamics that exist amongst them. This type of community engagement may not always be suited to the implementation of time-limited 'projects' but is instead best fostered/promoted through open and dynamic on-going 'processes'.
- Compared to other forms of rural innovation, social innovation is especially vulnerable to being suppressed or blocked by a lack of trust between local actors e.g. between civil society and local entrepreneurs.
- Social innovation has been / can be funded by many different programmes (EAFRD, ESF, ERDF) as well as the private sector (e.g. Corporate Social Responsibility) and voluntary sector (charitable foundations etc.) initiatives.
- Social innovation is not generally considered by agricultural research and innovation projects, although this is now gradually changing. For example, there have been several calls relating to rural innovation[74] in recent Horizon Europe work programmes and there is growing acknowledgement that boosting social and behavioural sciences in research and innovation is essential to enhance the resilience and attractiveness of the farming, forestry and other rural sectors.

[72] http://www.simra-h2020.eu/index.php/simradatabase/

[73] http://www.simra-h2020.eu/index.php/resources/collection-of-examples/

[74] Notably: HORIZON-CL6-2021-COMMUNITIES-01-02: *Expertise and training centre on rural innovation*; HORIZON-CL6-2022-COMMUNITIES-01-01: *Boosting women-led innovation in farming and rural areas*; HORIZON-CL6-2022-COMMUNITIES-01-02: *Assessing and improving labour conditions and health and safety at work in farming*, and; HORIZON-CL6-2022-COMMUNITIES-02-01-two-stage: *Smart solutions for smart rural communities: empowering rural communities and smart villages to innovate for societal change*

4.2.4 What can help to strengthen the AKIS for social innovation?

- Constructive interaction between public, private, and civil society institutions/organisations is a key factor for successful social innovation in rural areas. Whilst this is beyond the influence of the CSP Managing Authorities, **most CAP networks will have regular contact with relevant institutions/organisations** and should promote the opportunities within the national CAP Strategic Plan for supporting the fostering and/or upscaling of social innovation.
- According to Art. 15 of the CAP Strategic Plan Regulation, all Member States should have included *"services for advising farmers and other beneficiaries of CAP support"* into their national CAP Strategic Plans and, amongst other things, interventions supporting farm and other advisors should cover all requirements relating to the *"economic, environmental and **social dimensions**"* of land and rural business management. Whilst it is clear that many advisors will have limited capacity to engage effectively with social innovations, they **should be kept up to date with new knowledge and relevant social innovations generated within the EIP-AGRI**.
- Social innovation has most commonly been associated in the past with LEADER and more recently with the concept of Smart Villages. LEADER remains a key building block of innovation support within the CAP Strategic Plans and every opportunity should be taken for closer integration of LEADER with the EIP-AGRI. The CAP Networks can play a role in aligning the activities of Local Action Groups towards promoting and supporting social innovation within the AKIS and more specifically **within the EIP-AGRI at a local territorial level**. In some cases, this might include facilitating direct interaction between LEADER Local Action Groups and EIP-AGRI Operational Groups.
- Whilst uptake of the Smart Village concept varies between Member States, the thematic briefings, orientations and guidance on Smart Villages prepared for Managing Authorities by the 2014-2020 ENRD Contact Point continues to provide valuable insights into the **processes associated with community-led social innovation**. These can be found online in the ENRD Smart Villages Toolkit[75].
- As already indicated, the SIMRA project website remains a very important source of information. In addition to the links already given, there is a Social Innovation Practice Guide (in 5 languages)[76] and an evaluation manual for assessing the impact of social innovation in rural areas[77]. A number of other projects have also produced relevant materials and more will be developed under Horizon Europe.
- **Awareness raising and capacity development, such as training, are needed at all levels** to strengthen the enabling environment for social innovation. This requires flexible interpretation of eligibility criteria for relevant AKIS interventions to ensure accessibility for all key actors – including individuals and community groups, voluntary (third) sector organisations, social enterprises, businesses and public authorities.

[75] https://enrd.ec.europa.eu/smart-and-competitive-rural-areas/smart-villages/smart-villages-portal/smart-villages-toolkit_en
[76] http://www.simra-h2020.eu/wp-content/uploads/2020/02/SIMRA_SI_Practice_Guide_interactive.pdf
[77] https://drive.google.com/file/d/1eW3Z5rE8x7hMTRCZd7QHgilmb6hlbYDw/view

4.2.5 Towards a stronger AKIS for social innovation

- **An inclusive multi-dimensional AKIS is supportive of social innovation alongside all other forms of rural innovation**. This is in accordance with the expectation that Member States take account of and encourage innovative approaches to all dimensions of sustainability - economic, environmental *and* social – with the aim of guaranteeing that their CAP Strategic Plans provide effective solutions to the broad range of rural challenges in an integrated and territorially balanced way.

4.1 Engagement of users in thematic networks and interactive innovation projects

Sylvia Burssens (Ghent University)

EU Horizon funded TNs are by nature bottom-up projects oriented to sharing practical knowledge based on the needs of users. The rate of **success and impact** will therefore depend on the **engagement of users** in the network and/or its participatory activities.

Recent studies show however that users, **farmers and advisors, are not sufficiently engaged** in TNs (Feo et al., 2021) and other Horizon funded projects, although they take part in innovation projects (Fielsend et al., 2021). Besides it is likely that amongst the farmers who participate in projects, they are mainly from Western Europe as participants of Eastern European countries in EU Horizon funded projects are largely underrepresented (Fielsend et al., 2020; Feo et al. , 2021). The challenge remains thus not only to bridge the gap between the research and the practice, but also between the Western and Eastern regions and countries.

The so-called 'Diffusion of Innovation theory' proposed by Rogers (1962), illustrated why **some farmers are quick to adopt innovations**, while others are much slower in doing so. In his theory, Rogers asserts how people, as part of a social system, adopt a new idea, or product (innovation) and change their behaviour towards something new. A social system is the patterned network of relationships constituting a coherent whole that exists between individuals, groups, and institutions. Adopting a new idea is a process and, in a social system, does not happen synchronously.

In fact, due to different characteristics, some people are more inclined to adopt the innovation than others. In his work, Rogers distinguished five categories of people willing to adopt innovation: Innovators, Early adopters, Early majority, Late majority, and Laggards. Innovators are people that are interested in a new idea and interested in being the first to try it out. Being the first implies taking risks. Early adopters are the people with a leadership role who are willing to adopt new ideas because they already saw the need for change. The Early majority are people that normally need to see positive evidence about how innovation works before adopting it. An ideal way to involve them is by showing successful stories that prove innovation's effectiveness. Sceptical people characterised the Late majority. They may adopt an innovation after many other people have positively experienced innovation. As of last, the laggards are conservative and traditionalist people. They represent the hardest group to be made to adopt new ideas or behaviours (Rogers 1962).

In each category of adopters, Rogers identifies five main factors that affect the adoption of an innovation. In a new idea, behaviour or product, people need to see the advantage, the compatibility with their experiences and needs, the complexity, the trialability, and the observability of the final result. But, the most important innovation is spread thanks to a communication network. People which are interconnected with each other play an important role in the diffusion of innovation. Therefore, there should be a certain degree of similarity between them.

The study of Feo *et al*. (2021) shows that the **majority of** farmers participating in TNs and related participatory activities are mainly **Innovators and Early adopters** (see Figure 17), demonstrating the innovation gap between these groups and the Early and Late majority, and the Laggards.

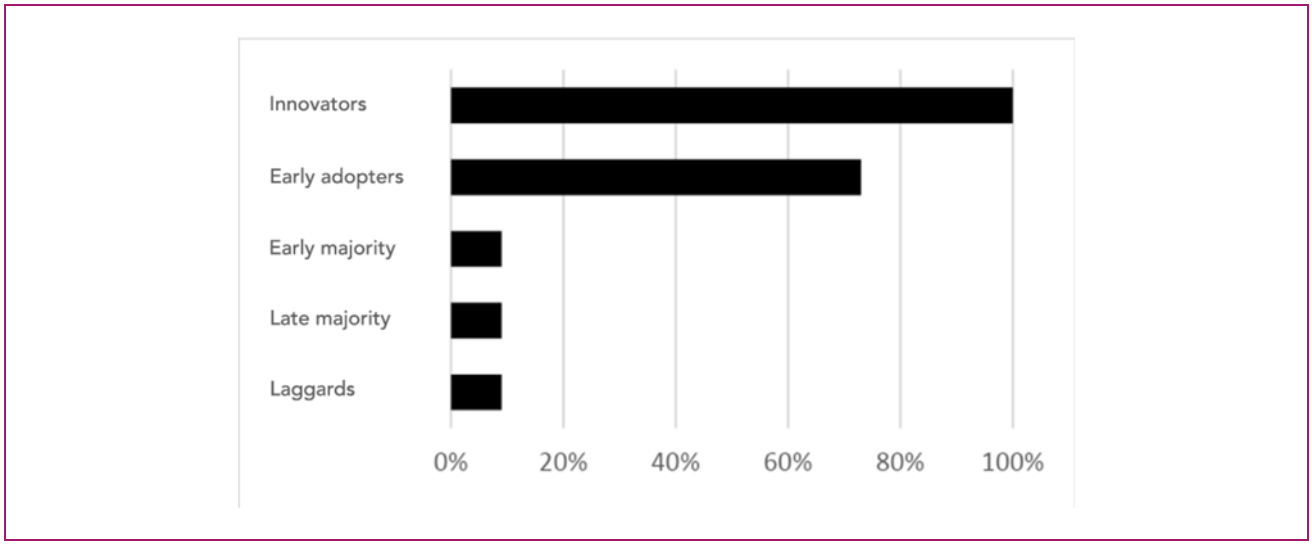


Figure 17 Percentage of types of farmers who participate in thematic networks (TNs) (Feo et al., 2021)

Already before, the social system was understood as a structured network of relationships constituting a coherent whole that exists between individuals, groups, and institutions (Parsons 1991). Adopting a new idea was seen as a process. It does not happen all at once across the whole system (Shetty 2011).

To stimulate this process, collaboration in value chains can enhance the innovation system and **add to value creation** specifically **by involving communities** (Agostini, Bitencourt and Vieira (2020).

Connections of TNs to OGs, and involvement of local farmer and advisory networks as well as CAP rural networks may help to better engage farmers and advisors (Feo et al. 2021). For this reason, TNs that are built on OGs may be more successful. On-farm demonstration activities and peer-to-peer exchange within local networks, as well as the organisation of cross-regional exchange visits or country-level workshops can contribute to better engagement and stimulate the exchange of farmers' knowledge, innovative solutions and best practices. The connection to educational and/or training institutions especially vocational schools, and long life learning programmes is also key. Not only advisors are main intermediaries to a transition, but also educators, trainers, and students play a crucial role

in the learning and innovation process (Feo et al., 2021) and they can largely benefit from TNs outputs (SCAR AKIS 2017).

Several indicators have been used as a tool to show the participation and the engagement of users in TN activities (Blundo-Canto et al. 2019). However, they do not show whether users benefit from TN outputs. Involving heterogeneous actors in early stages is essential to ensure the highest level of results uptake. Facilitators strengthen this aspect by improving the network of actors. Connecting partners through the share of common interests benefit the uptake of the results, as well as the impact of a TN. This requires time, human and financial resources, as well as strategic planning.

A post-execution phase is needed to **evaluate the uptake of project results by users**. However, this is challenging because there is no budget allocation for a long-term evaluation. The impact indicators used by TNs allows only an evaluation in the short term, not yet in the long-term period. Therefore, setting a good communication strategy among actors both inside and outside the consortia, and having them well engaged in TN activities ensures a better uptake of TN results. As such, further reflections are still needed in developing methodologies and indicators that allow having a long-term view.

4.2 New entrants investing in social innovation

Views from the NEWBIE project, Tessa Avermaete and Mertijn Moeyersons (KU Leuven)

NEWBIE is a European project that was carried out from 2018-2021. The main goal of the NEWBIE network is to increase innovation, entrepreneurship, and resilience in the European farming sector by enabling new entrants to successfully establish sustainable farm businesses in Europe. The NEWBIE network brought together new entrants, successors, advisors, and researchers, as well as regional and national stakeholders and policy makers to identify, create, discuss and disseminate new business models and approaches to help new entrants.

The burdens for new entrants are diverse, including access to land, labour, capital, housing, markets, knowledge and the networks needed to acquire these resources. Fertile land becomes extremely expensive. Prices for food commodities are low. Farm income is, especially in some subsectors, extremely unstable. This holds all across Europe and leads to a continuous decrease in the number of farmers. At the same time, new entrants often experience a communication gap with their customers. Farmers get critique from citizens and movements for many issues in society, such as soil and water pollution or emissions. Miscommunications and the gap between consumers and producers further contribute to polarisation in the food and farming debate. Polarisation hinders a constructive dialogue in society and hence also jeopardises the development towards more sustainable food systems. Vice versa, an environment that facilitates the dialogue between all actors in the food system can significantly contribute to stimulate sustainable food systems. Local authorities can contribute to create such enabling environments.

Newbie identified how new entrants overcome current bottlenecks in the food system. Among others, the consortium noticed how new entrants invest in social innovation. This social innovation can be considered as a very broad term including green care, education and recreation. We illustrate this with two examples, one in Belgium and another one in Slovenia.

Farm Tallaart (Belgium) is run by two brothers and their families. It is primarily a vegetable farm, of which they sell the produce mainly through their own farm shop and through markets. They organise and engage in a wide range of broadening activities, including the organisation of farm visits and guided tours, the organisation of recreational activities for families such as a corn maze, the provision of educational services for schools, and the provision of green care services on the request of different care institutions. Their main motivation is showing people what life on the farm is about, which they try to achieve through their farm-shop and the range of broadening activities they are involved in. They think it is sad that agriculture in Flanders often has a bad image, and they want to show people all the services that are delivered by farmers to society, including environmental, educational, green care, and recreational services.

Domen Virant runs his farm "Kmetija pri Ropet" in Slovenia a little outside the capital Ljubljana. Domen took over the abandoned farm from his grandparents in 2015 and started a new farm business from the beginning. He ambitiously began to diversify a farm business – from breeding of laying hens to the production of strawberries and other berries, vegetables and goat's milk. In just a few years he developed a market-oriented farm with various supplementary activities – from fruit and vegetable processing to on-farm education, etc. Although he is young, he is already implementing mentoring programmes for farmers or new entrants who want to farm dairy goats or growing berries. Through various school programmes his farm serves as an educational hub where children can look, hear and feel all about agricultural food production.

4.3 EU review on the future of agriculture and occupational safety and health (OSH)[78]

Alun Jones (CIHEAM), Martina Jakobs (Leibniz Insitute), John McNamara (Teagasc) (with contributions from Andrea Teutenberg (KWF))

EU-OSHA Project management: Annick Starren, Emmanuelle Brun and Ioannis Anefantys with support of Elisabetta de Cillis.

A sector with serious occupational safety and health challenges

Agriculture and forestry are among the most dangerous professions in Europe, with a high level of accidents affecting the sustainability and viability of the sector. Over the last 10 years, there has been an average of over 500 registered deaths per year in the agriculture and forestry sector and over 150,000 non-fatal accidents (Eurostat, 2017). Recent research indicates that there is significant under-reporting of both fatal and non-fatal accidents in the agriculture and forestry sector throughout Europe (Merisalu et al., 2019). In many instances, national reporting also places agriculture and forestry top or almost top among sectors in terms of the level of risk.

Farmer health is a key issue in the sector. Over 60 % of agricultural workers report having a limiting chronic disease and high levels of cardiovascular disease (CVD). According to an EU survey from 2012, workers from the agriculture sector were more likely than those in any other sector to report that their work affected their health (Eurofound, 2012). Eurostat (2010) also reported that work-related health problems occur more often in the 'agriculture, hunting and forestry' sector along with in the mining and quarrying sector than in any other sector. This is related to the fact that some of the least favourable job characteristics, such as manual work and atypical working hours, are more prevalent in these sectors. Pesticide-related risks, musculoskeletal disorders (MSDs), zoonoses, skin cancer, and stress and psychosocial issues are all major emerging and continuing risks in the sector that either have not been adequately managed or have been underestimated owing to lack of accurate data over the years.

The EU Farm to Fork strategy recognises the importance of the EU Pillar of Social Rights and its application to the sector; however, there is still a major social-economic deficit in farming today, owing to the marginal profitability and low income for many small farmers (who make up the majority of farmers), undermining the social sustainability of farming and forestry. This socio-economic deficit affects the ability of the sector to fully embrace and manage growing trends, such as digitalisation, climate change, societal pressures and labour market developments, and is very much linked to the poor level of OSH protection in the sector.

To successfully tackle future OSH challenges in the sector, it will be important to address existing, structural and future OSH issues in a comprehensive and cohesive manner, namely:

[78] Full report completed on 23 December 2020 and presented to the EP AGRI Committee on 25th October 2022.

- lack of investment in and uptake of new smart and safer technologies and machinery;
- growing number of climate change-related risks and occupational health challenges;
- lack of transparent and the wholly inaccurate occupational accident and ill health reporting in the sector, particularly for the self-employed;
- no clear OSH regulatory framework to protect farmers and foresters and manage OSH, particularly for the self-employed;
- lack of a prevention culture, as well as the considerable skills and training deficit, particularly in OSH;
- existence of widespread atypical, and sometimes irregular, employment practices;
- lack of appropriate labour inspection resources to combat undeclared work and ensure adequate protection of seasonal and migrant workers in the sector;
- insufficient farm income and quality management time with which to prioritise OSH issues, particularly for small and family farmers.

Recommendations on OSH measures

- integrate OSH considerations into the development and design of new digital, precision and smart farming technologies (and adapt farm layouts);
- adapt risk assessment techniques and health and safety training to account for new technologies, such as robots and cobots, AI;
- actively encourage the use of technology to enhance safety through the use of smart sensors, IoT, AI and smart PPE;
- adapt risk assessment, workplace design and awareness-raising initiatives to account for climate change circumstances;
- improve prevention culture by establishing a specific sectoral prevention campaign or European network for agriculture safety and health;
- carry out research on safety and health in agriculture (e.g. on quad safety, tractor overturns) and smart personal protective equipment (PPE).

Policy recommendations:

- include the self-employed in Eurostat OSH reporting for forestry and agriculture and tackle other OSH under-reporting challenges in the sector;
- promote ratification in national law of ILO Convention on Agriculture (and annex on self-employed) to provide a minimum legal framework for OSH, particularly on the self-employed;
- include activities on OSH and well-being in agriculture and forestry in the Horizon Europe programme;
- establish a link between EU OSH legislation and the CAP) conditionality (this recommendation was subsequently taken up and is now implemented through CAP social conditionality);
- encourage Member States to include safety measures and training under Pillar II of their CAP plans);
- consider a rebate scheme for retro-fitting roll-over protection (ROPS) systems (and seatbelts), which have been used in the United States and Australia in view of the significant number of deaths and injuries resulting from the overturn of farm vehicles.

5. Digitalisation and e-infrastructures for knowledge exchange

5.1 Enhancing the knowledge flow: digitalisation in AKIS

Elena Feo, Sylvia Burssens, Pieter Spanoghe (Ghent University)

Digitalisation is becoming increasingly important in the AKIS for example, through the use of decision tools or apps, machine learning, online data and knowledge platforms (Ingram and Maye 2020; Klerkx 2020). Digitalisation is expected to radically transform everyday life and productive processes since it has the potential to contribute to the innovation process and give a new dimension to the AKIS (Smith 2018). Furthermore, digitalisation is expected to provide technical optimisation of agricultural production systems, value chains, food systems and to enhance knowledge exchange and learning (Klerkx, Jakku, and Labarthe 2019a).

The new CAP (2023-27) is reinforcing the digital transition in agriculture (e.g. linking financial support/incentives to the requirement of farm digitalisation, supporting investments in digital solutions, promoting digitalisation through national and regional AKISs) (Hart and Bas-defossez 2018; EIP-AGRI 2020b). However, a clear added value needs to be identified by farmers to use these technological tools and a good regulatory framework needs to be set (SCAR SWG AKIS 2019; Pfeiffer, Gabriel, and Gandorfer 2021).

A large investment is made through Horizon funded MAPs on digital agri-innovation, training, and skills for advisors (some of these H2020 projects are, for example, FAIRShare, 4D4F, IoF2020, SmartAgriHubs, and DataBio) (Arney et al. 2016; FAIRshare, 2020). Moreover, the attention is also focused on building common repositories with agricultural and forestry-related data and knowledge (H2020 projects, EURAKNOS, and EUREKA) (Gernert et al. 2019). These knowledge repositories have to be easily accessible and use an easy-understandable language to allow end-users to exchange new knowledge and innovation for practical uptake and further adaptation (EIP-AGRI, 2015; Castro and Lopes 2021). Furthermore, they can also serve national/regional education or vocational training purposes for all the AKIS actors. To be able to use digital tools (e.g., Knowledge platforms, new machinery systems, GPs), to acquire the necessary media and technical skills for the digital era, AKIS actors should be educated and trained (SCAR SWG AKIS 2019). However, in a well-functioning and strong AKIS, actors' involvement and interaction will lead to proper skills development, which will then foster digitalisation (Schwarz, Vanni, and Miller 2021).

Digital knowledge platforms should be interoperable, to connect and link to national knowledge platforms, enabling exchange and integration and, as such constitute a large common EU-wide reservoir for agriculture and forestry practice-oriented knowledge (EURAKNOS 2020e). In this regard, in the framework of the EURAKNOS H2020 project, the ideal "Knowledge Reservoir" (KR) should suit user needs according to their areas of interest and their required level of engagement. It should be possible to store and personalise the KR experience for different end-users and to develop user journeys with knowledge pathways based on individual demands'' (EURAKNOS 2020). Such platforms should represent a destination for agriculture and forestry actors including key intermediary figures such as educators, advisors, and facilitators so they can easily find and access relevant networks and information and can opt to implement it in their systems and the interaction with less digitally skilled farmers and foresters.

The system may function as a living structure, constantly being updated, and enhanced. H2020 projects such as EURAKNOS and EUREKA investigated the feasibility of creating such a KR that stores content from past, present, and future H2020 TNs and MAPs, linking knowledge collected and co-created from all AKIS levels (regional, national, international). This KR is called "the FarmBook", at it might also be a useful tool for policy makers as well. Having access to this information should help them understand practical needs and gaps, and the problems that agriculture and forestry practitioners are facing daily (Panoutsopoulos et al. 2021). As a consequence, policy should be developed based on this understanding. The goal that "the FarmBook" aims to achieve, is in line with AKIS principles: strengthening links between research, practice, education advisors, and policy makers, to enhance interactive innovation and support digital transition in agriculture (COM 2019). However, to make such a KR concretely used,

the EU should place an obligation on AKIS actors to use "the FarmBook". For example, its content can be used by OGs to develop their project proposal and to upload their results. Additionally, future Horizon Europe projects maybe helped to build connections between other international projects and OGs. In this regard, such KR can prove to be valuable if the "micro AKIS" proposed by Sutherland, Laurent, and Cerf (2018) and Fielsend (2020) are considered. In fact, the AKIS is already loaded with numerous activities and initiatives, as such, it will not be easy for "the FarmBook" to carve out its own 'space' or 'unique selling point'. Instead, in a "micro AKIS" it can be seen as a valuable source of information from both a large farming corporation and smaller farmers. However, smaller farmers may be better accessed if the information is conveyed through farmers' unions and/or advisory services.

Even if digitalisation can represent an important added value on the framework of the AKIS, addressing the digital skills gap is not a straightforward way forward. An enabling environment is needed so that efforts towards skills development are fruitful (EIP-AGRI 2020b). Hence, attention needs to be paid to maintain equity and interactivity between the different actors (e.g. not all farmers are digitally skilled or have broadband connectivity in rural areas). More specifically, all actors need to be at the same level and need to be actively involved in the knowledge co-creation process (Penalva 2021). For example, this can be aided by facilitators, with a co-learning role (Koutsouris 2018; Klerkx 2020).

In other words, a holistic perspective, including policies is required, as multiple skills need to be developed through a comprehensive approach and not just through single, short-term activities. The EIP-AGRI (2020b) highlighted six key elements to foster synergies and flexibility to achieve such a holistic approach. First, several skills domains need to be addressed systemically and strategically. Additionally, the approach should be based on cooperation, with the use of a complementary set of tools. Lastly, it should be progressive, flexible, and finally, work within and on the context.

Digitalisation is a relatively new concept, however the introduction of new technologies in agriculture and forestry are already shaping new ways of interactions among actors in the system (e.g. the use of digital platform), as well as the diversity of farm types, farming styles, and producer characteristics, in terms of adoption and adaptation of digital agriculture technologies (Klerkx, Jakku, and Labarthe 2019a). More specifically, Ayre et al. (2019) and Eastwood et al. (2019) pointed out that digitalisation is not only affecting farmers and farm structure, but also agricultural advisory services. Because of this, Fielke et al. (2019) explicitly consider the element of digitalisation within the Innovation System, proposing the Digital Agricultural Innovation Systems (DAIS). The c should support the reflexivity of actors who are developing digital technologies for farmers through research and development activities. They argue that the future development of digital technologies will reshape production, values, and understanding in agriculture.

The availability of new technologies and new ways of retrieving knowledge are changing advisors' activities both related to front-office activities (new interfaces between farmers and advisors) and the back-office activities (e.g. use of KR). Advisors, together with farmers should acquire new skills for example, in terms of linking data to better decision-making on the farm. Another example might be given from back-office advisory roles. It may move from information gathering and implementation of field experiments to remote data computation and interpretation (Klerkx, Jakku, and Labarthe 2019a). The adaptation and transition to this new role are not easy. Ayre et al. (2019), use the word "*digiware*" to describe the challenges that farmers and advisors have to face. There is the need to develop a new co-design process that supports farm advisers to adapt their routine advisory practices and identify the value proposition of digital farming tools and services for their clients' businesses. This co-design process supported an adaptation of advisory services in both their front-office and back-office dimensions. This process involves finding ways to harness and mobilise diverse skills, knowledge, materials, and representations for translating digital data, digital infrastructure, and digital capacities into better decisions for farm management. In this evolving reality, co-design and co-create are becoming extremely important. Not only for advisors and farmers, other actors, such as facilitators and educators, should be involved in the process. Acting as key intermediaries, they can facilitate the acquisition of new skills, overcoming new relationships, arrangements, techniques, and the use of devices required to realise value for farm production from digital tools and services. The use of new technologies and the creation of new ways of interactions among actors due to digitalisation will need to be investigated in future research. As Klerkx, Jakku, and Labarthe (2019) pointed out, possible sets of future research questions include the study of

how digitalisation can affect the farming scale and the implications for farmers' learning, experiences, and skills. Furthermore, how does digital agriculture affect the process of farm innovation, in terms of the learning and experimentation processes it triggers, will need to be investigated. Additionally, what is the merit of digital technologies in facilitating interactively and collaboration between innovation actors will also need to be investigated (Knierim et al. 2020).

5.2 Digital knowledge reservoirs in MS

5.2.1 Innovarurale (Italy)

Andrea Bonifiglio (CREA)

The Innovarurale portal (www.innovarurale.it) is a website created by CREA and ISMEA in implementation of the Italian strategic plan for innovation and research in the agricultural, food and forestry sector for the period 2014-2020. It was developed primarily with the intention of satisfying a demand for information and sharing coming from the stakeholders of the agri-food sector and, in general, from civil society in the field of research and innovation. Specifically, it pursues three main objectives. First of all, to encourage the dissemination of information regarding research, knowledge and innovation through a navigation experience for the user with different levels of customisation. A further objective is to inform the public about the results achieved and how funds are used, to ensure adequate information transparency and legitimate research and innovation funding policies. A third objective is represented by the need to ensure a connection between projects and individuals who concretely operate in the territories and are involved in the processes of innovation and research.

Innovarurale is managed by an Editorial Committee and an Editorial Board. The Editorial Committee carries out guidance and planning functions. It is made up of representatives of the Italian Ministry for Agriculture, Food Sovereignty and Forests, the interregional research network in the agricultural and forestry sector, agricultural organisations, academic and research world. The Editorial Board is composed of managers of National Rural Network projects and other members of the implementing bodies. It has the task of translating the editorial and policy guidelines into operational and planning choices.

The portal is made up of five main sections. The Europe section is dedicated to conveying information coming from the EIP-AGRI network and official round tables. The Italy and PEI-AGRI sections publish information relating to research and innovation carried out in Italy. The "Innovation in action" section contains insights on applied innovation. Finally, the Knowledge section offers updated information on training and information policies promoted by Italian Regions as well as some useful services for setting up personalised training and evaluation activities. In this regard, there are two virtual laboratories: an educational laboratory (Rur@Lab), which creates, and tests tools and initiatives aimed at training in agriculture, and an evaluation laboratory (Ev@Lab), which develops web tools that can be useful for defining policies for the innovation in agriculture and for the assessment of the relevant effects. In Rur@Lab there is currently a freely usable software for the creation of multimedia lessons available to trainers and a series of teaching units organised into training courses. These courses have been created with the collaboration of training institutions and agricultural professional organisations to better understand the innovation needs of farmers. At the moment there are two training courses on precision farming and agricultural consultancy, respectively. As regards Ev@Lab, two web apps are currently available: APDecisio and GestInnova. APDecisio is a decision support tool to evaluate the profitability of investments in precision farming. GestInnova is a web application that allows an exploratory analysis at a regional level based on specific indices to identify economic, social, and environmental issues that can be solved through innovation policies.

The portal manages three interconnected databases that are accessible to all: a database of regional agricultural research including almost two thousand research projects, a national database of Operational Groups and a "catalogue of innovations in the field". In particular, the Operational Groups database collects detailed project information regarding the operational groups activated in Italy under measures 16.1 and 16.2 of the 2014-2022 rural

development programme. Currently, the database contains 661 projects out of a total of 679 projects selected. Of the various projects, it is possible to know objectives, activities carried out, innovations introduced, results achieved, documents published and the composition of the partnership. The "catalogue of innovations in the field" enriches the information on applied innovations through the narration of experiences of farms suitably selected and involved in innovation projects. There are currently 128 experiences published.

The portal also offers services for searching for potential partners and operational groups to facilitate the meeting between innovation supply and demand. It also contains in-depth documents and analyses, such as thematic studies (for example on the effectiveness of the EIP-AGRI in Italy), statistics and graphs concerning the published databases, infographics relating to the spreading of operational groups in Italy, a glossary of terms, which are frequently used in field of research and innovation in the agri-food system, a collection of useful links to external resources and a help desk to provide assistance and information to users.

The portal is constantly evolving. Further services and adjustments will be implemented in response to the strategic choices made by Italy for the 2023-2027 programming period.

5.2.2 An integrated Advisory Platform: Support for knowledge transfer and innovation system in agriculture and rural areas (Poland)

Piotr Dabrowski (Agriculture Advisory Centre in Brwinów, CDR)

Currently, the main **knowledge reservoir of the 'Centrum Doradztwa Rolniczego w Brwinowie'** (Agriculture Advisory Centre in Brwinów', CDR) for farmers, advisors and other stakeholders is a website[79]. The website is in Polish, however, there is also an English version available but only for some basic information. The website contains a lot of **information concerning agriculture and small food processing**. Stakeholders are able to find almost every info they are interested in, the website also links to other bodies surrounding the agricultural sector. For example, farmers can get the data on announced applications intakes within Rural Development Plan, links to most useful websites provided by research institutes, high schools and so on. There is also a **list of certified advisors** with contact details. Stakeholders (farmers and advisors) can get the info on **planned training** and its reports. The website also contains detailed **market info** about major branches of agriculture production including updated prices, trends and risks. There is for example a page on Water management aspects. Additionally, it is possible to search for info on CDR's projects granted by EU, such as Horizon 2020, HE, Interreg and Erasmus. From time to time, stakeholders are informed of planned thematic competitions.

Besides CDR, there are **16 regional Agriculture Advisory Centres**; one per voivodship. Each one has its own website. Stakeholders can find info concerning VAAC (provincial (Voivodship) Agricultural Advisory Centre) Activities and main events. These regional websites contain information about mainly the same issues as on CDR's general website, but still it is more focussed on the regional situation.

Of course, CDR is present on Facebook as well as on YouTube. These social media channels are used to disseminate information. The number of visitors on Facebook is around 6 million. These knowledge reservoirs are mostly attractive for young farmers. A YouTube channel is provided by our office located in Cracow. You can find some practical information there, for example concerning guidelines on how to prepare smoked cured meat, cooked meats and ecological cheese. Besides that, through social media CDR presents a lot of clips from events, seminars, conferences and training.

CDR also has a lot of IT applications supporting farmers and advisors to make proper production decisions, for example to calculate the correct amount of fertilisers, or to calculate costs and predict financial income. For example, CDR is involved in a project financed by the Polish budget called Agrobank. This project will be finalised by running three applications to help stakeholders in choosing the best grass variety to be seeded in a specific climate, soil and watering circumstances. This application will also help research institutes to archive old and register new types of seeds by using for instance phenotyping. This is a good example of effective and useful cooperation between the advisory and research sectors. The problem in PL is that most of the (similar) IT tools are

[79] www. cdr.gov.pl

diffused in many institutions, firms, and schools. That is why some months ago CDR started thinking about **how to combine the IT tools to facilitate and improve knowledge transfer to stakeholders.** Currently, CDR thinks that the **IT Integrated Platform** is the best solution. How to finance the platform is not decided yet.

5.2.3 DIH DATALife, the digital innovation hub of Galicia (Spain)

Lucia Castro Diaz, DATALife

DIH DATAlife is a digital innovation hub. Our mission is to accelerate digital transformation in the Life Sciences. DIH DATAlife encompasses four value chains: Biotechnology, Agri-sea Food, Forestry-Wood and Health Care. It is a non-profit association, members are technological centres, universities, sectorial clusters and companies. The focus is in introducing disruptive technologies, but their message is centered around data: Artificial Intelligence (AI) is about analysing data; Internet of Things (Iot) is about capturing data; Cybersecurity is about security of digital data; and High-Performance Computing (HPC) is about managing data.

DIH DATAlife was chosen by the Regional Government of Galicia as strategic in a competitive call in 2019 and since it has received support in the form of a collaboration agreement. Afterwards it was selected by the EC, to support its innovation hub network with funds of nearly 5.5 million Euros for three years for Galicia to accelerate digital innovation with a strong focus on the agri-food sector.

We are member of the Horizon 2020 SmartAgriHubs project to accelerate digital transformation of the agri-food value chain, actively participating in the Iberian Regional Cluster. In 2020 DATAlife defined challenges for the Agri-sea Food & Forestry-Wood sectors; since 2021 it provides support to 3 R&D&I projects funded by the Galician Innovation Agency (GAIN) that were selected via the open call ConectaHubs. Also since 2021, is part of the Interreg project HIBA for the creation of an Iberian network of DIHs working in the Agrifood sector in Spain and Portugal, which has facilitated its specialisation. In 2022 DIH DATAlife organised, thanks to funds by the Galician Institute for Economical Promotion (IGAPE) a series of workshops to advance digitalisation in dairy farms, certification process or labs.

The 3 projects selected in the Conecta Hubs call that DIH DATAlife supports involve 12 companies and have a combined budget of 2 million Euros. DIH DATAlife organise meetings with all consortia members, provided common solutions, communication support, press releases, etc. The 3 projects are: Bikenta Mplus is a digital tool to certify the sustainable management of forestry parcels and predict wood quality before cutting. Milkchain develops full traceability of milk from farm to customer. SersBiotech aims to develop a sensor to detect pathogens in water in aquaculture.

The Hiba (Hub Iberia Agrotech) project creates a pluriregional ecosystem in Spain and Portugal for the digitalisation of the agrosystem through DIHs. The project has a consortium of 15 entities, including the Andalucian regional government. Project actions have included a Diagnostic of the digital maturity of all regions involved, Digitalisation plans for SMEs, Promotion of entrepreneurship in the agrifood value chain, Training materials and Demolabs. For the Diagnostic we brought together different agents in husbandry, dairy, fishing, horticulture, wine, food, sitting at the same table sectoral SMEs, technology providers, but also SMEs, technological centres, public administration and sectoral clusters. Our conclusions are that they are quite well digitalised already, they are all using digital tools and understand why the data they collect is important for the future. The full diagnostic of the ecosystem is already published on our website.

In January 2023 the EDIH DATAlife project was launched, giving us the opportunity to increase the impact of our actions. In it we will provide access to funding, technological services, training and ecosystem activities, as well as a window to a European network with which we will share best practices and export our own know-how in our specialisations, i.e. forestry-wood, Sea-Industry and dairy sectors.

5.3 An EU-wide knowledge reservoir for agriculture and forestry practices

Sylvia Burssens and Pieter Spanoghe (Ghent University)

Conclusions from the Vision paper developed by the Horizon 2020 funded project EURAKNOS (see annex 8).

The vision paper was developed by the Horizon funded project EURAKNOS in collaboration with representatives from FAO, the Global Open Data for Agriculture and Nutrition Initiative (GODAN), the SWG AKIS (DG AGRI), COPA COGECA, the National Agriculture Research and Innovation Centre (NAIK, Hungary), EUFRAS, ENRD, and the European Council of Young Farmers (CEJA), and aims broadly to address the question: What should an open source **Knowledge Reservoir (KR) for agriculture and forestry** look like, and what do we need and want from it?

An EU-wide open source Knowledge Reservoir for agriculture and forestry practice would provide agriculture and forestry actors with a valuable '**one-stop shop'** for their knowledge needs.

The vision takes into account achieving high impact, **the needs of users**, in terms of interactivity and content, and ways to attain a self-sustaining and sustainable system. The vision starts from the point of view that the KR will serve two main purposes: 1) to be a tool for Horizon funded TNs (and by extension other multi-actor projects) **to share and disseminate innovative solutions** to the agricultural or forestry challenges which they sought to address and 2) to be a destination for **main users (agriculture and forestry actors including farmers, foresters, educators and advisors)** to **easily find and access relevant practice-oriented information** so that they can opt to implement it in their own systems.

According to the vision, the KR is to be a **high impact platform** or system, meaning that it provides access to meaningful, practice-oriented knowledge to targeted actors, improving the processes of seeking and implementing information relevant to agriculture and forestry. To achieve high impact, they should have **a unique selling point**. It should function as **a live and dynamic structure**, through constant updates and improvements.

Features of an impactful knowledge reservoir for agriculture and forestry practice

The content and structures of the KR must be relevant to farmers, foresters, educators and advisors. It is essential that the platform enables users to quickly and easily find relevant knowledge. The platform should be easy to find and access. The KR should be available as both web and mobile app platforms. It should reduce the time spent searching for accurate, relevant and high-quality practice-oriented information by utilising a well-structured content framework based on an end-user-oriented ontology and problem-solving approach. First time users should be able to use all functions of the KR platform with great ease, requiring that the platform is available in all local languages.

The platform should contain up-to-date technical and practice-oriented information conveyed using appropriate (jargon-free) language which is easily understood and can be adapted for practice according to the end-user's context and specific needs

Although the platform will be available for use by anyone regardless of registration, the option should be available for users **to create an individual profile** which allows the interface and provided functionalities to be tailored and **adapted to suit their needs** according to their areas of interest and their required level of engagement, setting their own filters and preferences.

An easy, automated method for adding new content from projects requires **interoperability** of data and information systems.

The upload of **training materials for further dissemination and exploitation by advisors and educators** such as teachers at vocational schools, technical colleges and agricultural universities using a problem-based learning approach with new learning methodologies, is key. Besides connection with adult learning and lifelong learning programmes including farmer learning groups and OGs is recommended. Besides on line peer-to peer and farm-advisor interactions, The platform should facilitate (physical) interactions, meetings, exchanges, and on farm demonstrations.

The EU knowledge reservoir for agriculture and forestry should be a **self-supporting open source system** which links knowledge collected and co-created from all levels (regional, national, international networks) and all types of projects including TNs and other multi-actor projects, as well as OGs under EIP-AGRI and National Rural Networks. It should **connect to other communication and dissemination channel**s such as project websites, paper based promotional materials (e.g. flyers, posters), social networks, emails, press releases, agricultural press (both print media and online) etc.

5.4 Operational Groups linked with digitalisation

Several OGs across Europe boost innovation in agriculture through the use of digital tools or digitisation techniques. Some recent examples are:

5.4.1 Environmental Sustainability, Process and Product Innovations for Competitiveness of Soilless Farming in the Apulia Region - Italy (2020-2022)[80]

Soilless farming systems are an important tool for improving the sustainability and competitiveness of protected crops. The project aims to transfer technologies and know-how on soilless systems and innovative products (e.g. micro-vegetables and edible flowers, 'local' varieties, 'bio-fortified' vegetables), in order to support the consolidation of companies on the market and the growth of innovative start-ups. The project provides for an extensive dissemination activity, to share the results of the project with all interested stakeholders at the regional level.

Following activities were implemented:

- Preparation of a demonstration area;
- **Development of 'smart' and 'low cost' digital technologies for the sustainable management of water and nutrients**;
- Development of innovative lighting technologies for production deseasonalisation;
- Development of 'soilless' techniques for the production of extra-seasonal table grapes, micro-vegetables and edible flowers with high added value, vegetables with 'personalised' nutritional value, 'local' varieties with high market value;
- Selection of varieties suitable for 'soilless' cultivation in the Mediterranean environment;
- Analysis of the economic and environmental impacts of innovations;
- Definition of competitive marketing strategies.

[80] SOstenibilità ambientale, Innovazioni di processo e di prodotto per la competitività deLLE coltivazioni Senza Suolo in Puglia - Gruppo Operativo. | EIP-AGRI (europa.eu)

The main expected benefits are:

- *at production level*: i) improvement of the management of horticultural crops in greenhouses through the adoption of 'precision' technologies; ii) improvement of production in the autumn-winter period through the use of artificial lighting; iii) introduction and / or development of innovative products / processes (soilless grapes, micro-vegetables, edible flowers, vegetables with 'personalised' nutritional value); iv) optimisation of variety choices based on screening in company contexts;
- *at economic level*: i) increase in company profitability thanks to the increase in the efficiency of use of resources and the improvement of production; ii) introduction of product innovations and differentiation of the offer; iii) better positioning on the market following the adoption of marketing strategies based on the quality and sustainability of SCS productions; iv) increase in company competitiveness thanks to the training of skills;
- *at environmental level*: i) reduction of water and fertiliser consumption; ii) reduction of the release of exhausted nutrient solutions in groundwater bodies, following the run-off control made possible by the use of sensors; iii) scientifically based definition of the environmental impacts of the SCS; iv) enhancement of regional agro-biodiversity following the recovery of local varieties on a commercial scale;
- *at social level*: i) strengthening the synergy between the greenhouse horticultural production sector and the world of research; ii) expansion of the training offer for the benefit of the regional horticultural sector; iii) technical-scientific support for youth entrepreneurial initiative

5.4.2 INNOEnergy: Concepts for digital data processing to increase energy efficiency in agriculture – Italy (2020-2022)[81]

South Tyrol's farmers are very interested in energy and energy efficiency. This is confirmed by a survey conducted by the South Tyrolean Farmers' Association among its members in 2017.

Farmers were asked about various topics such as boilers, photovoltaics and e-mobility. The survey clearly shows that farmers strive for optimisation in the energy sector, but often do not implement it. It could be deduced that the lack of information is a major obstacle in the implementation of innovations.

The INNOEnergie project offers customised information on energy efficiency and cost-effectiveness in primary production through an innovative consulting approach.

In addition, a trend towards digitalisation can also be seen in consulting services. This has emerged from the experience of the Innovation & Energy department in recent years.

Increase energy efficiency and the associated economic efficiency on agricultural holdings in the most important sectors (fruit-growing, viticulture and mountain farming) of primary production in South Tyrol;

- Conception of digitally supported advisory approaches for all agricultural enterprises;
- Development of information and knowledge transfer materials in the form of fact sheets, videos, sample calculations etc. to sensitise agricultural enterprises to energy efficiency measures (renewable energies, innovative technologies, energy efficiency...).

The project INNOEnergie lays the basis for an increase in energy efficiency and environmental protection in the primary production of South Tyrolean agriculture. For this purpose, a specification sheet for a digital consulting concept will be drawn up and information material will be prepared.

[81] INNOEnergie: Konzepte für die digitale Datenverarbeitung zur Steigerung der Energieeffizienz in der Landwirtschaft | EIP-AGRI (europa.eu)

The project is based on five work packages:

- Project management
- Communication & dissemination of results
- Needs analysis, data collection & creation of a specification sheet
- Development of a requirement specification & theoretical validation
- Development of concepts to increase the energy efficiency and sustainability of agricultural enterprises.

5.4.3 Digital platform for sustainable management and improvement of viticultural terroir- Italy (2029-2022)[82]

Viticulture in Tuscany represents about 8% of UAA but produces about 30% of the regional agricultural income. Impact of viticulture on the habitat is generally high, as morphology, hydrology and soil characteristics are often modified to enable agricultural practices. Also, viticultural areas are often in hilly locations, more prone to soil erosion. A proper soil management when designing new vineyards and during their whole lifetime is crucial to guarantee that viticulture is environmentally sustainable, of high quality and terroir-related.

The project develops an online digital platform including cartographic information layers on soil, and conceptual models helping wine growers properly manage soil in their vineyards. Final results is a detailed digital map for the 280 pilot hectares, available on an online platform with associated decisional models. Other wineries or wine growers' consortia in Tuscany region will be able to use this structure and replicate the pilot model.

The project develops in two pilot areas: Montefioralle in Chianti Classico and Val di Cornia in Maremma, sharing similar needs and opportunities. In these two areas the project involves in the pilot 16 wineries (in all 280 hectares), consisting in in-depth analyses, varied soil management based on DSS, and quantitative and qualitative monitoring on plants and products for at least 2 growing seasons. Innovation will be introduced in the wineries with technical seminars in both areas, and with training actions (short-term classes and practical workshops).

5.4.4 Digitalising vegetable irrigation – Slovenia (2019-2022)[83]

By irrigation, we can mitigate the effects of drought in agriculture. But where irrigation is introduced, agriculture is the main consumer of water. Excessive irrigation causes the nutrients to flow through the floor profile, excessive water use for irrigation, poorer quality of crops and poor plant health. For quality irrigation, information is needed and, through the digitisation of cultivation, the agricultural holding can access it easily and in a timely manner. In the project, we will develop a system that, based on a number of input data, calculates the amount of water needed for irrigation. Users will access information through an application, and information can be shared with other partners.

5.4.5 Methodological proposal for the forest digitalisation to obtaining high accuracy of forest stands parameters in Castilla-La Mancha and Valencia region – Spain (2018 - 2020)[84]

The lack of forest management is due (i) either to the cost of drafting the high precision Forest management projects and (ii) to the cost of forestry works that are usually greater than the income obtained, given the situation of the timber sector in recent years. To solve this, our project proposes (a) to validate the reliability of the inventory by means of the terrestrial laser lidar mobile (TLM), (b) generation of calculation algorithms to obtain forest stand variables based

[82] Piattaforma digitale per la gestione sostenibile e la valorizzazione dei terroir viticoli (PROSIT) | EIP-AGRI (europa.eu)
[83] Digitalisacija namakanja zelenjave | EIP-AGRI (europa.eu)
[84] Propuesta metodológica de digitalisación del monte para la obtención de parámetros dasométricos con alta precisión en Castilla-La Mancha y Valencia. | EIP-AGRI (europa.eu)

on the cloud of points obtained with TLM, lowering costs of inventorying and (c) application and validation of the algorithms on a higher scale (compartment / management area).

Activities

1. Forest stand characterisation by classical inventory sampling techniques. Cost Evaluation
2. Forest stand characterisation using the new LTM technique. Costs and comparison of both techniques.
3. Development of software for processing point clouds from the LTM at two scales: plot and compartment
4. Validation of the LTM data processing software and comparison with commercial software (time analysis)
5. Upscaling of the new methodological approach. Full inventory at compartment level based on the digitised forest by LTM technique. Cost evaluation.

6. Conclusion and perspectives

6.1 Main conclusions

Pascal Bergeret, former director, CIHEAM, and Anikó Juhasz, Ministry of Agriculture (HU), co-chairs SWG SCAR-AKIS 5th mandate

The period covering the 5th mandate of the SWG SCAR-AKIS largely coincided with the preparation by MS of their National CAP Strategic Plans and with the launch of the new HE R&I Programme.

Interestingly, the new CAP entails a cross-cutting objective (CCO), designed to support the fulfilment of the other nine specific objectives. The CCO aims at "fostering and sharing of knowledge, innovation and digitalisation in agriculture and rural areas, and encouraging their uptake by farmers, through improved access to research, innovation, knowledge exchange and training" (Article 6(2)). At the core of the CCO lie 3 key elements: (1) intensive knowledge exchange and competent advisors within the AKIS, (2) co-creating innovation and sharing it, and (3) using digitalisation for knowledge exchange. Under the new CAP, the EIP-AGRI, the ENRD and the Rural Networks are now fused into one EU CAP Network, competent for pillars one and two of the CAP. One subgroup of the CAP network assembly is devoted to innovation and knowledge exchange with the aim to reinforce AKIS approaches at national and EU levels and foster AKIS assessment methodology in member states.

Similarly, the Horizon Europe R&I programme also includes novel elements pertaining to the « AKIS approach », notably in its « cCuster 6 » dedicated to Food, Bio-economy, Natural Resources, Agriculture and Environment. The multi-actor approach is now embedded as a prerequisite for projects to be submitted all across the numerous topics included in the work programmes. Furthermore, requirements for the multi-actor approach have been specified and spelled out, referring to the co-innovation principle that has been advocated by the SWG SCAR-AKIS all along its existence. The Horizon Europe programme also initiated novel coordination tools aimed at aligning national R&D programmes and EU funded R&D projects, and at accelerating the uptake of research results by practitioners, namely the so-called « missions » and « partnerships ». It is interesting to pinpoint that the missions and candidate partnerships related to agriculture and the environment, such as the soils mission or the candidate partnerships on agroecology, food systems, animal welfare, agriculture of data, all refer to the necessary links to be established with the AKIS, at national and EU level.

Such concern for R&D issues and the link to practice in two key policies of the EU reflects the importance given to those issues in the overarching Green Deal strategy which promotes societal transformations driven by research and innovation.

All those elements have been discussed in the SCAR AKIS SWG for numerous years, since its inception in 2010, and it is heartening to see how they have been mainstreamed in EU and national policies during the lifespan of the group.

The fifth mandate of the SCAR AKIS provided a frame and opportunities for Member States participating in the group to exchange ideas and experiences about the preparation of their AKIS strategies as part of their CAP national strategic plans, as required for the fulfilment of the CCO mentioned above. Such experience sharing happened in virtually all meetings of the 5th mandate and was enriched by a wealth of information provided by the EU Commission representatives in the group. Those exchanges contributed to the cross fertilisation of ideas beneficial to countries with less developed AKIS who could take stock of the experience of others. Countries with well-developed AKIS also benefited, as they were exposed to new and fresh visions sometimes overlooked by long established habits. For instance, the new impetus given in many AKIS plans to strengthen and rationalise innovation support systems as intermediate agencies can be considered as a novelty abundantly discussed in the SCAR AKIS meetings of the 5th mandate and beneficial to all. It is hoped that the dynamics fostered by that kind of discussion contributed to shrinking the innovation gap observed among and within countries in the EU.

Discussions in the group were systematically enlightened by the presentation of inspiring R&D projects chosen from the H2020 and Horizon Europe programmes and dealing with subjects relevant to the AKIS approach. Here are some emblematic examples, among other projects presented in front of the group during its 5th mandate:

- The EURAKNOS project provided a policy brief (see annex 8 to this report) on sustainability and impact of the TNs initiated in the H2020 programme. It is interesting to see some of the provisions of this policy brief being reflected in "AKIS topics" of Horizon Europe, cluster 6, calling for the establishment of thematic networks focused on operational groups of the EIP, thus linking multi-actor R&D projects to the EIP-AGRI OGs.
- Similarly, the Agrilink and i2connect projects provided solid ground for Horizon Europe topics calling for the setting up of advisory networks.
- The EUREKA project and its younger sister EU-Farmbook are paving the way to the emergence of a EU wide knowledge reservoir of innovative agricultural practices and production systems (also see annex 5).
- The Agrilink project showed the crucial importance of independent and impartial advice, a principle now embedded in the new CAP. The project also stressed the difficulties linked to the existence of a proportion of hard-to-reach farmers, estranged from the AKIS, a concern reflected in many AKIS strategies in the national CAP plans (also see annex 4).
- The Liaison project developed a roadmap to level up the EIP-AGRI (also see annex 6) and a methodology to measure the innovation capacity of organisations and advocated in favour of capacity development in that regard among the AKIS actors, another concern reflected in many national CAP plans (also see annex 7).
- The Modern AKIS project is developing methods and tools for the implementation of AKIS that will be available to MS, and will complement to the material developed by the evaluation help desk for rural development of the CAP network.

Sadly, the period covering the 5th mandate of the SCAR AKIS SWG was also marked by the COVID pandemic and by the start of the war in Ukraine, both events with far reaching consequences on agricultural and food systems all over the planet. Like most institutional and policy arrangements, the AKIS in the EU was compelled to adapt to unprecedented, unexpected and destabilising, developments. Instantaneous adjustments had to be conceived and implemented in order to help farmers, actors of the food chains and other rural dwellers cope with lockdowns and with a steep rise in the prices of inputs, energy and commodities. The last four years inaugurated a time characterised by the intensification of risks of all sorts, affecting the everyday life of everybody, and calling for urgent and robust policy responses. The next mandate of the SCAR AKIS SWG reflects that harsh reality, with an emphasis on AKIS responding to challenges, and AKIS in EU widening countries and beyond.

6.2 The 6th mandate of the SWG AKIS

Jan van Esch, Ministry of Agriculture (NL) and Ewa Grodzka, Ministry of Agriculture and Rural Development (PL), co-chairs SWG SCAR-AKIS, 6th mandate

For the 6th mandate 5 topics have been defined, which were endorsed by the SWG members during the 13th meeting in Budapest, 25-26 October 2022, and 14th (online) meeting, 7 December 2022. The SCAR Plenary has endorsed this mandate on 15 December 2022.The topics for the 6th mandate are:1) the implementation of the AKIS plan in the next CAP period (2021-2027); AKIS in EU widening countries and beyond; AKIS responding to challenges; AKIS and rural innovation; and AKIS for co-innovation with a continuation of bringing the multi-actor approach in practice.

A description of the topics and the deliverables that are envisaged is given below.

6.2.1 The implementation of the AKIS plan in the next CAP period (2021-2027)

The first topic relates to a continuation of the 5th mandate and refers to the implementation of the AKIS plan in the next CAP period (2021-2027), more specifically

- Development of CAP AKIS plans, linked strategies, interventions and actions
- Sharing experiences between MS
- Bottlenecks and potential solutions

Main deliverables:

- Report from our meetings, presentations of MSs
- Cross-cutting activities: AKIS is a cross-cutting objective in CAP so it can be linked to all other working groups
- Policies and R&I role: CAP policy and the role is to link R&I and CAP

6.2.2 AKIS in EU-widening countries and beyond

The second topic relates to AKIS in EU-widening countries and beyond. It is about the promotion of AKIS, the interactive innovation model, and the multi-actor approach with EU widening countries and non-EU countries in development (cooperation with various other SCAR SWGs):

- Definition, concept, and the broader context of AKIS including the enabling environment
- Capacity framework development
- Showcasing best practices, and examples, bringing solutions
- Collaboration with international organisations (in particular FAO, OECD, and Balkan countries)

Main deliverables:

- Report from our meetings, presentations of MSs
- Cross-cutting activities: potential collaboration with ARCH group
- Policies and R&I role: EU accession policy role is to help develop the AKIS system in those countries

6.2.3 AKIS responding to challenges

The third topic is AKIS responding to challenges, meaning:

- AKIS in relation to short-term challenges such as pandemics, geo-political situations, and other pressing challenges
- AKIS in relation to long-term (global challenges) related to sustainability challenges such as climate change, water, energy, soil, biodiversity, food security etc.
- How to influence long-term farmers' decision-making & behaviour
- Potential approaches, structures, governance & coordination mechanisms, market type versus natural type, learn from successes and failures & other sectors
- Generational renewal, gender equality, etc.
- Toolbox for communication, dissemination, and education, support to improve sustainability levels with different stakeholders
- Collaboration with other SCAR SWGs

Main deliverables:

- Report from our meetings, presentations of MSs, chapters in the final report of the 5th mandate
- Cross-cutting activities: AKIS is a cross-cutting objective in CAP so it can be linked to all other working groups
- Policies and R&I role: CAP, Climate, Environmental, Energy and Education policies, and the role is to link and show how AKIS can help to get farmers involved.

6.2.4 AKIS and rural innovation

The 4th topic is AKIS and rural innovation:

- What can AKIS bring for rural community development
- EIP OGs and Horizon projects on rural innovation and dynamics
- How can we create more synergy for rural areas and establish links between the EIP-AGRI and other initiatives & policies e.g. Smart Villages, LEADER, Smart Specialisation Platforms (RIS 3)

Main deliverables:

- Report from our meetings, presentations of MSs
- Cross-cutting activities: possible links to Bioeconomy and Food System groups
- Policies and R&I role: Rural Vision policy and the role is to link R&I and CAP

6.2.5 AKIS for co-innovation with a continuation on bringing the multi-actor approach into practice

The success story of the EIP-AGRI with the implementation of OGs, MAPs and OGs illustrate that the MAA within the concept of the interactive innovation model is being applied and finds its way in the EU context and the process of innovations. OGs, TNs and MAPs have become a useful instrument to test future CAP interventions and users and practitioners are directly involved (Beers, Sol, and Wals, 2010). They are not a 'study-object', but their entrepreneurial skills are used to develop solutions and to create "co-ownership" of results (European Commission, 2017a). By making the best use of complementary knowledge it has become possible to co-create and disseminate solutions to tackle many issues and to implement them into practice. Farmers are active project partners and, as well as other actors, can take the role of advisor with proper training (Steen, Manschot, and de Koning, 2011; Fieldsend et al. 2020). Despite the application of the MAA in the interaction innovation model, important aspects will need to be further investigated in future research. For example, as Fieldsend et al. (2021) pointed out, finding strategies to implement the collaboration between the EIP-AGRI and other research programmes (e.g. LIFE, ERASMUS+, Interreg, LEADER) is of great importance as it may allow learning lessons on widening user participation.

The 5th topic is about AKIS for co-innovation with a continuation on bringing the multi-actor approach in practice

- AKIS-supporting project with a multi-actor approach
- Better engagement of underrepresented types of actors and EU regions/MS, e.g. in Horizon multi-actor projects

Main deliverables:

- Report from our meetings, presentations of MSs chapters in the final report of the 5th mandate
- Cross-cutting activities: AKIS is a cross-cutting objective in CAP so it can be linked to all other WGs
- Policies and R&I role: Horizon policy and the role is to link to CAP

Annex 1 How-to guide on AKIS strategy and related interventions

Meant to improve understanding and implementation of Member States' AKIS Strategies

How to guide on AKIS strategy and related interventions Meant to improve understanding and implementation of Member States' AKIS Strategies

Disclaimer

This How-to Guide was primarily conceived by the Commission services for internal use. This guide or its parts have no legal or interpretative value. They are meant to improve understanding and implementation of AKIS strategies and related CAP interventions.

The specific CAP objectives shall be supported by the "**Cross-Cutting Objective" (CCO)** which aims at **"fostering and sharing of knowledge, innovation and digitalisation in agriculture and rural areas, and encouraging their uptake by farmers, through improved access to research, innovation, knowledge exchange and training"** (Article 6(2)).
The 3 key elements of the cross-cutting objective – (1) intensive knowledge exchange and competent advisors within the AKIS, (2) co-creating innovation and sharing it, and (3) using digitalisation – can be regarded as the motor behind the many transitions in the sector and as "enablers" to achieve all nine specific and the general objectives of the CAP in a more effective and/or efficient way. Moreover, the three key elements of the CCO interrelate and will positively affect each other. For instance, actions in the field of innovation and knowledge exchange might increase the uptake of digital technologies by farmers (e.g. knowledge databases for practice).
The three key elements are key drivers for modernisation and support the whole CAP.

This tool describes how elements related to the CCO should be well embedded in a strategic way into the CAP Plans. This tool is covering specifically **Agricultural Knowledge and Innovation Systems** (AKIS) (Section 1).

Please note some important info also in the Annexes.

1. AKIS strengthening the role of knowledge and innovation under the new CAP

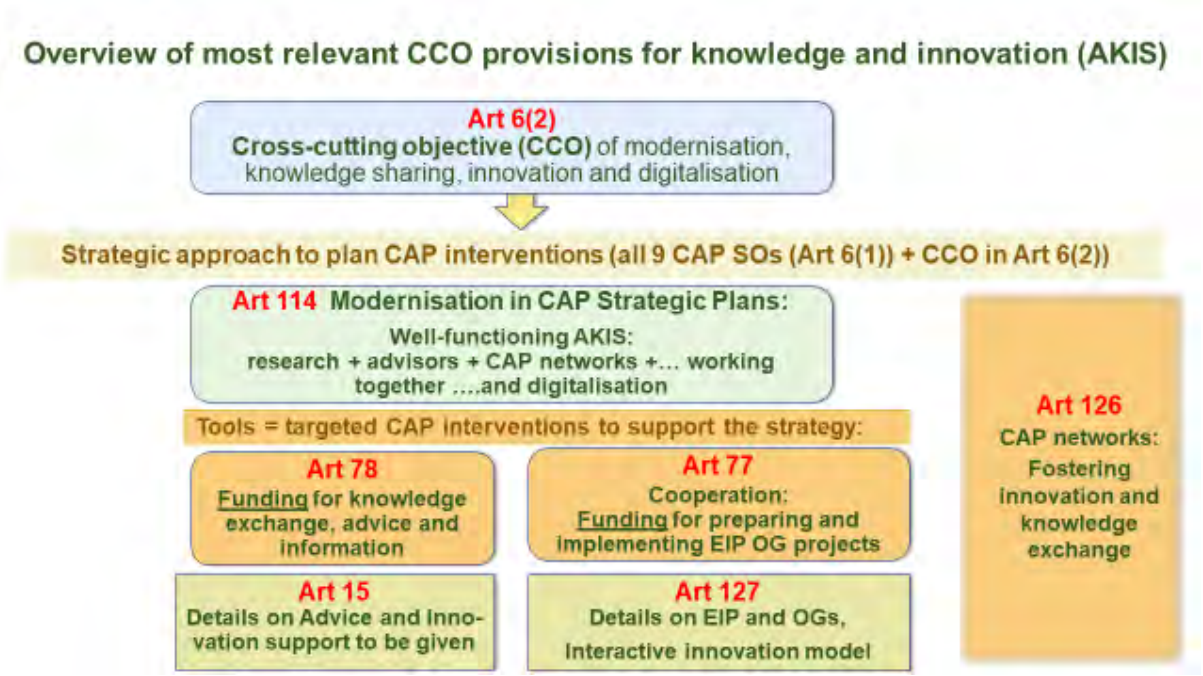
Agricultural Knowledge and Innovation Systems (AKIS) encompass **all people and organisations** (farmers, foresters, farmers' and foresters' organisations and cooperatives, advisors, researchers, businesses, NGOs…) **that generate, share, and use knowledge and innovation for agriculture and interrelated fields**: rural areas, value chains, environment, climate, biodiversity, society, consumers, etc.[85] For a well-functioning AKIS contributing to modernisation, the AKIS components need to interact to make the AKIS actors more competent and ready for the transition to a smarter, more sustainable, and competitive agriculture and rural areas. A **strategic approach is needed to interconnect the various interventions to reach an effective and efficient AKIS linking actors and actions to serve the cross-cutting objective,** and in consequence support all specific objectives**.** Co-creation of innovation in **EIP Operational Group** (OG) projects should link up with **interventions on training and farm advisory services**, ensuring that the **knowledge is intensively exchanged among the AKIS actors** through a variety of methods such as targeted one-to-one advice on farm, thematic multi-actor events, networking, on-farm demonstrations, training courses, knowledge databases etc. The **specific innovation related activities of the CAP networks** also play a key role in implementing those actions. They also help to build the bridge to actors and information in other Member States and to the dedicated innovation activities including those related to the EIP under the CAP network at EU level.

0 Legal references and their interaction

The AKIS' strategic approach and its related interventions are based on **Article 114 "Modernisation"** of the SPR. Articles 3, 6, 7, 15, 70, 77, 78, 107(1)(g), 109, 110, 111, 115(2), 126, 127 and Annex I of the SPR are building blocks for the CCO. The main objective is that **all 9 CAP specific objectives are served by the Cross-Cutting Objective**. The overview below illustrates the interrelations between various relevant articles. The CCO will be addressed in the same way as

[85] Art. 3k: definition of AKIS

the other nine specific objectives, with a dedicated SWOT, assessment of needs and specific CCO interventions.



In Articles 107 and 114, reference is made to the modernisation of the agricultural sector and the CAP. **The requested CCO elements based on Article 114 SPR are obligatory, as well as the provision of advice and the integration of advisors in the AKIS system** (Art. 15(2)). Also, the preparatory SWOT analysis is obligatory (Art. 115(2)). Articles 107(1)(g) and 114 request Member States to design in their CAP Strategic Plan a **strategic approach to improve the efficiency and effectivity of their AKIS**. Consequently, Member States should list the resulting interlinked CCO **interventions and actions, which need to be coherent with this strategic AKIS approach**[86].

Note that AKIS innovative actions may also impact creation or changing of the national/regional CAP policy itself, e.g. through co-creating innovative agro-environmental-climate interventions or ecoschemes in OG innovative projects or through new knowledge sharing AKIS networks and technologies for regular knowledge exchange.
After the elaboration of a strategic AKIS approach based on the CCO SWOT, prioritisation of needs, and sound intervention logic, **the resulting AKIS interventions will mainly fall under Articles 78 (funding advice, knowledge exchange, training, and information), and Articles 77 (funding EIP Operational Group innovation projects).** The framework and details on farm advisory services are provided for in Article 15, and for EIP and Operational Groups in Article 127.

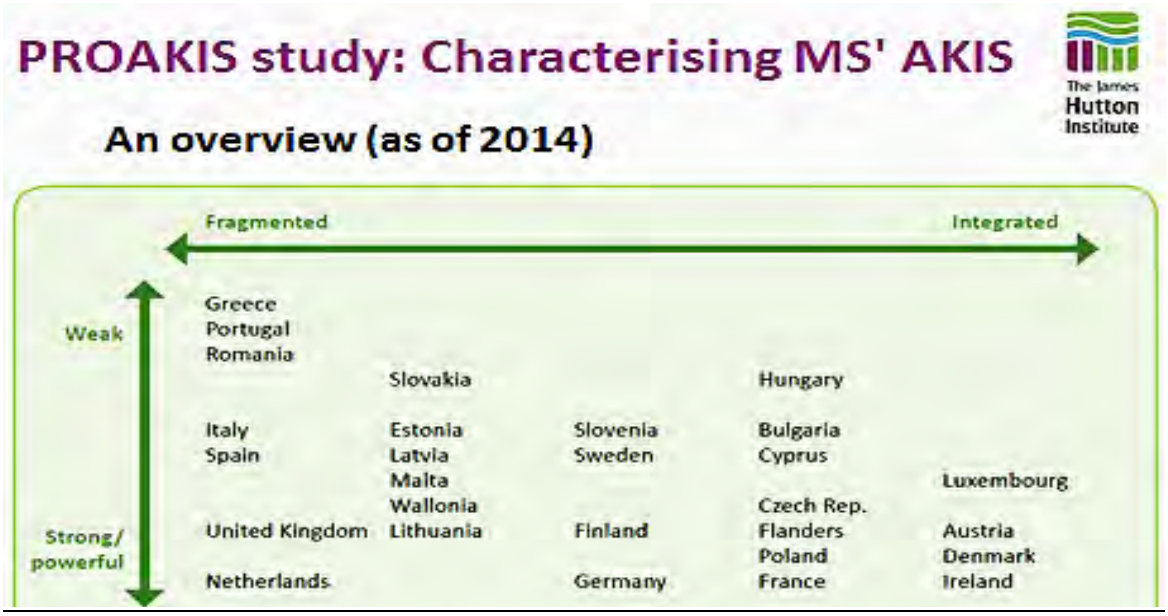
Also other interventions may have knowledge exchange, training or advice elements and contribute to the CCO, such as the **environmental, climate and other management commitments** referring to relevant training and advice, Art. 70(9), **innovative investments** - possibly by OGs - (Art. 73), or interventions for young farmers under first or second pillar (e.g. Art.

[86] Art. 72(6) on knowledge exchange and information (including advice, training, demo etc) explicitly mentions that "*Member States shall ensure that actions supported under this type of intervention be based on and be consistent with*" the description of the future strategic AKIS approach provided in the CAP Strategic Plan in accordance with point (i) of Article 102(a)"

69(3) on conditions for installation of young farmers). Modernisation through knowledge sharing, innovation and digitalisation is also supported by certain types of **sectoral types of interventions** which contribute to the CCO objective on a sector-by-sector basis and can contribute to the relevant CCO indicators.
All these knowledge and innovation interventions are complemented by the specific innovation **activities of the national CAP network** dedicated to speed up broad knowledge exchange and innovation (Art. 126). It will be important to highlight how different interventions and actions contribute to AKIS, and that a **sound strategic intervention logic should be the basis of any AKIS intervention** in the CAP Plan.

o Why do we need well-functioning AKIS?

New combinations of knowledge and actors drive innovation. Therefore, we need to do efforts to interconnect people with different expertise, knowledge and competences who together are able to solve the challenges we face. The **national AKIS actors are however not sufficiently interconnected**. The current performance of the **AKIS varies greatly from one Member State to another** (see figure below), and often from one region to another within the same Member State. This is essential when assessing CAP plans and the necessary efforts and related budgets. Taking this into account and making use of the diversity of the EU to tackle the challenges and opportunities ahead, **each Member State now needs to strengthen its AKIS and organise it in a structured way to ensure regular and broad knowledge flows and to foster innovation processes.** This will ensure an offer of **more competent and qualitative advisors** working in synergy, increase their interaction with and within innovation projects and improve the communication of project results, making them widely used and saving costs[87].



o How to shape an AKIS fit for the future?

Supported by the specific innovation activities of the CAP networks at regional/national levels and between Member States, the variety of AKIS interventions will make all advisors, researchers and

[87] The key role of AKIS is Member States (K. Rosenow): https://www.youtube.com/watch?v=a-noBHfYJu8

practitioners meet and collaborate on a regular basis around practical needs/opportunities and the potential solutions for them. This will enforce systemic links between researchers, practical knowledge (advisors) and practice (farmers, foresters, and their organisations). According to the SCAR SWG AKIS[88], **setting a specific financial envelope for AKIS** is essential ("target"/ring-fence a part of CAP funding to knowledge and innovation of about 10%"), and such budget is also a CAP impact indicator. A substantial proportion of the CAP **budget** should be spent on the various ways of improving the AKIS (see the 4 strands in the box below) to ensure that AKIS actions are sufficiently taken up in the CAP plans, so that changes and the sustainable transition will indeed happen and that the strategic AKIS approach is implemented with efficient interventions. It is essential to start spending early in the period, as many AKIS interventions require a learning period.

Successful AKIS strategies include 4 main groups of actions[89]:

(1) Strengthening **knowledge flows** and **links between research and practice**
(2) Fostering **all farm advisors' knowledge** and strengthen their **interconnections** within the **AKIS**
(3) Enhancing cross-thematic and cross-border **interactive innovation**
(4) Making effective use of **information and communication technologies** to improve knowledge sharing

Strengthen knowledge flows and links between research and practice

Key to-dos for the overall AKIS governance enhancing knowledge flows are:

1. **Develop the strategic AKIS approach for the CAP plan in a transformative process together with different stakeholders.** Beyond researchers, advisors, and networks, have also farmers and rural actors actively participating in the formulation of the plans. Involve the younger generation or women AKIS actors, e.g. young farmers, advisors, researchers.
2. **Well-functioning AKIS are dependent and need to link up with other relevant policies** beyond the CAP, as well as with the **regions** within the Member State. **National Ministries and administrations should do efforts to better coordinate** and make **collaboration agreements** among each other and collaborate intensively to foster knowledge and innovation (e.g. national Ministries of Agriculture, Research and Education, Environment, Agencies in charge of national or EU programmes such as Horizon Europe, ERASMUS+ etc.)[90]. This will give responsibility as well as visibility, and will allow the individual staff the leeway to engage with practice, not as an exception, but as valued part of their work.
3. **The AKIS coordination body[91] is the contact point for all AKIS related issues towards the European Commission.** It should cooperate with AKIS multi-actor platforms across the geographical levels in the country, following day-to-day AKIS interventions and actions, asking for modification of the CAP plan if needed, while continuously supporting interaction and implementation of the AKIS plan. The body should **keep an overview on the progress** and performance foreseen in the CAP plan, using a dedicated framework for monitoring and evaluation, in particular those related to the CAP indicators (Annex I, see Section 2.6).

[88] SWG SCAR AKIS: Strategic Working Group on AKIS of the Standing Committee on Agricultural Research, SCAR IV report, mainly pages 1-140): https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/report-preparing-for-future-akis-in-europe_en.pdf
[89] See full description of possible interventions in the 4th report of the Strategic Working Group (SWG) of the Standing Committee on Agricultural Research (SCAR) on AKIS on the DG AGRI website, in particular section 1.5 on p. 26-44
[90] https://www.youtube.com/watch?v=Z9YIYDhmDCM : example in "Preparing the Spanish AKIS strategy" (R. Wojski)
[91] The AKIS coordination body as foreseen in the SFC template for CAP strategic plans

4. **Linking with the research institutes and rewarding** researchers for their efforts for practice is obviously a key action[92]. **Bringing knowledge in a concise and understandable way close to practice** is key. Also, the media (agricultural journals etc.) have a role to play here. **National thematic networks[93]**, possibly under the lead of back-office advisors, can deliver materials for training, advice, and education, while also interlinking a mix of actors. Organise bottom-up calls and do efforts to disclose the needs of farmers, regular face-to-face exchange thematic events, etc.
5. CAP networks and/or other AKIS actors/platforms should initiate **on a regular basis meetings between research, farmers, and advisors**: researchers can share their work with practice, while learning to work more interactive and more solution oriented and getting informed on farmers' needs and opportunities. This which will bring them inspiration, get them to know advisors which can share practice needs and innovative ideas from practitioners, and farmers wanting to join innovative OGs.
6. **Informal ways also support knowledge flows e.g. co-location of research, advice and networks** (education, farmers' organisation, food clusters, cooperatives etc.): lunching together or drinking a coffee in the same building is cheap, efficient and informal and encourages informal interaction and trust.

Fostering all farm advisors' knowledge and strengthen their interconnections within the AKIS

1. Member States must ensure advice on a broad number of domains is available. All advisors need to be mobilised in order to cover all farmers and many more fields of advice than currently is the case. **Thanks to the AKIS interventions,** Member States now can and should **open up the current 2014-2020 farm advisory systems (FAS), including <u>all</u> public and private advisors, to strengthen provision of advice and increase advisory competences.**
2. **In particular, this means to include all trusted advisors** who have overall the strongest impact on farmers' behaviour.
3. All advisors should be empowered to design solutions **adapted to their specific farm context**[94] in an approach tailored to the farm and farmer and this all "*along the cycle of the farm development*"[95].
4. **Therefore, all advisors must be fully integrated within the AKIS to step up their qualification[96], interaction and connections**. Main elements and key examples on interventions related to advisors' integration in the AKIS can be found in Annex V and are taken into account in result indicator R.2.
5. Pursuant to Art. 15(2), Member States shall ensure that **within their territory** all following **requirements for advisory services** are fulfilled (Art. 15(2)):
   - Covering economic, environmental, and social dimensions
   - Delivering up to date technological and scientific information developed by research and innovation actions

[92] https://www.youtube.com/watch?v=wv3Ly5X1ijo : How to reward researchers beyond academic purposes (A. Fonts)
[93] https://www.youtube.com/watch?v=EPsVbkmnp9w : Added value of thematic networks at national level (P. **Bergeret)**
[94] "MS should ensure **farm advisory services tailored to the various types** of productions for the purpose of improving the sustainable management and overall performance of agricultural holdings and rural businesses"…""and to identify the necessary improvements as regards all **measures at farm level**". "MS should integrate all public and private advisors within the AKIS." (recital 50)
[95] Art. 15(2) second paragraph: "appropriate assistance **shall be offered along the cycle of farm development**"15
[96] Art. 15(3): "MS shall ensure that advisors are suitable qualified"

Advisors' networking and cross-fertilisation across the EU can also upscale their competences[97].

6. **The various interventions under Art. 78 form an integral part of the Member State's AKIS strategic approach**. Member States shall therefore according to Art. 75(6)) ensure that actions supported under Art. 78 "***be based on and consistent with***" **the** Art. 114 **AKIS strategic approach** provided for according to the CAP Strategic Plan.
7. **Advisors should take up a more interactive role and serve as innovation support services** (Art. 15(4) (**"one-stop-shops"** for innovation[98]), helping to reveal farmers' needs and to prepare and facilitate/implement EIP innovative projects. **There are no budget limitations concerning the maximum amount of support for advice or knowledge actions (Art. 78)**, except for the setting up of an advisory service (Art. 78(3)).
8. **Knowledge exchange and information interventions under Art. 78 could take many forms** such as: vocational or specific training courses for farmers and for advisors (or mixed). It is essential to **take into account the demand of the targeted audience** and not to programme the course fully top-down. Further actions are one-to-one on-farm advice to farmers or foresters; individual coaching; innovation advice; the setting up of advisory services for instance for innovation support. Mobility budgets enable to send advisors abroad and afterwards spread the new knowledge among the local AKIS actors. The organisation of knowledge exchange workshops or discussion groups, on-farm demonstration activities[99] short-term farm exchange and visit schemes, etc all profit from peer-to-peer effects, as well as information actions of all kinds (face-to-face, virtual, educational,…). Advisors may be good trainers or facilitators for those peer-to-peer events.
9. **The choice of supported advisors is free, on condition that the advisors have no conflict of interest and that the advice given is impartial** (Art. 15(2)). This may be secured by a formal contract/agreement between advisor and Managing Authority. Beyond this, **the status of advisors should not be regulated.** It is up to **the AKIS coordination body to organise the advice and advisors.** There is no obligation to follow other obligatory conditions nor for trainers, nor for advisors, as this may limit the provision of sufficient and adequate advice and knowledge provision in certain areas or fields where the necessity exists. Nevertheless, **regular obligatory training of advisors is obligatory[100].**
10. **Certification or designation of advisors is thus not needed**. This will reduce the administrative burden as well for advisors as for the Managing Authorities. A transparent register of advisors on the Ministry's website including all impartial advisors could be helpful, also for monitoring the situation, such as the advisory offer in certain domains. Such website will help clients with their choice of advisor, by sharing the advisors' curriculum vitae, their education, their specialisation (if any) and the experience they gained over the years. Such website can even be an instrument to work with vouchers, as some MS already do.
11. Member States shall further ensure - pursuant to Art. 15(4) - that **within their territory the following specific fields of advice are covered.** The organisation should be the task of the **AKIS coordination body** which most probably will be part of the Managing Authority to ensure legitimacy**:**
    - All requirements, conditions and management commitments applying to CAP beneficiaries set in the CAP Strategic Plans. This includes all eligibility conditions for support schemes

[97] https://www.h2020fairshare.eu/ , https://i2connect-h2020.eu/ are EU advisory networks on digital advisory tools and on supporting interactive innovation. They are financed by Horizon projects but will be of great support to the AKIS in MS

[98] https://www.youtube.com/watch?v=-BTua8oNeLo : Develop innovation support services including innovation brokering, facilitation and innovation tools (M. Gysen)

[99] https://www.youtube.com/watch?v=O9ycYsCiKX0: Organise farmer to farmer exchanges including on farm demonstrations and experimentation (T. Kelly)

[100] Art. 13(3): "MS shall ensure that advisors are appropriately trained"

under the CAP (see fiches for CAP interventions) and obligations under SMRs and GAEC standards under conditionality (see fiche 4.2 Conditionality and Annex III for the specific regulations, numbers, percentages and Articles concerned);

- Further requirements under environmental and climate legislation, as well as for plant and animal health, related to the agricultural activity: the Water Framework Directive, The Nature Directives (Birds and Habitats), the Clean Air Directive, the Net Emission Ceiling Directive, Art. 55 of the Plant Health Law, the Animal Health Law and the elements of the Sustainable use of pesticides Directive (SUD) which are not included into conditionality, in particular the voluntary practices under Integrated Pest Management (IPM). Note that the compulsory practices under the WFD and the SUD are covered under the first bullet.
- Farm practices preventing the antimicrobial resistance (AMR) set under the Communication COM (2017) 339 on AMR.
- Information on financial instruments and business plans established under the CAP Strategic Plans
- Risk management according to Art. 76
- Innovation support in particular for preparing and implementing the Operational Groups under the EIP-AGRI as referred to in Art. 127
- Development of digital technologies in agriculture and rural areas as referred to in Art. 114(b)
- Sustainable management of nutrients ("a Farm Sustainability Tool for Nutrients" by 2024)
- Conditions of employment and employer obligations as well as occupational health and safety and social care in farming communities.

Further guidance can be found in the toolkit for knowledge exchange and information[101] (Art. 78)

Enhancing cross-thematic and cross-border interactive innovation

1. Foresee **sufficient funding for a variety of regular OG calls, all linked to the CCO**. **OG projects may then tackle any subject serving one of the nine CAP specific objectives**, such as the development of new products or practices, pilot projects, supply chain cooperation, consumer-producer organisation, joint environmental project approaches or climate change actions, discussion groups or networks with a purpose, cooperation in biomass provision or renewable energy, forest management, social innovation, consumer-citizens' concerns, preparing generational renewal making the farm fit for the future, rural area related actions and much more.
2. Many issues can be solved with cooperation on new approaches. The EIP brings extra value in a region/MS thanks its interaction within OGs, with OGs across borders or with Horizon Europe projects: **contacts** can be made **and experience can be shared across the EU,** be it bilateral or at the occasion of dedicated events.
3. **A set ("family") of calls under the same single and broad OG intervention opens up to a variety of objectives for OGs and reduces administrative burden**: keep the **bottom-up calls** to capture grassroots innovative ideas and practice problems, and add further "**suggestive" thematic calls**[102] if useful for specific national/regional reasons.
4. **Support continuously open OG calls[103],** with several cut-off dates per year**. This incentivises farmers with an innovative idea** or an urgent problem, who find it hard to wait much more than 6 months. MS will have to describe the intervention on OGs to count their annual and 7-

[101] http://agriwiki.agri.cec.eu.int/Pages/AWFile.aspx?LISTNAME=AgriWikiDocuments&ITEMID=4046
[102] https://www.youtube.com/watch?v=AaxZ1IE608k: Use of a "family" of OGs & EIP network activities (Shane Conway)
[103] https://www.youtube.com/watch?v=zPkXbiVupgg : Prepare interesting calls for Operational Groups (Åsa Broberg)

year budgets in their CAP plans. How they would organise the frequency of calls is essential and is obviously related to expectations of MS and their farmers.

5. **Provide for a 2-step system** for OGs including a **first** action to prepare the project: develop the initial idea, check the available information on the project objective, find the most relevant partners who can help to develop the solution, prepare the way to cooperate and the final project proposal ready for selection**. Use simplified costs wherever you can**. This first preparatory action is often paid with lump sums under the OG intervention (indicator O.1) and thus eases the administrative burden. It could as well be an advisory action (counting for indicator O.2). The **second** action is for implementing the project. Here too, new opportunities have arisen: besides flat rates, up to 40% of the direct costs can be paid directly without invoices if activities are well described in the application. Overall**, the 2-step approach helps to** save money on meaningless projects**, improves the overall quality of the proposals** thanks to good support during this process **and simplifies the selection** of the projects because they are better prepared. However, 2 steps should not be an obligation, it should be seen case by case. If the OG has an already prepared project thanks to other means (e.g. other AKIS interventions such as innovation platforms, innovation support etc.), there may be no need for OG preparation funding. Note that the 2 actions count separately for output indicators and in the CAP plans.
6. **Make sure that a substantial part of the OG budget is spent on communication and demonstration during the project.** Some current OG projects manage to regularly attract up to 100 farmers to their events, who learn and mimic the new approaches in the OG project. Thanks to the peer-to-peer effects, this has impacts on farming practices beyond what any other type of innovation funding can deliver. Overall, it appears that OG need clear instructions to ensure broad communication.
7. **Ensure a substantial communication budget beyond the project budgets for all OG projects, also after they finished, as well as for dissemination in other ways** or with other funding (e.g. demonstration programmes, advice, …). Evaluation studies learn us that there is still much to gain by intensifying and possibly using **professional experts** for dissemination and communication of recent innovative practices. OGs should focus on the **existing channels which are the most used by the target audience** of end-users of project results, in particular those which also save the solutions on the longer term, beyond the project period (knowledge reservoirs/platforms).
8. Ensure **involvement of OGs in EU Horizon multi-actor projects**[104] (See Annex VI).
9. **Attract advisors in EIP OGs** and profit from the multiple roles they may play: helping to capture practice needs, preparing, facilitating, communicating and disseminating on OG projects and their outcomes.
10. CAP networks' innovation activities, EU advisory networks and knowledge reservoirs should help **facilitate cross-border OGs** (within one country and between countries). Timing and conditions of calls are often a hurdle. So why not synchronise within Europe one yearly fixed common timing and harmonise the selection criteria from Art. 127 (criteria for the interactive innovation model) to simplify cross-border OG calls, so that partners and CAP networks can timely prepare clustering exercises, brokering events, face-to-face encounters etc.?
6. Peer-to-peer learning is key: **organise cross-border or intra border visits for OGs** or for specific actors who can incentivise OGs (innovation support services, advisors, farmers' groups, cooperatives…).
7. **Avoid subjects without prospects** for effective implementation: ensuring application and impact are key to attract farmers and advisors. Chose a mix of evaluators with a good view on agricultural practice and an open eye to innovative (cross-over) ideas.

[104] See Annex VI for more details

8. Use the relations within the AKIS and the EIP Operational Group projects **to test new practices/approaches that may become supported interventions under the CAP such as ecoschemes and environment-climate interventions.** Through such projects[105], all will benefit from the practice knowledge and entrepreneurial skills of practitioners, while at the same time this will promote the future intervention at an early stage and motivate the future beneficiaries to take up the outcomes thanks to increased ownership of the co-developed interventions.
9. **Foster structural and regular specific innovation activities within the national CAP networks[106]** to have a permanent platform and activities where all the knowledge created within and beyond the country can be shared and may inspire the implementation of new innovative practices and projects (section 1.5.2 and Annex IV).

Making effective use of information and communication technologies to improve knowledge sharing

1. **Interlink open public data to enable additional knowledge services**, e.g. Lithuania's RECAP app, Estonia's GIS/LPIS based layers combining soil fertility, erosion zones, spreading harmful organisms, irrigation needs etc.
2. Set up **multi-actor platforms** to discuss how to support the digital transition within AKIS, to find the most urgent needs, for instance on training/advice, involving practitioners such as farmers and advisors.
3. **Develop and share digital advisory tools, avoiding duplication** and reducing maintenance costs for the many advisors who can profit from it[107].
4. Organise **training on digital skills** for farmers, advisors etc, possibly combined with a satisfaction score of users of training or advice.
5. **Build digital knowledge reservoirs /knowledge hubs that are interactive, quality checked and serve your AKIS** (e.g. LT[108], EUREKA[109]). Use their recommended common EU standards and programming language for Member States' practice knowledge databases to ensure translation and interoperability of all knowledge material and outcomes from within the EU as much as possible.

0 Main new elements in the post 2022 CAP related to AKIS and EIP

Obligations

1. Member States have the obligation to include in their CAP Plan **how they will be strategically organising their AKIS to improve knowledge flows, in particular how researchers, advisors and CAP networks will work together**, Art. 114 (a)(i) and (ii)

[105] https://www.youtube.com/watch?v=AaxZ1IE608k: Use of Operational Groups for testing out new CAP measures (S. Conway)
[106] https://www.youtube.com/watch?v=xjjvPs5dRew : Example: Promote collaboration and knowledge flows among OGs (**J. Rohrhofer)**
[107] The EU FAIRSHARE Horizon 2020 project (https://cordis.europa.eu/project/id/818488) is testing 240 such tools already
[108] https://www.youtube.com/watch?v=H6JMN92Lc0k: Establish knowledge centres and digital knowledge reservoirs (G. Kučinskienė)
[109] https://www.youtube.com/watch?v=q9VlwGprzKk : EU knowledge reservoir EURAKNOS and EUREKA (**Pieter Spanoghe)**

2. **Member States shall include in the CAP Strategic Plan an AKIS system providing advisory services** for farmers and other beneficiaries of CAP support, Art. 15(1)
3. Member States have the obligation to detail in their CAP Plan **how they will be providing advice and innovation support** for OGs, Art. 114 (a)(ii)
4. **Advice must be impartial** and advisors supported under the CAP should have no conflict of interest, Art. 15(3)
5. All advisors **must be integrated within the AKIS** (key examples are listed in Annex V)
6. Within the Member State a larger number of advisory **fields are obligatory**, see section 1.3.2 (mainly points 2-7 and 11)
7. **The EIP Ogs shall contribute to achieving all nine CAP specific objectives,** Art. 127(1)
8. Operational Groups shall share both the **plan and a summary of the results of their project**, to enable early contacting, networking, and clustering of groups with similar themes, Art. 127(4)
9. The principles of **interactive innovation** for EIP OGs are made explicit in Art. 127(4) and easy to use as common **selection criteria** across Member States. This will simplify the conditions for cross-border OG calls:
    - focus on practical farmers' needs
    - complementary knowledge in the OG is necessary
    - co-creation and co-decision all along the project

Opportunities

1. Possibility of **advance payments** for EIP OG projects (**up to 50%),** Art. 44(3) of the financing regulation[110].
2. In principle **maximum 7 years per project, but longer is possible** if justified for collective actions for environmental, climate and biodiversity objectives (specific CAP objectives 4, 5 and 6)
3. **Higher than normal EAFRD contribution rates** specifically for EIP OG projects (**up to 80%**, instead of the normal 43%), Art. 91(3)(b)
4. **A State Aid derogation[111]** up to 500.000 Euro per OG project is in force from 1 January 2023
5. **Funding to provide innovation support** to OGs available through Art. 78 (Art. 15(4)(e). Art. 78 intervention can both pay for individual innovation advice or for setting up innovation support services.
6. The introduction of the funding of (**new**) **cross-border OG projects** (Art. 127)
7. CAP networks now can **support** under their EIP networking the **cooperation of *existing* OGs** (e.g. meetings to exchange on a common theme, structured knowledge exchange on how to manage OGs or give incentives for developing common project proposals etc.), Art. 113(4). This could equally be funded by Technical Assistance e.g. for regions. Cross-fertilisation between OGs on similar or complementary topics can also be enabled by Art. 78. It could be useful as preparatory action to prepare cross-border OGs or for Horizon Europe multi-actor projects.
8. A number of **Horizon Europe projects** of calls 2021-2022 will support the various AKIS strands during the transition phase, for instance an AKIS co-creation project and one on

[110] R. 2021/2116 - REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the financing, management and monitoring of the common agricultural policy and repealing Regulation (EU) No 1306/2013

[111] Commission Regulation (EU) 2022/2472 of 14 December 2022 declaring certain categories of aid in the agricultural and forestry sectors and in rural areas compatible with the internal market in application of Articles 107 and 108 of the Treaty on the Functioning of the European Union (Articles 39-40) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2022.327.01.0001.01.ENG&toc=OJ%3AL%3A2022%3A327%3ATOC

innovation support, EU advisory networks and thematic networks. New in 2021 is a specific topic on Horizon Europe thematic networks for OGs: projects will be obliged to build themselves around a number of OGs working on a common theme. This can be the start for preparing cross-border OGs (Art. 127), after working together on a common theme in such Horizon Europe project (see Annex VI).

0 Cornerstones for an AKIS fit for the future

EIP-AGRI Operational Group (OG) innovative projects - Art. 77 and 120

Support to EIP Operational Groups follows the general provisions of cooperation (Art. 77)[112]. Details essential for the EIP and Operational Group projects are listed in Art. 127. Overall, there is major continuity with the period 2014-2020 with a number of extra incentives (see section 1.4.2). Lessons will have been learnt from the over 3000 OGs in that period. The 100% support rate and the State Aid derogation will be essential, to boost energy, biomass, environmental, climate, rural and social innovation projects. Such subjects also were possible in the 2014-2020 period but were hardly used as 100% support rate was not possible and no private parties were willing to put in budget.

Further important info is available in Annex III. For instance, it is important to remember the fact that the **envisaged innovation may be based on new but also on traditional practices in a new geographical or environmental context (Art. 127)**. There is no "definition" of innovation needed, so any project starting **new** initiatives is eligible.

CAP networking for innovation post 2022 - Art. 126 and Art. 114(a)

The new CAP cross-cutting objective calls for intensified knowledge exchange and co-creation of innovation. The CAP networks are privileged platforms for this, and this is indicated in the regulation as such. Fostering innovation and facilitating the networking of EIP Operational Groups are specific objectives/tasks mentioned in Art. 126. In line with these objectives, MS - to the example of some active current NRNs[113] - should develop more specific innovation activities in their CAP network to fulfil the requirements of Art. 114(a). Plenty of examples are available[114] but the future AKIS strategic approach is even more ambitious. MS will be invited to describe in their CAP Plan how they intend to organise the specific innovation activities in their CAP network[115]. Regions can also take initiatives in this sense and are allowed to use Technical Assistance to do so, and also Art. 78 can fund similar actions. In this case, coordination within the Member State is expected. Key points to be brought to the MS attention before developing their CAP plan can be found in Annex IV, to ensure that the CAP Networks' requirements, objectives and tasks related to innovation are fulfilled.

New and more interactive functions for advisors, innovation support

Beyond the classical linear advising, three more recent types of interactive advisory functions will become main instruments for a well-functioning future AKIS. These types will ensure advisors'

[112] Further guidance can be found in the toolkit for the cooperation intervention: http://agriwiki.agri.cec.eu.int/Pages/AWFile.aspx?LISTNAME=AgriWikiDocuments&ITEMID=3047

[113] https://www.youtube.com/watch?v=NF5H7RR8MPU: Innovation activities of the Nat. Rural Network Unit (J. Swoboda)

[114] https://www.youtube.com/watch?v=GO9o0EMPnOk : Networking meetings with Operational Groups (E. Frankhuizen)

[115] https://www.youtube.com/watch?v=x-MOmD3bFKg : Preparing the role of CAP networks in strengthening the AKIS by promoting innovation and knowledge flows within the country and across the EU (I. Van Oost)

quality within a Member State to become more competent and involved in innovative knowledge and connected with participatory research. Thus, this should be considered for the AKIS strategic approach of every country:

A set of interactive innovation roles of advisors in Operational Groups:

Which new roles will advisors take up in EIP Operational Groups or other interactive innovation projects, such as Horizon Europe (HE) multi-actor projects or HE thematic networks?

- They can capture practice needs of farmers and pass this info to researchers and CAP networks (obligation in Art. 114)
- They can share up-to-date practical knowledge from a wide range of active farms
- They can broker to help prepare interactive innovation projects
- They can facilitate interactive innovation projects and learn from the AKIS actors involved
- They are key actors for communicating and disseminating the newly generated innovative knowledge, both to their clients, their back-office specialists as to the wider public
- They can bridge between CAP and Horizon Europe consortia as innovation support services

Which functions can an Innovation Support Service (ISS) provide as a "one-stop-shop"?[116]

The experience of agricultural/rural innovation support services is that you need to have expertise in both the subject matter and in brokerage/facilitation. **Innovation support** can be funded under Art. 77 (if the person delivering the innovation support is a partner in the OG: use O.1) as well as under Art. 78 (innovation coaching/advice for a project, with the advisor not becoming a partner: use O.2). A typical operational example of an innovation support service working exclusively and effectively for Operational Group projects is the one in Schleswig-Holstein[117].

The following innovation support functions are key for a "one-stop-shop" ISS:

1. **Brokering** function: connecting actors around a bottom-up innovative idea[118]
2. **Coordination and facilitation** of projects, as an intermediate between partners
3. **Promoting** innovation at large and raising **awareness** on its importance for transitions
4. **Coaching** farmers towards innovation (individual **innovation advice**)
5. Organising **thematic brainstorming events** to find possible solutions and link partners
6. Encouraging farmers with **an innovation prize**, to show their peers how normal or easy it is to innovate. This can be done e.g. with a biannual prize from which for instance 150 candidates are reduced to 10 nominees and one winner. All nominees are promoted in the most read practice-oriented farm channels, and get also help to develop their innovation, which again promotes innovation
7. **Dissemination** of innovative results, specific events and campaigns
8. Keeping **closely connected** with other SMEs and other innovation services and funding bodies.

A "Back-office for advisors"[119]*:*

To support their colleagues, as well as farmers, trainers, educators etc., some advisors specialise on the practical side of particular themes. This means that they are in close and regular contact

[116] https://www.youtube.com/watch?v=9FBi7Z410GE : Innovation support services: the glue in AKIS (**W. Ceulemans)**
[117] Page 106: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/report-preparing-for-future-akis-in-europe_en.pdf (K. Ketelhodt, innovation advisor in the Schleswig-Holstein Chamber of Agriculture)
[118] https://www.youtube.com/watch?v=fbiAGzlf3IA : Distrikempen – Logistic Innovation (P. Pasgang)
[119] Page 101-103 of https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/report-preparing-for-future-akis-in-europe_en.pdf

with national and international researchers on that theme, as well as with OGs working on these themes and the CAP networks collecting information from theme-related projects. As such, these "**specialist" advisors**, thanks to their intensive knowledge on a particular subject, are of great help for the whole Member State, vocational training and education included and illustrate the strategic approach within the AKIS. Such specialists could be individual advisors (even a part time researcher that works as an advisor too), or part of a team within a larger advisory body[120], farmers' organisation or an applied research institute having a group of advisors as part of the organisation. They may produce dedicated educational material serving to upskill many AKIS actors. They may also be well placed to lead national multi-actor thematic networks[121,122].

o How reflect the AKIS Strategic approach in the CAP plan?

The following sections of the CAP plan template are dedicated to fill in the various elements of the AKIS approach in the CAP strategic plans:

Section 2 - Assessment of needs and intervention strategy

This section covers on the SWOT summary, needs assessment and interventions chosen for the CCO. It also indicates which are for the CCO the related result indicators and the target value for those indicators, including the justification of the targets and milestones and the financial allocation.

Section 4 - Elements common to several interventions

This section focuses on the work of the CAP networks and the possibility of using technical assistance. Key questions here concern the planned networking activities to strengthen innovation and knowledge flows within AKIS and the beneficiaries. The last question in section 4.6 is investigating on the coordination and complementarities between EAFRD and other Union funds (in particular Horizon Europe and ERASMUS+, but also EFRD and Interreg):

Technical Assistance (Art 89)

- ***Objectives;***
- *Scope and indicative* ***planning of activities****;*
- ***Beneficiaries.***

CAP Network (Art. 126)

- *Summary overview and objectives of the National CAP Network, including* ***activities to support the EIP and to increase knowledge flows and interaction within the AKIS;***
- ***Structure, governance and operation*** *of the National CAP Network, including the* ***indicative share of technical assistance*** *funding allocated to the network.*

Coordination, demarcation and complementarities between EAFRD and other Union funds active in rural areas (Art. 110(d))

- *Short description of demarcation and coordination mechanisms.*

Section 5.3 - Description of interventions under EAFRD

This section includes the set of CCO/AKIS interventions foreseen in the CAP plan, including the description of the design and requirements to ensure effective contribution to the CCO, the relevant output indicator to which the intervention contributes, the territorial scope, the needs addressed by the intervention, the result indicator(s) selected for this intervention, the eligibility conditions, the form and rate of support, the total indicative financial allocation and the planned unit amounts per year.

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[120] https://www.youtube.com/watch?v=JTBwA4PPXbk : Integration of Slovenian advisors in the AKIS (**A. Jagodic)**

[121] SWG SCAR AKIS Report page 29-31 https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/report-preparing-for-future-akis-in-europe_en.pdf

[122] https://www.youtube.com/watch?reload=9&v=EPsVbkmnp9w : thematic networks at national level (P. **Bergeret)**

Section 7 - Governance systems and coordination systems

In section 7.1. the **formal AKIS coordination body** should be identified, including its contact details. This will be the contact point for the Commission as regards the **governance and coordination of the AKIS strategic approach. This includes farm advice and all other related AKIS interventions**. It is expected that this coordinator is in close and regular contact with the main AKIS (regional) coordinators and actors in the country which can help assess and guide the improvement of the AKIS in the country by giving suggestions for encouragement of more effective knowledge exchange activities (advice, training, …), including in particular also the generation and co-creation of innovation (EIP OGs) and the broad sharing of it.

Section 7.2 requests a brief description of the monitoring and reporting systems established to record, maintain, manage, and report the information needed for assessing the performance of the CAP Strategic Plan, and the annual performance for the CCO elements (Art.123(2)).

Section 8.1 - Modernisation: AKIS and digital technologies

This is the section to describe the strategic AKIS approach on which the AKIS interventions are built. It summarises the key elements by which the CAP plan will illustrate the planned improvement of the strategic approach related to the functioning of its AKIS and digitalisation. The knowledge exchange, advice, information actions and EIP Operational Group innovative projects need to contribute the CCO (Art. 6(2)), and may also contribute to further specific objectives according to the specific interventions chosen. Member States shall explain:

- ***The overall envisaged organisational set-up of the improved AKIS****: detailing how knowledge flows between the different actors forming part of the AKIS will be improved (Art.120)(a)(i), and including the specific interventions which serve this purpose;*
- ***The description of how advisors, researchers and CAP networks will work together within the framework of the AKIS (Art.114)(a)(ii)*****:** including potential inter-ministerial agreements and sufficient budget attribution to support the actions that regularly interlink researchers with all advisors and with the specific innovation activities of their CAP network, to increase knowledge flows;
- ***The description of the organisation of advice according to the requirements referred to in Article 15(2), 15(3) and 15(4****): Explaining how advising farmers and other beneficiaries of CAP support will be organised and integrated within the AKIS ensuring the delivery of up to date technological and scientific information (Art. 15(2)) and that, within the Member State, advice all fields listed in Art. 15(4) are covered. Providing details on the inclusion of all impartial advisors (public and private). Illustrating that all CAP supported advisory, knowledge exchange and information actions are based on and consistent with the AKIS strategic approach as described in reply to the former questions;*
- ***The description of how innovation support services are provided as referred to in Article 114(a)(ii):*** *Explaining how innovation support is organised in order to capture grassroots innovative ideas and develop them into innovation projects of EIP Operational Groups, how it is ensured that these services are supported by the regular knowledge flows between researchers, advisors and the CAP network innovation activities, and also how this innovation support is organised within the AKIS: for instance as a "one stop shop for innovation" covering any possible theme, etc.*

Please, note that in that Section of the CAP Strategic Plan, in addition to the AKIS plan, also the **strategic approach towards digitalisation** needs to be described (see Section 2 and 3).

o AKIS related impact, result and output indicators

Impact indicator (Article 7, Annex I of the SPR)

- I.1 ***Sharing knowledge and innovation***: *Share of CAP budget for knowledge sharing and innovation*

Output indicators[123] (Article 7, Annex I of the SPR)

- O.1 *Number of European Innovation Partnership (EIP) operational group projects*
- O.2 *Number of advice actions or units to provide innovation support for preparing and implementing European Innovation Partnership (EIP) Operational Group projects*
- O.29 *Number of supported training, advice and awareness actions or units*

Main Result indicators[124] (Articles 7, 97 and Annex I of the SPR)

- *R.1* ***Enhancing performance through knowledge and innovation***: *Number of persons benefitting from advice, training, knowledge exchange or participating in European Innovation Partnership (EIP) operational groups supported by the CAP in order to enhance sustainable economic, social, environmental, climate and resource efficiency performance*
- *R.2* ***Linking advice and knowledge systems***: *Number of advisors receiving support to be integrated within Agricultural Knowledge and Innovation Systems (AKIS)* (for examples of how this can be done, see Annex V)
- *R.24* ***Environmental-climate performance through knowledge and innovation***: *Number of persons benefitting from advice, training, knowledge exchange or participating in European Innovation Partnership (EIP) operational groups supported by the CAP related to environmental-climate performance* (sub indicator of R.1*).*
- Several other result indicators will also be targeted by specific AKIS interventions.

o Guidance questions for the assessment of the AKIS strategic approach

In blue: general questions that should fit for all types of intervention.
For the AKIS Strategic approach, interventions Art. 77/127 and 78 are key.

Refere n-ce in the CAP Plan tem-plate	Item to be assessed
	Section 1 - Common elements to all types of interventions
	Does the title reflect sufficiently clearly the content of the intervention?
2 &5	**Objective(s) to which the intervention is linked**
	Please refer to the tool on the CCO (2.2.10)

[123] Note that some modifications of Annex I may still need adjustment according to the final legislation.
[124] Note that some modifications of Annex I may still need adjustment according to the final legislation.

	Is the design of the intervention consistent with the CCO (and SOs) to which it contributes? Is the level of detail of the description of the intervention sufficient to answer the above issue?
5	**Eligibility conditions and description of the intervention**
	Do the eligibility conditions of the intervention respect the applicable legal provisions in the SPR? Are the interventions according to Article 72 based on and coherent with the AKIS strategic approach?
	Are the eligibility conditions consistent with the policy objective/goal of the type of intervention? Is the level of detail of the description of the intervention sufficient to answer the above question?
	If the intervention is 'territorialised': is the territorial targeting relevant to the identified needs and intervention logic? [see the fiche X.4 on regionalisation125]
2 &5	**Result indicator(s) to which the intervention contributes**
	Is/are the RI proposed consistent with the design of the intervention and its eligibility conditions? Is the level of detail of the description of the intervention sufficient to answer the above issue?
5 &6	***Please refer also to the tool 5.0 on what is an intervention***
	Do the planned annual outputs fall under the relevant output indicator?
	Are the planned outputs consistent with the relevant planned milestones/targets?
	Are the planned outputs plausible in view of the design of the intervention, its eligibility conditions and thus its targeted beneficiaries? Is the level of detail of the description of the intervention sufficient to answer the above question?
5 &6	***Please refer also to the tool 5.0 on what is an intervention***
	Are the planned unit amounts plausible in view of the design of the intervention and its eligibility conditions? Is the level of detail of the description of the intervention sufficient to answer the above question?
	Are the planned unit amounts consistent with the relevant planned milestones/targets?
5 &8	**Simplification**
	Please refer also to the tool 8.2 on simplification
	Is the intervention designed in a way that would avoid unnecessary complexities or administrative burden for the beneficiaries (e.g. using SCO, vouchers, etc.)? This would be in particular need to be checked for advice under Art. 72
3	**Consistency and accumulation of support**

[125] http://agriwiki.agri.cec.eu.int/Pages/AWLibrary.aspx?LISTNAME=AgriWikiDocuments&ITEMID=1097

	Please refer also to the tool 3.1 on intervention strategy and its consistency/coherence
	Is the intervention consistent/not in contradiction with other interventions?(including with similar types of sectoral intervention chosen by MS) Is the level of detail of the description of the intervention sufficient to answer the above question?
	Is the intervention likely to create accumulation of support (i.e. overcompensation/double funding)?
	Section 2 - Items specific to the AKIS Strategic approach
	The following questions are designed to help assess the proposed Strategic approach by MS and provide ideas for discussion with MS during informal phase, but often go beyond regulatory obligations in a way to enhance good practices. • How will the MS fulfil each of the obligations under Art. 114, as listed in the 4 indents in section 8.1 of the CAP plan? • Overall, what are the main collaboration pathways to make researchers, advisors and CAP networks work better and more regular together to exchange knowledge? (see section 1.3 for examples) • With which interventions will the advisors be integrated in the AKIS (Annex V for best examples) • How will the MS fulfil the obligations for advice and advisors under Article 15? How will this be organised while at the same time avoiding administrative burden (such as designation, certification etc.) (see section 1.3.2, 1.5.3 and Annex V) • In the case of Art. 78 types of intervention, are the intervention "based on and consistent with" the strategic AKIS approach as described in section 8.1 of the CAP plan? Are they helpful for the aim of improving the functioning of the AKIS? • In the case of EIP OG interventions, do they fulfil the requirements and guidance (section 1.3.3 and 1.5.1, Annex III)? • Are they helpful for the aim of improving the functioning of the AKIS? • Are they designed in a way that the objectives are focusing on farmers'/foresters' needs? • Do they take a full multi-actor approach with criteria to get an appropriate mix of relevant actors? Do they request co-creation and co-deciding all along the project (Art. 120)? • Will OGs share their plans and the summary of results (eligibility condition)? • Will grassroots innovative ideas be captured and bottom-up OG calls be provided to develop them? Are sufficiently frequent EIP OG calls foreseen? • Will OGs be used to test out and develop CAP interventions? • Has the MS provided for adequate innovation support for EIP OGs as requested in Art. 15(4)? Does it cover the full territory in a rather equal manner? • How will up-to-date knowledge and information be spread in the MS (advisory specialists' back-office? Innovation support database? CAP network investing in innovation exchange? etc., see section 1.3.3 and 1.3.4, Annex IV) • How is the MS bridging between research and practice? How is it making use of the outcomes of Horizon 2020 and Horizon Europe multi-actor projects, and in particular from the thematic networks compiling knowledge ready for practice, to design their interventions, for instance under Art.78, but also for other SOs (see section 1.3.1 and Annex VI)?

	• Are the innovation activities of the CAP Network well developed in terms of specific actions planned and adequately budgeted (see sections 1.3.1 and 1.5.2 and Annex IV)? • Do the specific innovation activities of the CAP network follow the guidance given in section 1.5.2 and Annex IV? • Is it collecting and sharing up-to-date information and knowledge with the advisors and researchers? And with which other AKIS actors? • Has the MS defined linkages with other EU support/programmes in particular with Horizon Europe (for knowledge produced in OGs and multi-actor projects), and possibly ESF+, ERASMUS+, ERDF (see section 1.4.2 point 10 and Annex VI)? • Are regular contacts of OGs with Horizon Europe projects and consortia preparing proposals set up? (section 1.4.2 point 8) • Has the MS taken steps to implement the interventions from the very beginning of the Programming period? • Has the MS considered how to reach the various types of farmers, including the small farms and the socially excluded with knowledge exchange and advice?

Annex I. Background information on AKIS

EIP seminar on AKIS in CAP Strategic plans – 16-18 September 2020: https://ec.europa.eu/eip/agriculture/en/event/eip-agri-seminar-cap-strategic-plans-key-role-akis (the full seminar was recorded and can be seen again via the weblinks on the webpage)

- *Inspiration from an experienced **innovation support service**, followed by a **panel discussion on AKIS policy***
- *Opening speeches from **Commissioner** and Polish **Ministers** of Agriculture*
- *One very inspiring and **Rural Inspiration Award OG***
- *An overview on the **basic elements of AKIS +** Q&A*
- *Section on advice: basics + 3 diverse examples of **advisory services***
- *Section on role of the **national CAP network for innovation,** again with good examples*
- ***Online discussions** which happened in the weeks before the seminar (on advisory services, on CAP networks and on the CAP plans), summarised by Mark Gibson*
- ***10 good examples** of **nice AKIS interventions that can be supported by the CAP***
- ***4 MS presenting their CAP plans,** already full of content*
- *After the breakout sessions, **Director General Burtscher** closed with a summary on the interactive discussions and expresses how he sees the future & AKIS*

EIP webinars on the role of the specific innovation activities of CAP networks (3, 8 and 10 June)

AKIS animated infographic: https://ec.europa.eu/eip/agriculture/en/news/new-animated-video-akis-building-effective

AKIS brief: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/building-stronger-akis_en.pdf

AKIS brochure: https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-brochure-agricultural-knowledge-and

– Animated infographic on **innovation support**: https://www.youtube.com/watch?v=pTV6kLH0ykg&feature=youtu.be

Brochure on **innovation support**: https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-brochure-innovation-support-services

https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/report-preparing-for-future-akis-in-europe_en.pdf (**SWG SCAR AKIS report,** page 81-112 **on advisory approaches**)
https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/report-preparing-for-future-akis-in-europe_en.pdf (**SWG SCAR AKIS report**, see in particular **list of best AKIS practices** from MS on page 31-44)
Evaluation Study on the CAP's impact on knowledge exchange and advisory services:
file:///C:/Users/oostiin/Downloads/KF0320756ENN.en%20(2).pdf
https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/research-innovation-and-technology/caps-impact-knowledge-exchange-and-advisory-activities_en
Further reading:
https://ec.europa.eu/eip/agriculture/en/event/eip-agri-seminar-promoting-creativity-and-learning
https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-brochure-horizon-2020-multi-actor

Annex II. Why do we need well-functioning AKIS?

Knowledge and innovation have a key role to play in helping farmers and rural communities meet the challenges of today and tomorrow. New combinations of knowledge and actors drive innovation. Therefore, we need to do efforts to interconnect people with different expertise, knowledge and competences who together are able to solve the challenges we face.
The **national AKIS actors are however not sufficiently interconnected**. Even if there is already a substantial amount of knowledge available, this knowledge is mostly fragmented and insufficiently known and applied in practice. That is why a more strategic approach is needed to break down the silos, to look for synergies and more intensive knowledge exchange among actors.
The Foresight study of the SWG SCAR AKIS 3rd mandate revealed that **open and impartial knowledge sources (people as well as data) are essential to combat the privatisation of knowledge** by an ever smaller number of multinational interlinked companies.

In short, well-functioning AKIS will help speed up innovation throughout the EU, **avoid duplication of efforts between Member States and thus save costs.** They will increase considerably the impact of EU and national/regional research & innovation funding. Overall, the CAP post 2020, supporting better AKIS approaches in Member States, will result in **EU added value and more cross-border spillovers of knowledge and innovation**.[126]

Annex III. Basics on EIP Operational Groups

Annex III lists the key elements on the EIP and its Operational Groups[127] applicable in the 2014-2020 period, which stay still valid and are very much worth reminding.

1. **What is innovation? In short, innovation is: "an idea put into practice with success".** Therefore, it is important to have practitioners involved, not as a study-object, but in view of using their entrepreneurial skills and practical knowledge for developing the solution or opportunity and creating co-ownership for the end-users of the project results. Given the **impossibility of defining "innovation" ex-ante**, managing authorities should not programme an intervention by restricting eligible operations to the condition that they are "innovative". The CAP can support operations which have the potential be innovative, **without making the innovative character of an operation an eligibility criterion.**
2. The envisaged innovation may be based on new but **also on traditional practices in a new geographical or environmental context**. The intervention may cover all costs related to all aspects of the cooperation, including in particular the work of practitioners such as farmers and advisors. Note that Member States **shall not support** through this type of intervention cooperation **solely involving researchers:** cooperation should not replace classical research, not even if applied research. The intention is to cooperate with practitioners and advisors, so that **practical (tacit) knowledge** is taken into account also, to make outcomes easy applicable and ready for practice.
3. **Obligatory selection criteria for OG projects** (not new but now in post 2022 legislation): EIP OGs must draw up a plan for innovative projects based on the **interactive innovation model** which has as the key principles as listed in Art. 127(3)((a), (b), (c)) . Besides the focus on farmers' or foresters' needs, the particular composition of the group should benefit the specific project and its outreach, making the best use of different types of knowledge (practical, tacit,

[126] https://www.youtube.com/watch?v=a-noBHfYJu8
[127] See also EIP guidelines 2014-2020 for further info: https://ec.europa.eu/eip/agriculture/en/publications/guidelines-programming-innovation-and

scientific, technical, organisational, etc) in an interactive way. Mutual respect and putting partners at equal (decision) levels all along the project are essential to make it work.

4. Member States may grant support to **prepare** or to **implement** Operational Group projects, or both. These actions request separate requests for grants and will be funded as separate operations, without an automatic link between them. To fund the **preparation** of an operational group, the application may be a relatively simple: a description of the rough project ideas and its relevance for practice, together with the targeted partner combination to be developed. A lump sum approach is very appropriate. For the funding of the **implementation** of an operational group project, a higher budget and a more thorough project description will be needed. The work plan and the agreements among partners on who does what and which activities will be undertaken should be clear in this stage. Such project description is important in case the foreseen solution cannot be achieved: auditors will then be able to find proof of activities planned and executed, and thus those payments allowed.
5. **Innovation support is an action** which should help to capture individual grassroots innovative ideas, understand the practice needs, bring the most relevant partners together, refine the project proposal, arrange sound working methods thanks to a clear cooperation agreement[128], and finally prepare a solid project proposal on which all actors of the operational group want to engage. As part of innovation support services, "**innovation brokering**" has an important role in discovering innovative ideas, facilitating the start-up of operational groups, notably by acting as a go-between who connects innovation actors (farmers, researchers, advisors, NGO's, etc.). The function of brokering may be combined with innovation advising and/or EIP networking. [129]
6. **Operational groups (OGs) and Leader Local Action Groups (LAGs):** Operational groups and LAGs have in common that they capture ideas from interested actors and foster the setting up of projects. However, LAGs act on the basis of a comprehensive local development strategy. LAGs will approve several projects to implement this strategy which are not necessarily multi-actor. In contrast, an EIP operational group builds itself around a single innovation project, targeted towards finding a solution for a specific issue. The operational group exists only to carry out that project and can seek help from partners or experts across the EU.
7. Operational Groups shall **disseminate their plans and the results of their projects**, within their country. They should also send them to SFC for publishing on EU CAP networks' website and enabling contacts with other projects (OGs, Horizon Europe, etc). **See Annex VII for the format in which this dissemination of plans and project results is to be done**.

Annex IV. Innovation related CAP networking elements to be brought to the MS' attention when developing their CAP plan

- How precisely will the **CAP network work closer together with advisors and researchers** within the AKIS (obligation in Art. 114 (a)(ii))? Which actions will directly deal with this?
- Is the contribution to the EU CAP network included in the planned innovation and knowledge exchange activities according to the **obligations** in Art. 126 covered by an **appropriate budget?**

[128] https://www.youtube.com/watch?v=-BTua8oNeLo : innovation support services, including innovation brokering, facilitation and innovation tools and much more (**M. Gysen)**
[129] https://www.youtube.com/watch?v=QkoQTH9Q5J8 : The Polish advisory service and EIP network (K. Janiak)

- Which **high level agreements** between ministries of Agriculture, Research, Education, Innovation, Environment etc. will support this improved collaboration in the coming 7 years?
- **Which specific networking** structures/tools/activities are foreseen for innovation/AKIS support and the regular interactions between AKIS actors?
- Will the network's **governance** structure be organised in a way that **innovation/AKIS activities will be part of the network annual work plans**? How will this in turn support the other CAP network activities?
- How will the network support unit (NSU) ensure that the **outcomes of research and innovation projects under Horizon 2020/Europe are disseminated** through the network's tools? **How will translation and filtering of existing information (from EU OGs, Horizon Europe MA projects etc.) be organised? Is there sufficient capacity foreseen** for the website, publications, events...?
- How will the NSU ensure **availability of appropriate project datasystems** – an essential part for NSU support to support a good AKIS - based on the OG's information (laid down in the common EIP format) that will be interconnected in a single EU-level knowledge reservoir?
- Is there **a dedicated support unit dealing with innovation**, and keeping an overview of all OG innovative projects in the Member State? (e.g. with OG databases)
- **Will this activity also actively promote OG participation and inclusion in Horizon Europe projects**, in particular in all multi-actor projects, thematic networks or Advisory networks? (please be aware that for researchers it is not obvious to find famers, advisors and other OG participants with whom they could collaborate in a multi-actor project, so extra networking efforts are essential)
- How will key research actors such as **Horizon Europe National Contact Points** and connection units within research bodies and universities be networked with farmers, advisors, and other OG partners? How will they be **connected to the innovation support services**?
- Will support for **cooperation between existing OGs** become an essential activity of the specific innovation activities in their CAP networks?
- How will **cross-border OGs** within regionalised Member States as well as beyond the borders of Member States be encouraged?
- Is **transnational cooperation** between OG included in the network's activities and are there sufficient resources (budget, multilingual staff, sufficient knowledge and overview on the MSs' OG themes...) to cover it?
- **How will be (public and private) advisors be involved in networking activities**, considering that they are not usual actors of current NRN activities?
- Is the network promoting or **interconnecting innovation support services**?
- Will **peer-to-peer learning** for advisors and farmers be organised?
- What about the supporting and sharing of useful info with policymakers, e.g. the outcomes of test bed OGs for future CAP interventions?

Further guidance can be found in the toolkit for National CAP Networks[130]

Annex V. Good practices to integrate advisors in the AKIS

A few examples of how advisors become more integrated within the AKIS system:

[130] Add wiki link of the final version of toolkit 4.5

- Advisor giving holistic on-farm one-to-one advice on economic, environmental and social dimensions, capable of delivering up-to-date technological and scientific information developed by R&I (very broad scope)
- Specialist advisor on a certain theme or for a specific target group, on-farm or off-farm, or working for the "back-office" having regular exchanges with researchers and exploiting info from the EU from the CAP networks, collecting, managing and updating practical knowledge
- Providing individual innovation support: capture grassroots innovative ideas and accompany the preparation and implementation of a farmer-led EIP OG (the CAP networks can bring innovation brokers together to learn from each other)
- Development of an innovation support service, capturing bottom-up innovative ideas and helping preparation of OGs[131]
- (Obligatory yearly) training of advisors on specific themes, or learning new approaches and skills (e.g. social farming, digital, short chains, …)
- Advisors providing training to farmers, farm workers etc., writing in agricultural journals
- Advisors joining/organising knowledge exchange events with researchers, farmers etc., making work programmes, exchanging practical needs, Advisors writing in agricultural journals, websites, social media, newsletter, acting as EIP event coordinator
- Advisors leading a multi-actor thematic network (e.g. RMT) at national/regional level, organising a farm demonstration, a fair, winter event or another type of multi-actor event to bring AKIS actors together for all types of knowledge exchange
- Advisors as partner in a research project, communication event,…
- Advisors going abroad to learn and come back to train and disseminate new knowledge ("advisor mobility budget")
- Giving innovation advice linked to investment aid for novel type of investments, fine-tuning the investment and supporting the farmer in his contacts with the company on the use of this investment

It is important to start early with these new approaches, as it might take time to make them known and fully develop the concepts, promote them, and implement the knowledge exchange and information actions according to commitments.

Annex VI. Links to Horizon 2020 and Horizon Europe projects

1. Rural Development interventions under the CAP and the Union Research and Innovation Policy "Horizon 2020/Horizon Europe" complement each other in providing opportunities for EIP interactive innovation groups. The rural development interventions in a CAP plan are applied within a specific programme area, whilst research policy must go beyond this scale by co-funding innovative actions at transnational level.
2. European research policy has become more practice oriented since the introduction of multi-actor projects and thematic networks in the period 2014-2020. This is why it is so **important for NRNs/CAP networks to regularly connect with Horizon Contact Points before consortia are formed. It is equally essential for them to be proactive in promoting their OGs widely and through a searchable database so that researchers interested in finding OGs can be helped**.
3. **Synergies and complementarities have been developed between the research and CAP policy. The EIP network and the common format for informing and reporting on OGs and**

[131] https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-brochure-innovation-support-services and https://www.youtube.com/watch?v=pTV6kLH0ykg&feature=youtu.be

multi-actor projects will continue to play an important connecting role between OGs with Horizon research consortia on specific topics.

4. **Horizon Europe thematic networks**[132] are a particular format of multi-actor projects that aim to develop ready-made material for practice or training/education, such as info sheets in a common format and audio-visual material. This material should be easily understandable, stay available beyond the project period, and is to be shared through the EIP network. Dedicated thematic networks can from 2021 be built on the collaboration of OGs acting upon a common theme.
5. A newly developed format are the **advisory networks**, which interconnect advisors across Europe on dedicated themes. This will help knowledge exchange across borders and Member States' AKIS.

Annex VII. Common format for the output of EIP OG projects

See SFC guidance on OG data as presented in the CAP Committee on 16 May and 29 June 2023 (final)

[132] https://www.youtube.com/watch?v=gv5fqGnKtmI

Annex 2 AKIS related part of the CAP Strategic Plan regulation

ANNEX

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

TITLE I

SUBJECT MATTER AND SCOPE, APPLICABLE PROVISIONS AND DEFINITIONS

Article 3

Definitions

For the purposes of this Regulation, the following definitions shall apply:

(9) 'AKIS' means the combined organisation and knowledge flows between persons, organisations and institutions who use and produce knowledge for agriculture and interrelated fields (Agricultural Knowledge and Innovation System);

TITLE II

OBJECTIVES AND INDICATORS

Recital 50

Member States should ensure that there are **farm advisory services tailored to the various types of production** for the purpose of improving the sustainable management and overall performance of agricultural holdings and rural businesses, covering economic, environmental and social dimensions, and of **identifying the necessary improvements as regards all measures at farm level** provided for in the CAP Strategic Plans…. Advice should also be available on the management of risks and **innovation support for preparing and implementing emerging EIP operational group projects, whilst capturing and making use of grassroot innovative ideas**. In order to enhance the quality and effectiveness of the advice, Member States should integrate all public and private advisors and advisory networks within the Agricultural Knowledge and

Innovation Systems (AKIS), in order to be able to **deliver up-to-date technological and scientific information developed by research and innovation**.

Recital 51

In order to **support both the agronomic and the environmental performance of farms, information on nutrient management, with focus on nitrogen and phosphate** which are the nutrients that from an environmental perspective can pose particular challenges and therefore deserve particular attention, should be provided with the help of **a dedicated electronic Farm Sustainability Tool** made available by the Member States to individual farmers…. should provide **on-farm decision support**…

Recital 52

In order to better inform and advise farmers on their obligations towards their workers with regard to the social dimension of the CAP, the farm advisory services should inform about the requirements regarding the provision, in writing, of the information referred to in Article 4 of Directive (EU) 2019/1152 and on the health and safety standards which are applicable on farms.

Recital 69

Types of **intervention in certain sectors**… the establishment of specific interventions is deemed to have beneficial effects on the achievement of some or all of the general and specific objectives of the CAP pursued by this Regulation….. those benefits **should be promoted to farmers through, inter alia, the farm advisory services**.

Article 5

General objectives

In accordance with the objectives of the CAP set out in Article 39 TFEU, with the objective to maintain the functioning of the internal market and a level playing field between farmers in the Union and with the principle of subsidiarity, support from the EAGF and the EAFRD shall aim to further improve the sustainable development of farming, food and rural areas and shall contribute to achieving the following general objectives in the economic, environmental and social spheres, which will contribute to the implementation of the 2030 Agenda for Sustainable Development:

(a) to foster a smart, competitive, resilient and diversified agricultural sector ensuring long-term food security;

(b) to support and strengthen environmental protection, including biodiversity, and climate action and to contribute to achieving the environmental and climate-related objectives of the Union, including its commitments under the Paris Agreement

(c) to strengthen the socio-economic fabric of rural areas

Article 6

Specific objectives

1. The achievement of the general objectives shall be pursued through the following specific objectives:

(a) to support viable farm income and resilience of the agricultural sector across the Union in order to enhance long-term food security and agricultural diversity as well as to ensure the economic sustainability of agricultural production in the Union;

(b) to enhance market orientation and increase farm competitiveness both in the short and long term, including greater focus on research, technology and digitalisation;

(c) to improve the farmers' position in the value chain;

(d) to contribute to climate change mitigation and adaptation, including by reducing greenhouse gas emissions and enhancing carbon sequestration, as well as to promote sustainable energy;

(e) to foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency;

(f) to contribute to halting and reversing biodiversity loss, enhance ecosystem services and preserve habitats and landscapes;

(g) to attract and sustain young farmers and new farmers and facilitate sustainable business development in rural areas;

(h) to promote employment, growth, gender equality, including the participation of women in farming, social inclusion and local development in rural areas, including the circular bio-economy and sustainable forestry;

(i) to improve the response of Union agriculture to societal demands on food and health, including high-quality, safe and nutritious food produced in a sustainable way, to reduce

food waste, as well as to improve animal welfare and to combat antimicrobial resistance.

2. The objectives set out in paragraph 1 shall be complemented and interconnected with the cross-cutting objective of modernising agriculture and rural areas by fostering and sharing of knowledge, innovation and digitalisation in agriculture and rural areas and by encouraging their uptake by farmers, through improved access to research, innovation, knowledge exchange and training.

3. When pursuing the specific objectives set out in paragraphs 1 and 2, Member States, with the support of the Commission, shall take appropriate measures to reduce the administrative burden and ensure simplification in the implementation of the CAP.

TITLE III

COMMON REQUIREMENTS AND TYPES OF INTERVENTIONS

SECTION 4

FARM ADVISORY SERVICES

Article 15

Farm advisory services

1. Member States shall include in their CAP Strategic Plans a system providing services for advising farmers and other beneficiaries of CAP support on land management and farm management (‘farm advisory services’). Member States may build upon existing systems.

2. The farm advisory services shall cover economic, environmental and social dimensions, taking into account existing farming practices, and deliver up-to-date technological and scientific information developed by means of research and innovation projects, including as regards the provision of public goods.

   Through the farm advisory services, appropriate assistance shall be offered along the cycle of the farm development, including for the setting-up for the first time, conversion of production patterns towards consumer demand, innovative practices, agricultural techniques for resilience to climate change, including agroforestry and agroecology, improved animal welfare, and where necessary safety standards and social support.

Farm advisory services shall be integrated within the interrelated services of farm advisors, researchers, farmer organisations and other relevant stakeholders that form the AKIS.

3. Member States shall ensure that the advice given is impartial and that advisors are suitably qualified, appropriately trained and have no conflict of interest.

4. The farm advisory services shall be adapted to the various types of production and farms and shall cover at least the following:

   (a) all requirements, conditions and management commitments applying to farmers and other beneficiaries set in the CAP Strategic Plan, including requirements and standards under conditionality and conditions for interventions, as well as information on financial instruments and business plans established under the CAP Strategic Plan;

   (b) the requirements laid down by Member States for implementing Directive 92/43/EEC, Directive 2000/60/EC, Article 55 of Regulation (EC) No 1107/2009 of the European Parliament and of the Council (5), Directive 2008/50/EC of the European Parliament and of the Council (6), Directive 2009/128/EC, Directive 2009/147/EC, Regulation (EU) 2016/429 of the European Parliament and of the Council (7), Regulation (EU) 2016/2031 of the European Parliament and of the Council (8) and Directive (EU) 2016/2284 of the European Parliament and of the Council (9);

   (c) farm practices preventing the development of antimicrobial resistance as set out in Commission communication of 29 June 2017 entitled ‘A European One Health Action Plan against Antimicrobial Resistance (AMR)’;

(d) risk prevention and management;
(e) innovation support, in particular for preparing and for implementing the projects of the EIP operational groups referred to in Article 127(3);
(f) digital technologies in agriculture and rural areas as referred to in Article 114, point (b);
(g) sustainable management of nutrients, including at the latest as from 2024 the use of a Farm Sustainability Tool for Nutrients, which is any digital application that provides at least:
   (i) a balance of the main nutrients at field scale;
   (ii) the legal requirements on nutrients;
   (iii) soil data, based on available information and analyses;
   (iv) data from the integrated administration and control system (IACS) relevant for nutrient management;
   (v) conditions of employment, employer obligations, occupational
(h) health and safety and social support in farming communities.

[1]2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (OJ L 344, 17.12.2016, p. 1)

CHAPTER IV

TYPES OF INTERVENTIONS FOR RURAL DEVELOPMENT

SECTION 1

TYPES OF INTERVENTIONS

Article 73

Investments

1. Member States may grant support for investments under the conditions set out in this Article and as further specified in their CAP Strategic Plans.

4. Member States shall limit the support to one or more rates not exceeding 65 % of the eligible costs.

   The maximum support rates may be increased:

   (a) up to 80 % for the following investments:
      (i) investments linked to one or more of the specific objectives set out in Article 6(1), points (d), (e) and (f) and, as regards animal welfare, in Article 6(1), point (i)
      (ii) investments by young farmers who fulfil the conditions provided for by Member States in their CAP Strategic Plans in accordance with Article 4(6);
      (iii) investments in the outermost regions or the smaller Aegean islands;
   (b) up to 85 % for investments of small farms, as determined by Member States;
   (c) up to 100 % for the following investments:
      (i) afforestation, establishment and regeneration of agro-forestry systems, land consolidation in forestry and non-productive investments linked to one or more of the specific objectives set out in Article 6(1), points (d), (e) and (f), including non-productive investments aimed at protecting livestock and crops against damage caused by wild animals;
      (ii) investments in basic services in rural areas and infrastructure in agriculture and forestry, as determined by Member States;
      (iii) investments in the restoration of agricultural or forestry potential following natural disasters, adverse climatic events or catastrophic events and

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investments in appropriate preventive actions, as well as investments in maintaining the health of forests;

(iv) non-productive investments supported through community-led local development strategies set out in Article 32 of Regulation (EU) 2021/1060 and the projects of EIP operational groups as referred to in Article 127(3) of this Regulation.

Article 77

Cooperation

1. Member States may grant support for cooperation under the conditions set out in this Article and as further specified in their CAP Strategic Plans to**:**

   (a) prepare and implement the projects of the EIP operational groups referred to in Article 127(3);

   (b) prepare and implement LEADER;

   (c) promote and support quality schemes recognised by the Union or by the Member States and their use by farmers;

   (d) support producer groups, producer organisations or interbranch organisations;

   (e) prepare and implement smart-village strategies, as determined by Member States;

   (f) support other forms of cooperation.

2. Member States may only grant support under this Article to promote new forms of cooperation, including existing ones if starting a new activity. That cooperation shall involve at least two actors and shall contribute to achieving one or more of the specific objectives set out in Article 6(1) and (2).

3. Member States may cover under this Article the costs related to all aspects of the cooperation.

4. Member States may grant the support as an overall amount under this Article covering the costs of cooperation and the costs of the operations implemented, or they may cover only the costs of cooperation and use funds from other types of intervention for rural development, or from other national or Union support instruments, to cover the costs of the operations implemented.

Where support is paid as an overall amount, Member States shall ensure that the operation implemented complies with the relevant rules and requirements laid down in Articles 70 to 76 and 78.

In the case of LEADER, by way of derogation from the first subparagraph of this paragraph:

(a) support for all costs eligible for preparatory support under Article 34(1), point (a), of Regulation (EU) 2021/1060 and for implementing selected strategies under points (b) and (c) of that paragraph shall only be granted as an overall amount under this Article; and

(b) Member States shall ensure that implemented operations which consist of investments comply with the relevant Union rules and requirements under the type of intervention for investments laid down in Article 73 of this Regulation.

5. Member States shall not support through this type of interventions cooperation solely involving research bodies.

Article 78

Knowledge exchange and dissemination of information

1. Member States may grant support for knowledge exchange and dissemination of information under the conditions set out in this Article and as further detailed in their CAP Strategic Plans with a view to contributing to achieving one or more of the specific objectives set out in Article 6(1) and (2) while specifically targeting the protection of nature, environment and climate, including environmental education and awareness actions and the development of rural businesses and communities.

2. Support under this Article may cover the costs of any relevant action to promote innovation, training and advice and other forms of knowledge exchange and dissemination of information, including through the drawing up and updating of plans and studies with the aim of knowledge exchange and dissemination of information. Such actions shall contribute to achieving one or more of the specific objectives set out in Article 6(1) and (2).

3. Support for advisory services shall only be granted for advisory services that comply with Article 15(3

4. For the setting up of advisory services, Member States may grant support in the form of a fixed amount of a maximum of EUR 200 000. They shall ensure that support is limited in time.

5. Member States shall ensure that actions supported under this type of intervention are based on, and are consistent with, the description of the AKIS provided in their CAP Strategic Plans in accordance with Article 114, point (a)(i);

TITLE IV

FINANCIAL PROVISIONS

Article 91

EAFRD contribution rates

1. The CAP Strategic Plans shall establish, at regional or national level, a single EAFRD contribution rate applicable to all interventions.

2. By way of derogation from paragraph 1, the maximum EAFRD contribution rate shall be:

   (a) 85 % of the eligible public expenditure in less developed regions;

   (b) 80 % of the eligible public expenditure in the outermost regions and in the smaller Aegean islands;

   (c) 60 % of the eligible public expenditure in transition regions within the meaning of Article 108(2), first subparagraph, point (b), of Regulation (EU) 2021/1060;

   (d) 43 % of the eligible public expenditure in the other regions;

   The minimum EAFRD contribution rate shall be **[**20 %**]**.

3. By way of derogation from paragraphs 1 and 2, the maximum EAFRD contribution rate shall, if the rate set in the CAP Strategic Plan in accordance with paragraph 2 is lower, be:

   (a) 65 % of the eligible public expenditure for payments for natural or other area-specific constraints under Article 71;

   (b) 80 % of the eligible public expenditure for payments under Article 70, for payments under Article 72, for support for non-productive investments referred to in Article 73, for support for the projects of the EIP operational groups under Article 77(1), point (a), and for LEADER under Article 77(1), point (b);

(c) 100 % of the eligible public expenditure for operations receiving funding from funds transferred to the EAFRD in accordance with Articles 17 and 103

4. The minimum EAFRD contribution rate shall be 20 % of the eligible public expenditure.

5. The eligible public expenditure referred to in paragraphs 2, 3 and 4 shall exclude the additional national financing referred to in Article 115(5).

TITLE V

CAP STRATEGIC PLAN

CHAPTER II

CONTENT OF THE CAP STRATEGIC PLAN

Article 107

Content for the CAP Strategic Plans

1. Each CAP Strategic Plan shall contain sections on the following:

(a) the assessment of needs;

(b) the intervention strategy;

(c) the elements common to several interventions;

(d) the direct payments, interventions in certain sectors and interventions for rural development specified in the strategy;

(e) target and financial plans;

(f) the governance and coordination system;

(g) the elements that ensure modernisation of the CAP.

(h) where elements of the CAP Strategic Plan are established at regional level, a short description about the Member State’s national and regional set-up, and in particular which elements are established at national and at regional level;

2. Each CAP Strategic Plan shall contain the following annexes:

(a) Annex I on the ex-ante evaluation and the strategic environmental assessment (SEA) referred to in Directive 2001/42/EC of the European Parliament and of the Council (17);

(b) Annex II on the SWOT analysis;

(c) Annex III on the consultation of the partners;

(d) where relevant, Annex IV on the crop-specific payment for cotton;

(e) Annex V on the additional national financing provided within the scope of the CAP Strategic Plan;

(f) where relevant, Annex VI on transitional national aid.

3. Detailed rules for the content of the sections and the annexes of the CAP Strategic Plans referred to in paragraphs 1 and 2 are laid down in Articles 108 to 115.

Article 114

Modernisation

The section on the elements that ensure modernisation of the CAP referred to in Article 107(1), point (g), shall highlight the elements of the CAP Strategic Plan that support the modernisation of the agriculture and rural areas and the CAP, and shall contain in particular:

(a) an overview of how the CAP Strategic Plan will contribute to the achievement of the cross-cutting objective set out in Article 6(2), in particular through:

(i) a description of the organisational set-up of the AKIS

(ii) a description of how advisory services as referred to in Article 15, research and the national CAP network referred to in Article 126 will cooperate to provide advice, knowledge flows and innovation services and how the actions supported under interventions pursuant to Article 78 or other relevant interventions are integrated into the AKIS;

(b) a description of the strategy for the development of digital technologies in agriculture and rural areas and for the use of those technologies to improve the effectiveness and efficiency of the CAP Strategic Plan interventions;

Article 115

Annexes

1. Annex I to the CAP Strategic Plan referred to in Article 107(2), point (a), shall include a summary of the main results of the ex-ante evaluation referred to in Article 139 and the SEA referred to in Directive 2001/42/EC and how they have been addressed or a justification of why they have not been taken into account, and a link to the complete ex-ante evaluation report and SEA report.

2. Annex II to the CAP Strategic Plan referred to in Article 107(2), point (b), shall include a SWOT analysis of the current situation of the area covered by the CAP Strategic Plan.

   The SWOT analysis shall be based on the current situation of the area covered by the CAP Strategic Plan and shall comprise, for each specific objective set out in Article 6(1) and (2), an overall description of the current situation of the area covered by the CAP Strategic Plan, based on common context indicators and other quantitative and qualitative up-to-date information such as studies, past evaluation reports, sectoral analyses and lessons learned from previous experiences.

   Where relevant, the SWOT analysis shall include an analysis of territorial aspects, including regional specificities, highlighting those territories specifically targeted by interventions, and an analysis of sectoral aspects, in particular for those sectors that are subject to specific interventions or programmes.

   In addition, that description shall, in particular, highlight in relation to each general and specific objective set out in Article 5 and Article 6(1) and (2):

   (a) strengths identified in the CAP Strategic Plan area;
   (b) weaknesses identified in the CAP Strategic Plan area;
   (c) opportunities identified in the CAP Strategic Plan area;
   (d) threats identified in the CAP Strategic Plan area.

   For the specific objectives set out in Article 6(1), points (d), (e) and (f), the SWOT analysis shall refer to the national plans emanating from the legislative acts listed in Annex XIII.

   For the specific objective set out in Article 6(1), point (g), the SWOT analysis shall include a short analysis of access to land, land mobility and land restructuring, access to finance and credits, and access to knowledge and advice.

   For the cross-cutting objective set out in Article 6(2), the SWOT analysis shall also provide relevant information about the functioning of the AKIS and related structures.

3. Annex III to the CAP Strategic Plan referred to in Article 107(2), point (c), shall include the outcomes of the consultation of the partners, and in particular the relevant authorities at regional and local level, and a brief description of how the consultation was carried out.

4. Annex IV to the CAP Strategic Plan referred to in Article 107(2), point (d), shall provide a brief description of the crop-specific payment for cotton and its complementarity with the other CAP Strategic Plan interventions

5. Annex V to the CAP Strategic Plan referred to in Article 107(2), point (e), shall contain the following:

(a) a short description of additional national financing for interventions in rural development laid down in Title III, Chapter IV, which is provided within the scope of the CAP Strategic Plan, including the amounts per intervention and indication of compliance with the requirements under this Regulation;

(b) an explanation of the complementarity with the CAP Strategic Plan interventions;

(c) an indication as to whether the additional national financing falls outside the scope of Article 42 TFEU and is subject to State aid assessment; and

(d) the national financial assistance in the fruit and vegetables sector referred to in Article 53.

6. Annex VI to the CAP Strategic Plan referred to in Article 107(2), point (f), shall contain the following information as regards transitional national aid:

(a) the annual sector-specific financial envelope for each sector for which transitional national aid is granted;

(b) where relevant, the maximum unit rate of support for each year of the period;

(c) where relevant, information as regards the reference period modified in accordance with Article 147(2), second subparagraph;

(d) a brief description of the complementarity of the transitional national aid with CAP Strategic Plan interventions.

Article 126

National and European CAP networks

1. Each Member State shall establish a national network for the common agricultural policy (‘national CAP network’) for the networking of organisations and administrations, advisors, researchers and other innovation actors, and other actors in the field of agriculture and rural development at national level at the latest 12 months after the approval by the Commission of the CAP Strategic Plan. The national CAP networks shall build on the existing networking experience and practices in the Member States.

2. The Commission shall establish a European network for the common agricultural policy (‘European CAP network’) for the networking of national networks, organisations, and administrations in the field of agriculture and rural development at Union level.

3. Networking through the national and European CAP networks shall have the following objectives:

   (a) increase the involvement of all relevant stakeholders in the implementation of CAP Strategic Plans and, where relevant, in their design;

   (b) accompany the Member States’ administrations in the implementation of CAP Strategic Plans and the transition to a performancebased delivery model;

   (c) contribute to improving the quality of implementation of CAP Strategic Plans;

   (d) tribute to the information of the public and potential beneficiaries on the CAP and funding opportunities;

   (e) foster innovation in agriculture and rural development and support peer-to-peer learning and the inclusion of, and the interaction between, all stakeholders in the knowledge-exchange and knowledge-building process;

   (f) contribute to the dissemination of CAP Strategic Plans results;

4. The tasks of the CAP Networks for the achievement of the objectives set out in paragraph 3 shall be the following:

   (a) collection, analysis and dissemination of information on actions and good practices implemented or supported under CAP Strategic Plans as well as analysis on developments in agriculture and rural areas relevant to the specific objectives set out in Article 6(1) and (2);

(b) contribution to capacity building for Member States administrations and of other actors involved in the implementation of CAP Strategic Plans, including as regards monitoring and evaluation processes;

(c) creation of platforms, fora and events to facilitate exchanges of experience between stakeholders and peer-to-peer learning, including where relevant exchanges with networks in third countries;

(d) collection of information and facilitation of its dissemination as well as networking of funded structures and projects, such as local action groups referred to in Article 33 of Regulation (EU) 2021/1060, EIP operational groups referred to in Article 127(3) of this Regulation and equivalent structures and projects;

(e) support for cooperation projects between EIP operational groups referred to in Article 127(3) of this Regulation, local action groups referred to in Article 33 of Regulation (EU) 2021/1060 or similar local development structures, including transnational cooperation;

(f) creation of links to other Union-funded strategies or networks;

(g) contribution to the further development of the CAP and preparation of any subsequent CAP Strategic Plan period;

(h) in the case of national CAP networks, participating in, and contributing to, the activities of the European CAP network;

(i) in the case of the European CAP network, cooperating with, and contributing to, the activities of the national CAP networks.

5. The Commission shall adopt implementing acts setting out the organisational structure and operation of the European CAP network. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 153(2)

Article 127

European Innovation Partnership for agricultural productivity and sustainability

1. The aim of the European Innovation Partnership for agricultural productivity and sustainability (EIP) shall be to stimulate innovation and improve the exchange of knowledge.

The EIP shall support the AKIS, by connecting policies and instruments to speed up innovation.

2. The EIP shall contribute to achieving the specific objectives set out in Article 6(1) and (2).

It shall in particular:

(a) create added value by better linking research and farming practice and encouraging the wider use of available innovation measures;

(b) connect innovation actors and projects;

(c) promote the faster and wider transposition of innovative solutions into practice, including farmer-to-farmer exchange; and

(d) inform the scientific community about the research needs of farming practice;

3. EIP operational groups supported under the cooperation type of intervention referred to in Article 77 shall form part of the EIP. Each EIP operational group shall draw up a plan for an innovative project to be developed or implemented. The innovative project shall be based on the interactive innovation model which has as key principles:

(a) developing innovative solutions focusing on farmers' or foresters' needs while also tackling the interactions across the whole supply chain where useful;

(b) bringing together partners with complementary knowledge such as farmers, advisors, researchers, enterprises or non-governmental organisations in a targeted combination as best suited to achieve the project objectives; and

(c) co-deciding and co-creating all along the project.

EIP operational groups may act at transnational, including cross-border, level. The envisaged innovation may be based on new practices, but also on traditional practices in a new geographical or environmental context.

EIP operational groups shall disseminate a summary of their plans and of the results of their projects, in particular through the national and European CAP networks.

SCAR
Standing Committee
on Agricultural Research

Annex 3 Evaluation support study on the CAP's impact on knowledge exchange and advisory activities

European Commission

Evaluation support study - Nov 2020

The CAP's impact on knowledge exchange and advice

Why do we need knowledge exchange and advice in agriculture and forestry?

Although since the 1960s agricultural innovations enabled to achieve major productivity gains to feed the entire European population at a decent price, this has not been without consequences for the environment and society. *Pressure on natural resources and biodiversity, climate change, lack of resilience of specialised farms, increasing dependence to inputs, instability of globalised markets, food safety issues, ethics, and animal welfare…* the problems associated with productivity-oriented production systems are numerous. Yet, the global demand for agricultural products continues to increase.

This overall situation calls for a deep re-assessment of the European way of "doing agriculture". Beyond the respect of the numerous existing standards set by the EU for good agricultural practices, substantial change of the production systems – technical as well as organisational change – are needed to face the dual challenge of sufficient food production and sustainability. A far-reaching mission relying on the shoulders of our farmers…

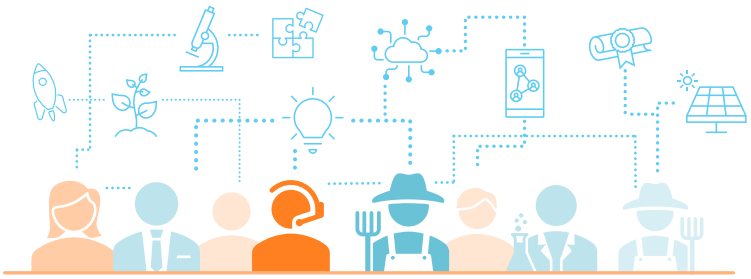
We then understand the **growing political will to foster knowledge exchange and innovation** to develop viable solutions for the sector. Training, information and advice are the common way farmers can build new skills and keep up to date on the last innovations to improve their activity. But new approaches to knowledge production, diffusion and utilisation are also needed – to keep pace with the evolution of the farming profession, and to overcome the bottlenecks that can exist in linear knowledge transfer models (from scientists to the users).

A new strategic priority: a well-functioning AKIS in each Member State

Knowledge exchange and innovation is actually very complex to capture. Those activities can take an infinity of different forms (from the formal training, or individual on-farm advice, to the information found in agricultural press, discussion with the neighbouring peer, and collaborative innovation projects). They imply many actors with different roles, interacting in various ways with each other and with farmers.

A very useful concept elaborated to describe the knowledge exchange and innovation system of a Member State is the **'AKIS'**. This concept is a powerful tool to approach the issue of **information flows between actors**, which are key to respond to numerous issues of the agricultural sector, and to achieve the EU Common Agricultural Policy's (CAP) objectives.

The AKIS concept is gradually gaining in maturity, but remains for the moment rather limited to academic research, and is very little known and used by Member States' decision-makers. It is unfortunate considering how a better functioning AKIS could help to tackle the sector's challenges with holistic, comprehensive approaches. Presently, coordination and exchange between stakeholders are often limited, which in many cases is one reason why promising technologies are not adopted very quickly, why policies seem to be ineffective, or why changes in consumer demand seem to take farmers by surprise sometimes.



AKIS you said?

Indeed, for an Agricultural Knowledge and Innovation System. Which means:

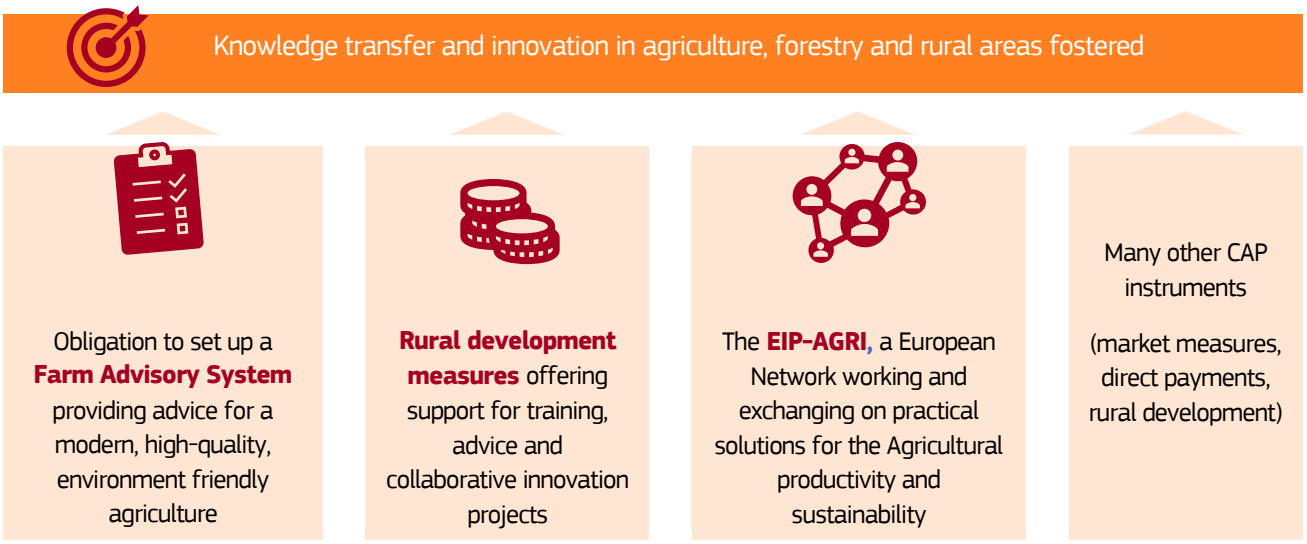
- ✓ a set of **actors** and the **interactions** between them,
- ✓ engaged in the generation, transformation, diffusion, storage and utilisation of knowledge and information,
- ✓ with the purpose of working together to support decision making, problem solving and innovation in agriculture.

All farmers, and every person and organisation working in or accompanying the agricultural sector – being supplier, retailer, advisor, trainer, researcher, NGO, media, public authority and many others – are part of the AKIS.

The AKIS of a country or a region can be strong (having important resources), or weak (facing financial or technical constraints). It can also be integrated if the actors do interact actively (many information flows), or fragmented if there are very few interactions.

What intervention of the CAP?

With its 2013 reform, the EU Common Agricultural Policy has integrated those preoccupation in its objectives and priorities. Thus, among all its instruments and measures provisioned for the **2014-2020 programming period**, a number concern knowledge exchange, innovation and advice.



As part of the Horizontal Regulation setting rules on the managing and financing of the CAP, all Member States have the obligation to set up a **Farm Advisory System (FAS)** covering EU legal standards for modern, high-quality and environment friendly agriculture, including the standards covered by cross-compliance. This obligation was introduced in the CAP in 2005, but its scope was enlarged in 2013, to cover new topics such as advice on the greening, the Water Framework Directive, and Integrated Pest Management for instance. It is aimed at raising awareness of farmers and CAP beneficiaries on the relationship between agricultural practices on the one hand, and the environment, climate change, food safety, public/plant/animal health and animal welfare on the other.

Within the Pilar 2, Member States / regions can pick up specific **rural development (RD) measures** to offer public financial support to training, advice, and innovation projects. This support is financed by the European Agricultural Fund for Rural Development (EAFRD) - jointly to national funding. The three most important measures are:

- The **measure on training** (M1), supporting training activities, information, demonstrations, exchange, and visits
- The **measure on advice** (M2), supporting the use of advice, the setting up of farm advice, and the training of advisors
- The **measure on innovation through cooperation** (M16), supporting the setting-up of EIP Operational Groups, and the implementation of pilot projects testing new co-created practical solutions

The choice of RD measures by each Member State is based on a SWOT analysis to identify the needs to address in priority.

At the crossroads of the CAP and Horizon 2020 (the 'research' component of Europe 2020 strategy) is the European Innovation Partnership for Agricultural productivity and sustainability (shortly, **EIP-Agri**). This partnership, created in 2012, aims to find innovative practical solutions. It acts as an interface between agriculture and science at regional, national and EU levels. In this framework, a variety of stakeholders assemble into Operational Groups (OG) to work on specific issues arising directly from the field. The results of all OG projects are shared all over Europe to create a network of knowledge. The EIP-Agri is coordinated by Rural Networks, with the support of innovation facilitators and service points.

Many other CAP tools may have their contribution, including a market measure supporting innovation in the wine sector, several other rural development measures, and the direct payments to farmers with the new agricultural standards requiring knowledge update and advice. Minimum level of qualification and training is also required to benefit some CAP aids (e.g. for investments, or young farmers' start up), which encourages the improvement of skills.

And for what impact?

This question was subject to an evaluation support study carried out end of 2019, based on an extensive desk review, combined with field work. Data from multiple sources of information (quantitative and qualitative) were collected at EU level and in eight case study Member States: Estonia, Belgium (Flanders), France, Germany, Greece, Ireland, Italy and Poland.

The evaluation examines how the CAP provisions materialised regarding knowledge exchange, innovation and advice in agriculture, forestry and rural areas across the EU. It also assesses the effectiveness, efficiency, relevance, coherence and value added of these instruments, with a view to draw recommendations for the EC and Member States to possibly improve these instruments and their implementation in the future CAP.

How does the CAP operate within Member States' AKIS?

Because of the tremendous diversity of AKISs across EU, the set of CAP instruments and measures chosen by Member States and how they are used is very heterogeneous. No typical CAP support scheme could be associated with a type of AKIS. Even the FAS obligation is met very differently by Member States.

The way an AKIS is structured, as well as the way the CAP is used in a Member State, is actually sooner influenced by historical factors (including the advice's privatisation trend in the 1980s, and how the CAP was previously implemented), cultural, legal and institutional context, the available resources, and the specific needs in economic, social and environmental terms. Thus, CAP instruments indeed affect Member States' AKIS, but it only concerns a small (to very small) part of AKIS, parallel to a plethora of other elements.

Considering this diversity in AKISs and CAP use, it is hard to make detailed general conclusions about the success of the measures at a European scale. Nevertheless, some success has undoubtedly been achieved. Indeed **the CAP instruments and measures were found to contribute to foster knowledge exchange, innovation and advice in rural areas**. In some cases the AKIS is highly reliant upon CAP funding to operate, while in others CAP funding is much less a factor and it is more the impact of the types of measure which is deemed significantly to improve AKIS functioning.

A look at the following aspects helps to better understand where progress was made, and which challenges remain for the future.

The CAP contributes to a better functioning of AKIS

Overall, the CAP toolbox allows to meet the needs of the sector

Both the Farm Advisory System and RD measures are designed in such a way that **all the topics relevant to agriculture and forestry can be covered**, being the classic, more technical/economic topics or the new societal challenges. The CAP especially encouraged the development of services on topics of common public interest, such as environmental issues, and helped to rise the farmers' awareness on these generally less asked topics.

Also, the possibilities for rural development support have been extended to cover **new types of activities**, such as information and demonstration activities, visits and exchanges at farm level, the training of advisors, and the setting-up and operation of EIP Operational Groups (a brand new approach). However some activities (like small group advice, or webinars and online courses) and some potential beneficiaries remain difficult to include under the RD support.

Finally, the new obligation for Member States / regions to conduct a SWOT analysis before drawing their rural development programme made it possible **to explicitly identify the needs** and refocus knowledge exchange, innovation and advisory activities on certain specific themes accordingly.

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Adaptation to climate change is among the new needs of farmers, as well as limiting pesticides' use, anticipating the glyphosate ban, or managing professional stress.

The CAP support helped to reach higher achievements in knowledge exchange and advice

The CAP budget allocated to knowledge transfer and advice (under Rural Development measures) decreased compared to the previous CAP period (2007-2013). Nevertheless, despite limited financial allocation and administrative burden in implementation, these measures showed positive results.

All case studies discuss and validate that CAP funding enables additional achievements to be performed (also in comparison to what would have been achieved only with national budgets) and new services to be proposed. With a great variety among the different Member States and regions, additional offer, more localised services, and cost-support to the farmers (making training and advice more attractive) have been reported. In parallel, thanks to the FAS, farmers are better informed both on the service offer and the new issues to face, which may increase their participation to training, information and advice. In addition, thanks to the regular training of advisors required by both the FAS and rural development, the quality of services is enhanced, and the content is up-to-date.

Through those measures, the CAP promotes and encourages lifelong learning and vocational training. It has also supported the entry of adequately skilled farmers into the agricultural sector. With starting up young farmers holding higher degrees than their elders, the education level of farm managers has progressed.

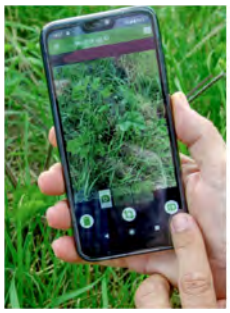
Speaking about impact, some case studies where RD measures' implementation is already advanced illustrate that the CAP has fostered the adoption by farmers of obligatory standards, but also led to the improvement of farming practices and management on a variety of other topics beyond those standards.

It should be noted that, for both the FAS and the supported training activities, robust data on the number of participants are missing (for different reasons). It is then hard to draw precise quantitative conclusions. For the supported advice (M2 of Rural Development), the results are above expectations notwithstanding the reduction in budget and the limited implementation of the advice measure up to end of 2018.

Bottom-up approach to innovation is highly promising

With the 2013 CAP reform the EIP-Agri was created, a platform that incentivises different stakeholder groups to form operational groups (OGs) to tackle problems arising directly from the ground, at the request of farmers. With this bottom-up approach, the solutions developed are adapted to farmers' needs (as co-creators), and the adoption of those innovations is accelerated. The Operational Groups are supported by the CAP (through its RD measure on cooperation) for their set-up and the operation of their projects. The cooperation measure (M16) was largely mobilised by Member States, and the allocated budget increased five-fold compared to 2007-2013 to cover those new activities related to the EIP-Agri.

The added value of the EIP-Agri and Operational Groups approach is highly recognised, by all stakeholders and decision-makers. The success of the EIP-Agri considerably lies with "innovation service points" playing a brokering role for the formation of the OG and the project elaboration.

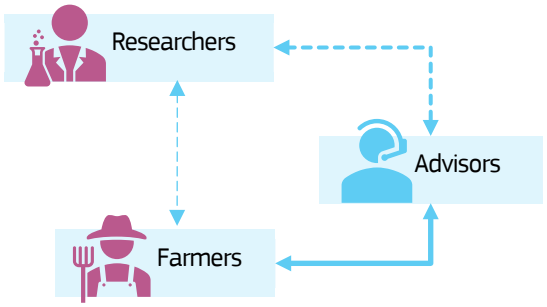


Yet there is still room for improvement

Information is not flowing that much

A cornerstone of AKIS is the information flow between stakeholder groups. But despite the success of the EIP-Agri approach, it appeared in case studies that making an effective link between research and farmers is actually a challenge in all Member States. Also, the information flow between researchers and advisors is often weak. And the information flow between advisors and farmers is generally good but depends on the number and quality of impartial advisors, and in some Member States where advice is charged for, on the ability of farmers to pay for the service.

Actually, there is still a comparably small share of farmers that participates in OGs, since for many farmers and foresters the effort (especially regarding time) often appears too big. Also, the dissemination of results between OGs and across borders remains limited.



Some farmers stay "out of the loop"

A further factor impeding the development of strong, resilient innovation systems in many Member States is the limited reach of implemented actions (around 10% of CAP beneficiaries participate in CAP-funded activities). No precise figure does exist, but it is estimated that only 20 to 25% of farmers have more than a basic agricultural training across EU.

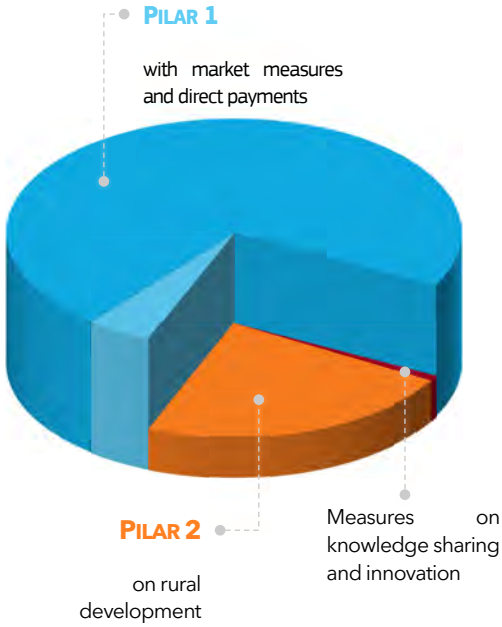
Some "hard to reach" farmer groups have little trust in advisory services and are generally more sceptical towards innovation or cooperation with other stakeholders. A quite significant portion simply does not see any interest in training or is reluctant to the idea of "going back to school". The limited participation to activities on sustainability issues can partly be explained by a lack of awareness or personal interest for some farmers; but a considerable factor is most of all the lack of time and the need to prioritise which activities to attend. Thus, topics focusing more directly on productive and income-generating practices are generally preferred.

The hard-to-reach can also be smaller or more vulnerable agricultural workers (youth, part-time farmers, women) with little resources to participate in knowledge exchange and innovation activities, but would wish to.

Of course all farmers not taking part of CAP activities are not out of the AKIS: some are part of networks, attend to other public-funded or private activities, or benefit from services provided by supply chain actors and from peer-to-peer exchanges. They do not seek any CAP support or advice from the Farm Advisory System.

The administrative burden is disproportionate to the limited budgets allocated

Rather small share of total RD budget is used for activities directly targeted at improving knowledge transfer, advice and innovation, even though Member States usually contribute with their national financial resources. The comparably small share of funds dedicated by Member States to an improvement of AKIS indicates that the concept needs to be promoted also among decision makers.



Relatively to this limited budget allocation, the administrative burden associated to CAP-supported activities can be an important challenge. This burden is not that much of an obstacle for farmers, but for Managing authorities and service providers implied in the aid application processes and the monitoring of measures. Public procurement rules, management and control procedures often hampers the implementation and limits flexibility let to Member States' administrations and advisory/training bodies to create new ideas for instance. The non-predictability of outputs is incidentally inherent to innovation.

The importance of this burden and the effort required should nonetheless be qualified: in some cases, the complexity of implementation was justified by high impact value, and in others, the difficulties mainly came from a lack of experience or capacity of public administrations. For instance, the novelty of the EIP approach calls for a learning process, including in the Operational Groups (where participants are generally not accustomed to managing innovation projects and public support).

Overall the administrative burden of RD measures has limited their use (mostly for training and advice), especially when Member States have the capacity to support these activities with their own funds.

A greater policy coherence could multiply the impact

Even though approaches are made to enhance coherence between the two CAP pillars and individual policy measures, there still seems to be much room for improvement. The integration of instruments is often intended in strategic documents, but do not materialise in concrete realisation. Instruments and measures are generally managed by different competent authorities, and it is often difficult for stakeholders to understand which measures exist and how they are related. Indeed the complementarities and synergies encouraged in regulations and envisaged at the design stage are quite complex and could not always be fully implemented.

Although the internal coherence of rural development (pillar 2) improved compared to 2007-2013, there is still a lack of flexible and combined use of measures, both among knowledge exchange, advice and innovation measures, and with other RD measures. Still, in a few Member States, the support to advice is combined with other measures in "integrated" packages and serves to ensure better results from other measures (for instance innovative investments combined with advice to fine-tune the use of that investment). The role of innovation service points, possibly set up within a National Rural Network, also proved to be really valuable for the implementation of the EIP and the coordination and facilitation of Operational Groups and projects (at Member State and EU levels).

A better coherence was also sought with the other European Structural and Investment Funds (ESF, ERDF, MFF) and the Horizon 2020 programme, but despite common objectives, it is still hard to find strong synergies.

Recommendations

Develop an integrated vision of Member State's AKIS. An appropriation of the concept of AKIS by decision-makers is first necessary. Then, based on an assessment of the existing system, authorities, with stakeholders, shall agree on a short- to medium-term vision, to build a coherent strategy to strengthen and adapt their AKIS to needs. An important focus should be made on information flows between actors.

Strengthen coherence between CAP measures and Member State's AKIS. Based on the comprehensive view of the existing AKIS, CAP measures can be used in line with the national/regional strategy for AKIS built upstream.

Maintain and develop the EIP-AGRI. The EIP-AGRI shows a strong potential for co-creation and adoption of innovations. The EU and Member States should promote more widely the initiative, to increase the farmers' and advisors' involvement, and elaborate strategies for results' dissemination. As newly designed tool, it is interesting to monitor the results and impacts of operational groups.

Foster information flows between advisors and both farmers and research. Considering their role and their direct contact with farmers, advisors could be the perfect link for knowledge dissemination within AKIS. More interactions with research and implication in innovation should be encouraged to exploit the full potential of their role in information flows, and give them a central interface position.

Maintain training and knowledge support for advisors. Higher qualification of advisors proved to improve the quality of advice. In that sense, Member States should be encouraged to link the support of advice to training of advisors.

Build holistic advisory services based on farmers' needs. Advice is ensured on legal requirements, but farmers also seek for advice – adapted to their local context – on the economic and environmental performance of holdings, and on public interest topics.

Promote advisory services and increase the ability of all farmers to access them. Expectations for knowledge exchange, innovation and advice are higher due to the increasing needs expressed by farmers and society. An access to high-quality advice must be guaranteed to all farmers, notably through public support.

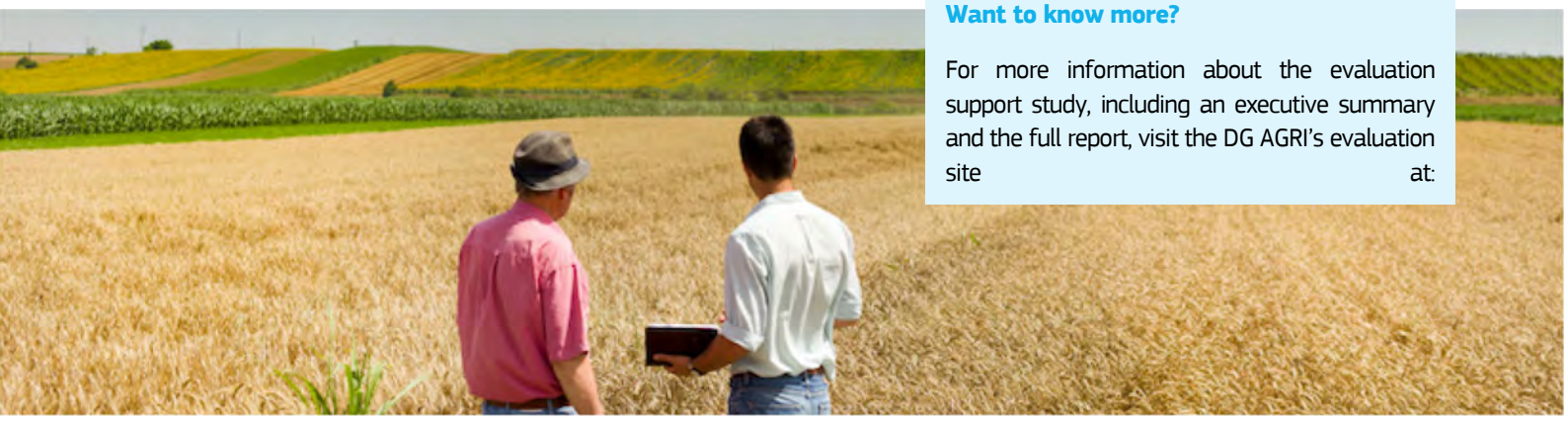
Place more emphasis upon reaching the 'hard to reach'. CAP funding for knowledge exchange and advice should as much as possible reach all farmers, foresters and SMEs to multiply its potential impact. Strategic reflections should also be initiated on the most efficient public/private/hybrid balance for the knowledge exchange and advisory support.

Target beneficiaries based on needs. The EU shall increase the awareness on how CAP measures can target specific groups of beneficiaries. Member States are then encouraged to examine where the needs are higher and elaborate a targeting strategy, with the proper mix of measures.

Support knowledge exchange, innovation and advisory methods based on new technologies. New technologies can help reaching more farmers. CAP measures should enable to support activities making use of such communication technologies (webinars, distant learning but also collaborative work).

Reduce administrative burden. Efforts has already been made but should go on to ease the implementation of measures, their understanding by public administrations and beneficiaries, reduce costs and achieve the objectives.

Revise and specify data collection of CAP monitoring indicators. Some EU monitoring indicators should be more specific, notably with clarified definitions (of beneficiaries, activities covered…) and systematic data collection procedures.



Want to know more?

For more information about the evaluation support study, including an executive summary and the full report, visit the DG AGRI's evaluation site at:

This independent evaluation was carried out on behalf of the European Commission, Directorate-General for Agriculture and Rural Development, between September 2019 and November 2020, by the consultancy consortium ADE – CCRI – OÏR. This paper has been prepared by ADE on the request of the EC; the views expressed are those of the authors and do not represent the official views of the European Commission.

As leading part of this study, ADE wishes to express its deep acknowledgment to all persons and organisations having contributed to this study, including (but not exhaustive): the CCRI, CREA, all country correspondents and their teams for the good conduct of case studies (CCRI – University of Gloucestershire in Ireland, Eleni Papadopoulou in Greece, CREA in Italy, ILVO in Flanders, Thünen Institute in Germany, Barbara Wieliczko and Marek Wigier in Poland, CEE in Estonia), the Steering Group, EC services, FAS coordinating units and managing authorities of EU Member States, other national and regional authorities, and all advisors, trainers, researchers, brokers, representatives, and final beneficiaries that gave some of their precious time to answer our numerous questions.

Annex 4 Concepts and empirical findings to support farm advisory services

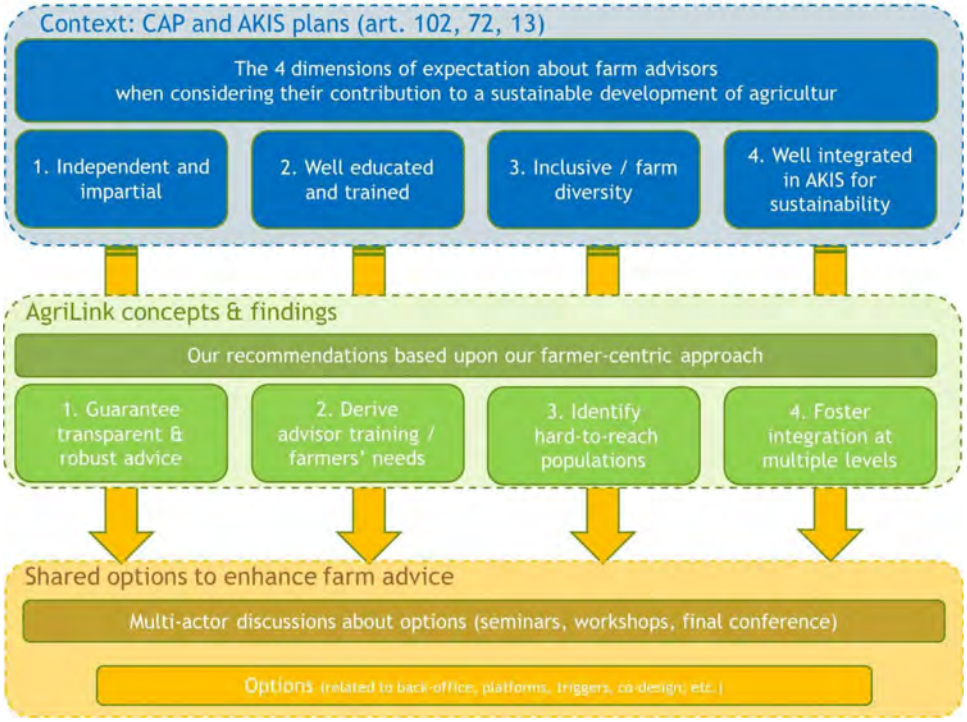
Agrilink project's policy recommendations

Agricultural advisory services play an important role in facilitating innovation and sustainability transitions in the agricultural sector. They are key players in Agricultural Knowledge and Innovation Systems (AKIS), the organisations and infrastructure which facilitate innovation in European agriculture. The Cross-Cutting Objective (CCO) of the Common Agricultural Policy (CAP 2023-2027) focuses on "fostering and sharing of knowledge, innovation and digitalisation in agriculture and rural areas, and encouraging their uptake by farmers, through improved access to research, innovation, knowledge exchange and training" (Art. 6). Farm advisors are central to this CCO. We identified four dimensions embedded in these policies for well-functioning advisory services:

- **Dimension 1** deals with the independence and impartiality of advisory services delivered to farmers. The aim is to ensure that the content of advice supported by public funds is not biased by vested interests (e.g. related to selling pesticides, machinery, etc.) in order to best integrate societal issues.
- **Dimension 2** deals with advisors' education and training. The aim is to ensure that advisors benefit from relevant education and life-long training to keep their knowledge and skills up-to-date. Such training should be adapted to farmers' changing needs in context, but also to societal expectations and challenges.
- **Dimension 3** deals with the inclusiveness of farm advisory services. The aim is to give any farmer access to services and knowledge needed to develop their activities and comply with European environmental, social and health regulations.
- **Dimension 4** deals with the integration of advisory services into the broader AKIS. Sustainable development often requires having to face complex problems and combine various types of knowledge. There is a need to foster mechanisms that will facilitate networking, knowledge flows and the co-design of innovation support services in multi-actor configurations (between advisors, farmers, researchers). This integration is expected to support step changes in agricultural practices and contribute to sustainable development.

However, the design of concrete measures to incorporate these dimensions, at a national or regional level, remains a very complex task. This is especially true in a context of increased pluralism of suppliers of farm advisory services and/or where advisory services were privatised. This was confirmed in the various workshops organised in the context of the research project AgriLink.

In this paper, we highlight a series of policy recommendations that the research project AgriLink brought to light regarding different potential beneficiaries, topics or methods for farm advice. In particular, we argue that AKIS and advisory policies could benefit from a more micro perspective. We combine new concepts and our empirical findings to flag pitfalls and identify options in order to develop new pathways for each of the four dimensions of well-functioning advisory services (Figure 1).



1. Recommendation about independent and impartial advice

The intent to guarantee that the content of advice is not biased by vested interest (e.g. about selling pesticides, machinery) that would hamper the integration of societal issues (e.g. reducing pesticide use) is largely agreed. However, our research highlighted various pitfalls that might hamper this objective, and make it hard to implement and enforce from a national perspective. First, it can be very difficult to identify "independent" advisors. Second, independence might not necessarily be a criterion for farmers when choosing advisors. Third, bias in advice might come in many different (and sometimes hidden) forms that cannot be reduced simply to a question of independence of advice suppliers. But that does not mean that there is no room for public policies in this area, on the contrary. We consider that there is a need for public policies to enforce more transparency and robustness in the supply of advice. To reach this objective, there is a key role for public actors in supporting, investing in, and controlling the back-office dimension of farm advisory services. The AgriLink project more precisely contributed to this debate by:

- proposing a definition of farm advisory services, and a classification of actors to make sense of the complex configurations for the supply of advisory services. It can help to distinguish between "professional" and "occasional advice suppliers" and between "independent" and "linked" advisors;
- Providing tools to better understand the farm advisory landscape based on an understanding of farmers' microAKIS. We consider that describing the sources of advice to farmers in various innovation areas can provide a complementary view on AKIS and advisory services vis-à-vis national or regional inventories;
- Highlighting various concrete activities to support and control the back-office of farm advice and enhance the transparency and robustness of the content of advice (compulsory joint training, demonstration activities, knowledge platforms, etc.).

2. Recommendation about advisors' training

The next CAP emphasises the necessity to invest in advisors' education and training to ensure they can support farmers with relevant knowledge and pedagogical methods. This is also shared by some communities of advisors that identified the skills advisors should acquire. Our findings are complementary, starting from farmers' perspectives. First, we identified gaps in advisors' knowledge, skills and functions in a variety of innovation areas: gaps related to very new technologies (e.g. digital, new crops to adapt to climate change, etc.), gaps in advice on public goods-related issues (such as water conservation, animal welfare, but also social, health and labour issues), and gaps related to communication and trust building (social skills, not only soft skills). Second, we consider that an understanding of farmers' microAKIS and an application of the Triggering Change Model of farmers' decision-making has the potential to frame novel training modules. We consider there is a potential to better incorporate advances of social sciences on farmers' decision-making (economics, sociology, psychology, ergonomics) in education and training modules for advisors, by:

- Using farmer-centric approaches, based on an understanding of farmers' needs and personal networks, to highlight gaps and needs in the supply of advisory services in specific contexts;
- Exploring the heuristics of microAKIS and Triggering Change Model of farmers' decision-making on innovation uptake to train advisors and help them identifying conditions and momentum when their advice would have more impact (e.g. farm succession, territorial issues related to pest propagation);
- Helping advisors to support farmers at specific stages of their decision-making (typically when they assess and implement innovation). This requires better integration in AKIS through concrete back-office activities.

3. Recommendation about inclusiveness of advice

Increasing social cohesion is a key objective of European agricultural and rural policies. Reducing the inequalities of access to advisory services and relevant knowledge provides an important target to strengthen social cohesion within the European farming community. Based on AgriLink's findings, we argue that the situation of unequal access to advice is a complex issue that requires detailed attention. Our findings indeed show that if a part of these "hard-to-reach" populations for advisory suppliers are well known (small farms, part-time farmers, new entrants, women), other rural and agricultural populations are less often considered in debate about inclusiveness. This includes population within the family workforce but also beyond (salaried workers, contractors, posted workers). We consider that there is a need to better understand who the hard-to-reach populations are and what their needs are regarding different types of innovation, by:

- Using bottom-up approaches to better understand who are the "hard-to-reach" populations for advisory services in specific contexts but also in specific innovation areas;
- Integrating in the scope of advice some categories of actors that are often overlooked in innovation studies. Some of them relate to structural transformations of agriculture (farm workers, contractors). Others relate to farmers who decided not to adopt or to drop innovations.
- Framing policies that go beyond financial support than can be necessary, but is not sufficient to promote access to advice for hard-to-reach populations. Here again, AgriLink's key concepts of microAKIS and TCM could support advisors in exploring needs and designing new services.

4. Recommendation about integrated advice

An assumption upon which AgriLink is based is that there is no automatic, systematic and positive relationship between innovation and sustainable development. Some innovations will have positive impacts on certain dimensions of sustainability while negative impacts on other dimensions. In other words, there is a need to invest in situations characterised by uncertainty, gaps, and controversies. This calls for holistic advice provision that enables an assessment of the various dimensions of innovation and that brings together different types and sources of knowledge. This is in line with the CAP 2023-27 promoting an integration of advisory services into broader AKIS, based on multi-actor networks. However, the coordination of fragmented AKIS and pluralistic advisory landscapes is a significant challenge. The contribution of AgriLink is to help managers of advisory services and policymakers to identify situations where the integration of advice could be pushed forward and contribute to the transformative change of farmers' practices for sustainable development at different levels.

- At the farm level, we propose to use the TCM model to identify triggers as entry point to develop integrated advice with farmers.
- At a more global level, we identified conditions where co-design might be applied, based on our reflexive implementation of Living Labs.

Overall, some transversal elements can be highlighted between these four policy recommendations. The first one relates to the importance of public support to the backoffice of farm advisory services. The second transversal element stems in the potential to make more use of advances of social sciences in public policies dealing with farm advisory services.

Annex 5 Sustainability of thematic networks Recommendations from the EURAKNOS project

Modernisation of national strategic plans for the new Common Agricultural Policy (CAP) will require a stronger collaboration between researchers, advisors and CAP networks, and greater efforts in digitalisation and education. To build a strong and well-functioning EU AKIS; better connectivity, quicker circulation of information, and intensive knowledge sharing is needed. TNs can play an important role in the exchange of information and knowledge between key actors in agricultural and forestry innovation at European, national and regional levels. Maintaining the outcomes of thematic networks (TNs) within the Agricultural Knowledge and Innovation System (AKIS) beyond the funded project period, which is in general 3 years, is always a challenge. As the sustainability and legacy of TN projects are not guaranteed, the results of TNs may get lost at all levels in a relatively short time, hence losing their impact on agricultural and forestry innovation.

The basis for this policy brief was developed through an interactive participatory and co-creative process with over 80 key actors in agricultural and forestry innovation, including government representatives of at least 17 Member States (Lithuania, Spain, Sweden, Netherlands, Germany, Finland, Slovenia, France, Hungary, Belgium, Poland, Romania, Portugal, Italy, Latvia, Estonia and Ireland). Discussions took place during the meeting of the (SWG SCAR AKIS in Kaunas (19-20 November 2019). The ten recommendations explored during the meeting were based upon the summary of previous results from the EURAKNOS expert workshop in Budapest3 (11-13 September 2019). This process resulted in six main recommendations which can be supported through adapted decision-making and funding frameworks at EU, national, regional, and local levels.

1. **Funding schemes should provide extra financial incentives for farmers and foresters to participate in meetings, participatory activities, or consultation rounds.** This will facilitate the engagement of farmers and foresters in a bottom-up approach during the pre-funding phase and throughout project implementation to ensure the TN effectively addresses the needs of the users. This funding should be flexible, to be used at any stage of the project, including the conceptualisation stage. Claiming the funding must be simple with minimal administration required (e.g., vouchers or a lump sum covering the practitioner's time and/or direct expenses required to participate). In addition, to increase the involvement of farmers and/or foresters in TNs, strong links should be made with local networks and Operational Groups (OGs). Engagement of the user in the co-development, co-design, co-creation, and co-sharing phase is key for the success of TNs.

2. **Funding schemes should be clear, simple, and allow thematic networks to be flexible and responsive to challenges that present themselves or develop over the project's lifetime.** The funding framework should enforce addressing the current needs of farmers and foresters. Flexibility is helpful as social, economic, regulatory, and environmental needs may shift from those identified at the beginning of the funding phase. In addition, funding schemes should allow for the combination of various types/sources of funding (e.g. within the CAP, Horizon Europe and other schemes at regional and national level) to create synergy and strengthen projects' effectiveness and impact at social, economic and environmental levels. Responding to real and pressing needs of farmers and foresters is the basis for TN outputs.

3. **Funding and intermediary agencies should develop and promote standardised dissemination formats which appeal to different thematic network target groups (farmers, foresters, advisors, and educators in different agricultural and forestry sectors).** The concept of the EIP-AGRI practice abstract should be expanded to incorporate more diverse outputs tailored to different user profiles. Visual materials such as videos presented by farmers or foresters in local languages, and well-designed presentations and infographics can increase the attractiveness, visibility and impact of TN results. When adapted to specific target groups they will be more easily applied by different user groups in different socio-economic and cultural contexts (farmers and foresters in practice, and advisors/innovation support services and educators as key intermediaries). Standards should be developed for Member States to improve digital interoperability between initiatives at national level; these standards should be applied for the whole knowledge chain from research to practice (i.e., OGs). The standards should also consider aspects to enhance the user-friendliness and accessibility of materials e.g., formats should be used that offer attractive design and aesthetic options whilst also being easily and automatically translated into local languages. Establishing a standard for user-friendly dissemination materials for successful uptake of results.

4. **National, or regional and local governments should facilitate and financially support mapping of local (user) networks and the main information sources for farmers and foresters.** Identifying and collaborating with existing networks, information sources, connections and support mechanisms used by farmers and foresters allows TN outcomes to be transmitted by these trusted 'long-term established networks'. Cross-border interaction between local networks and/or OGs should be strongly encouraged as thematic networks on specific topics that are based on the real needs of the participating farmers and foresters may arise. This increases the credibility of thematic networks, ensures a broader reach and uptake of their results, and thus increases impact. Connection to long-term established networks will enhance TN integration within the AKIS at macro- and micro-levels.

5. **Funding schemes should stimulate connection to (digital) training.** The COVID-19 pandemic has confronted us with unprecedented challenges, increased the need for digital training and simultaneously has spurred the digital innovation and improved digital standardisation on many farms. However, to maximise the reach to the broad demographic of farmers and foresters, thematic networks should target key intermediaries, such as advisors and innovation brokers, to help 'analogue users' to increase their digital literacy via training and support. This would enable those users to access online information resources and communities for peer-to-peer knowledge sharing. Local authorities, with support from key agricultural and forestry actors, should stimulate thematic networks in linking with educational initiatives, training platforms, discussion groups, demonstrations, or face-to-face meetings through funding schemes. Connection to education within the AKIS will enhance the sustainability of thematic networks and their outputs.

6. **National and/or regional government departments should support the sustainability of thematic network outputs by integrating these into a national or regional open access knowledge platform and by promoting the creation and maintenance of a common EU-wide agricultural knowledge platform according to the FAIR principles**. Digital collaboration between TNs and OGs and the different actors within the European AKIS should be enhanced. A key element to support this aim is the development of a common, EU-wide, standardised, and interoperable digital platform for co-sharing practice-oriented materials and other relevant knowledge for sustainable innovation in agriculture and forestry. This will strengthen the integration

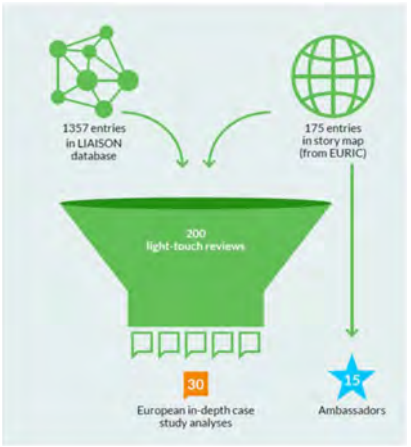
of TNs and OGs within the AKIS and strengthen the AKIS at all levels (European, national, regional, and local). This platform would serve to connect different actors, initiatives and (CAP and other) networks at local, national, or European levels to combine the outputs of different projects 5 and bridge the gap between research and practice. Target users could easily find information in one place, resulting in higher web traffic compared to individual project websites. It is essential that the platform is well-maintained and adapts to user needs and expectations, including the use of local languages. Regional and national AKIS strategies need to be further developed to support digital knowledge reservoirs based on outputs from projects funded at the regional/national level to enhance knowledge sharing and link to the EU-wide platform. A digital platform should be combined with real-life activities such as demonstration activities and face-to-face meetings, and link to trusted traditional channels such as agricultural magazines and local user networks. Digitalisation of TN Outputs in national and EU-wide open access platforms will enhance their connection to the (digital) Agricultural Knowledge and Innovation System (AKIS).

Annex 6 Roadmap to levelling up Capacity Development

Elements from the Liaison project

About the LIAISON project

LIAISON was a European multi-actor project that brought together researchers, actors from innovation initiatives and networks, decision-makers, and officials providing the enabling environment for co-innovation in agriculture, forestry and related rural activities across Europe. An interactive work programme guided the 17 Partner teams from 15 European countries to jointly investigate the design and implementation of international or local co-innovation projects – both inside and outside of the EU's policy framework of the European Innovation Partnership 'Agricultural Productivity and Sustainability' (EIP-AGRI). The project team learnt from their own experiences and from good practice examples of others implementing the idea of cooperation for innovation.



The results and recommendations emerge from encompassing data collection in the field. In 2018, the search through public databases provided a list of 1357 funded projects identified as cooperative and participatory (multi-actor criteria). A systematic selection process resulted in 200 projects or networks, which entered the light touch review involving all LIAISON partner teams (Figure 4). In parallel, the LIAISON European Rural Innovation Contest (EURIC) took place in 2019. The idea was to identify and learn not only from funded projects but also from under-the-radar co-innovation initiatives on the grass-root level. An Interactive map presents the numerous entries to the LIAISON contest from across Europe. Thereof, 15 Rural Innovation Ambassadors were selected and awarded. The LIAISON Ambassador videos tell the stories of the groups' innovative ways of working in partnership. The review of the 200 light-tough projects and the EURIC laid the foundation for the selection of 30 European project groups. In total, 32 In-depth case studies provided a solid evidence base, because two international projects from other policy contexts enriched the analyses. While LIAISON's focus was to provide meaningful insights into the performance of the EIP-AGRI programme, the case studies provided lessons learnt from a diversity of multi-actor co-innovation partnerships and allowed to analyse a variety of national AKIS and policy contexts.

State of play

European Union (EU) policy defines innovation as the outcome of an interactive and co-evolutionary process engaging multiple types of actors. The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) was set up by the EU as an instrument to speed up innovation in agriculture, forestry and related sectors by creating synergies between different policy programmes both at the EU and Member State levels, and to build bridges between research and practice. Central to the EIP-AGRI is the application of the 'interactive innovation model', which is defined as: "the collaboration between various actors to make best use of complementary types of knowledge (scientific, practical, organisational etc.) in view of co-creation and diffusion of solutions and opportunities ready to implement in practice." Horizon projects are required to apply the 'multi-actor approach' (MAA). As part of the implementation of the interactive innovation model, the Agricultural Knowledge and Innovations Systems (AKIS) approach gained increased importance. The AKIS is described as 'a system of innovation, with emphasis on the organisations involved, the links and interactions between them, the institutional infrastructure with its incentives and budget

mechanisms'. It is widely understood e.g., via the European Innovation Score Board, that an 'innovation gap' exists in Europe. The innovation performance varies greatly from one Member State to another, and often from one region to another within the same Member State. The innovation performances of many Member States (MS) and regions are lagging significantly behind the 'innovation leaders' (see Figure 1a and 1b).

There are existing mechanisms aimed at supporting those countries lagging behind in innovation performance such as the Horizon 2020/HEU 'widening Participation and Spreading Excellence' (SWEP) actions. Indications from the first impact assessment (December 2021)5 of the H2020 SWEP actions are positive, however, there are clear barriers to the implementation of this support action. For example, the Coordination and Support Actions (CSA) project proposals funded under H2020 and HEU to support the capacity development of countries lagging behind, are assessed on the basis of 'Excellence'. Since the achievement of scoring high in the Excellence section of the proposal, requires scientific references and experience that are very difficult to address by newcomers from disadvantaged countries. Consequently, an uneven geographical distribution of SWEP beneficiaries remains, resulting in a real risk of increasing the 'innovation' gap even further. The impact assessment also shows that SWEP actions have poor long-term effects after the end of the CSA projects. Hence, more targeted actions are still needed for effectively 'levelling-up' the interactive innovation performance in the disadvantaged MS.

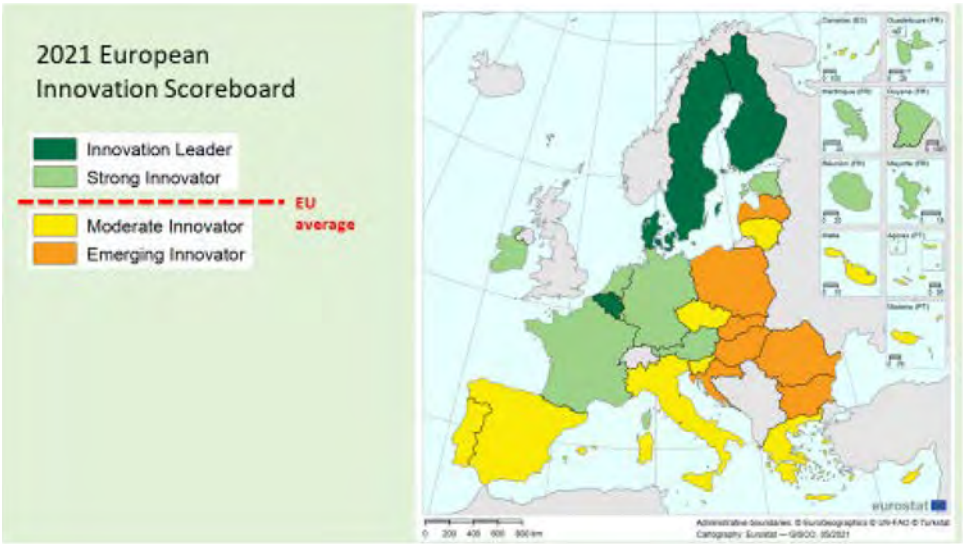


Figure 1a. Map of the European Innovation Scoreboard (2021)

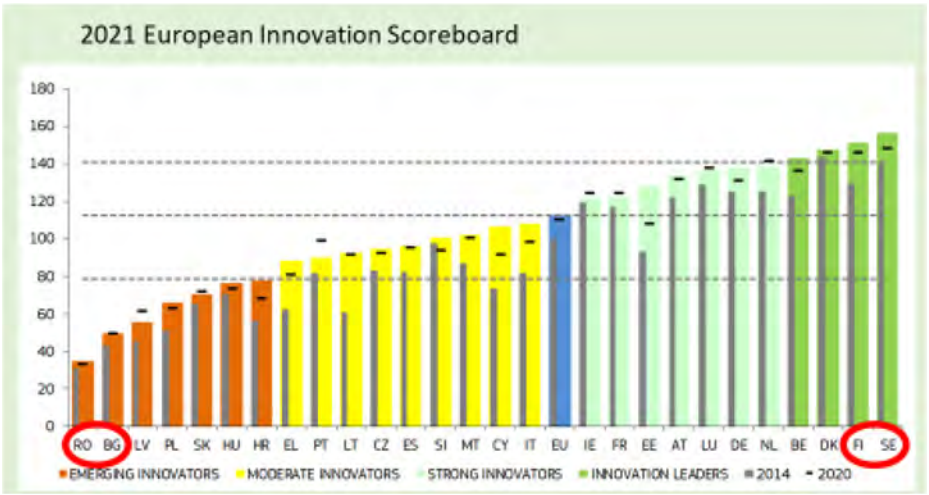


Figure 1b. Member States scores on the European Innovation Scoreboard (2021)

A well-functioning AKIS in MS is essential for the successful implementation of the interactive innovation model and to increase innovation performance. Innovation capacity, and more specifically functional innovation capacity, is inextricably linked to innovation performance.

Innovation capacity varies greatly across MS among others based on differences in political and institutional history, integration maturity, social and cultural context and level of decentralization. The empirical work of the H2020 research and innovation project LIAISON revealed that the capacity required to implement the interactive innovation model is rarely, if ever, evenly shared, either amongst those involved in local co-innovation project group or across the broader (inter)national landscape of innovation. On one hand, there is a limited understanding of what the overall capacity requirements are to successfully implement the MAA, whilst on the other hand, there is limited understanding in the MS of their 'innovation readiness' and their specific CD needs to successfully implement the model. Consequently, this situation requires distinct and targeted CD intervention for specific MS and across the wider European policy space to close (or at least reduce) the current innovation gap.

Towards a common framework for Capacity Development (CD)

Capacity Development is a multi-dimensional and multi-actor process that goes well beyond the direct transfer of knowledge and skills at the individual level. Instead, it encompasses organizational and institutional dimensions. Capacity Development builds on the existing knowledge and skills to drive a dynamic and flexible process of change. One of the key conclusions of the LIAISON empirical work was that the future implementation of the EIP-AGRI concept would benefit from the introduction of a Capacity Development Framework, which will focus specifically on the development of actors' functional capacity. For that reason, LIAISON teams recommend to develop and include Capacity Development as a core policy concept for the implementation of the Post-2020 CAP. Hence, Capacity Development will be seen as a policy objective for the Commission and other bodies promoting interactive innovation, and as a goal for those, which are interested in stimulating the engagement of farmers, forester, advisors, researchers and other relevant actors to speed up innovation.

Capacity Development definitions

Capacity development can be defined in different ways. A commonly used definition is the definition of the Organisation for Economic Co-operation Development's Development Assistance Committee6

Capacity as the ability of people, organizations and society as a whole to manage their affairs successfully.

Capacity Development the process whereby people, organizations and society unlock, strengthen, create, adapt, and maintain capacity over time, in order to achieve result.

Capacity Development versus Capacity Building
While 'capacity-building' suggests building something new from the ground up, according to a pre-imposed design, 'capacity development' is believed to better express an approach that builds on existing skills and knowledge, driving a dynamic and flexible process of change, borne by local actors

Both terms are still widely used and often used interchangeable in various EU policy documents.

The proposed Common Framework (CF) for multi-level CD represents an innovative approach to strengthening the capacity of actors and the enabling environment. Due to the large diversity across and within MS, no blueprint or one-size-fits-all recipe can be applied to CD. The draft CF for CD, designed by LIAISON teams, can be further developed into a dynamic and flexible vehicle for structuring and organisation CD for implementation of the MAA across MS.

Already, the current draft version aims to provide a structure for bringing CD issues to national level but ensuring also a coherent approach for CD across the EU. The LIAISON CF wants to lay a common ground for assessing MS innovation 'readiness' capacity and a common CD language. MS own and manage their CD processes and will ensure that the design and sequencing of CD activities will fit the countries' CD needs and circumstances, as well as national-level CAP implementation plans.

The proposed Common Framework for CD consists of five core elements:

- A focus on functional CD across the implementation of the EIP-AGRI, on
- three (3) CD levels, micro, meso and macro, for multi-level CD, through
- five (5) CD principles to speed up interactive innovation, by
- adoption, adaption and expansion of existing CD support mechanisms within and outside the rural policy domain, based on
- a self-assessment tool for functional capacity, which MS will use to develop their need-based CD activities.

Case study: Capacity for change: The Tropical Agriculture Platform (TAP) Common Framework

Developing countries, 90 percent of which are located in the tropics, often lack the resources and capacities to advance their Agricultural Innovation System (AIS). To address this gap, the Agriculture Ministers of the G20 called for the creation of the Tropical Agriculture Platform (TAP) in 2012. With more than 40 partners, TAP is a multilateral dynamic facilitation mechanism, which fosters better coherence and greater impact of capacity development for agricultural innovation in tropical countries.

The TAP Action Plan was supported by the EU-funded project "Capacity Development for Agricultural Innovation Systems" (CDAIS) from January 2015 until August 2019, jointly implemented by FAO and Agrinatura.

The TAP Common Framework proposes a practical approach to CD for agricultural innovation that aims at harmonizing, through an AIS perspective, the diversity of existing strategies. The TAP Common Framework provides concepts, principles, methodologies and tools to better understand the architecture of AIS, to assess CD needs and to plan, implement, monitor and evaluate CD interventions. This aims to lead to more sustainable and efficient AIS. This Common Framework emphasizes the crucial role of facilitation, documentation and knowledge management issues as well as that of reflection and learning for enabling agricultural innovation.

Defining functional capacity development at multiple levels

Capacity Development interventions often focus on the development of actors' technical capacities. Technical capacity refers to knowledge and skills that are task, sector or context-specific such as crop production, livestock production or forestry. Although developing the technical capacity is essential, it is often not enough for successful innovation. Functional capacity are the skills, knowledge, attitudes and behaviour needed to utilize and coordinate technical capacity so that actors work effectively, in particular in a co-innovation setting. Functional capacity is often not task or sector-specific, and often less 'visible' than technical capacity. However, it refers to the ability to learn and collaborate. Furthermore, real capacities might not be obvious or apparent to others but there is also innovation in e.g. realising the own potential or in allowing collaborators to grow and flourish.

A fundamental condition for the strengthening of AKIS lies in the capacities available at individual and organisational levels, and in the enabling environment. The capacity at individual and organisational levels brings about effective change through innovative structures and practices at both the micro level (multi-actor project or initiative level) and the meso or innovation support level (e.g. innovation networks, Innovation Support Services (ISS)). Capacity on the macro level provides policies and policy mechanisms to create a supporting enabling environment that encourages co-innovation and change. Each of the three levels overlaps, interlinks and works interdependently and influences the capacity at the other levels. For that reason, an EIP-AGRI Conceptual Framework for CD will require a multiple-level approach in order to strengthen the whole system.

The capacities at the three levels related to:

MICRO - Innovation project/partnership, niche or network: the combined and complementary skills, experience and knowledge of each individual actor collaborating in interactive innovation processes - shaped by the organisational and environmental factors described above. (AKIS actors in MAPs, TNs & OGs)

MESO - Organisations: the internal structure, policies, procedures and practices of the organisations the individual actors are part of, as well as those which translate and implement policy to the local context, and provide support to implement on the micro level. This refers to both intra- and inter-organisational capacity. (For example: National and regional level administration, ISS, intermediary organizations, projects such as 'modern AKIS' 'ATTRACTIS' and others)

MACRO - Enabling environment (or system), in which individuals and organisations function: the 'rules of the game' - formal 'tangible' rules, laws, regulations and policies, and informal 'intangible' components such as social conventions, norms, values, attitudes and beliefs (including public policy, governing structures, framework conditions, industry policies and practices that shape the landscape.)

Key principles for optimising interactive innovation

The proposed framework for the development of functional CD is tailored around five key principles that are needed to optimise and level up the implementation of the interactive innovation approach across MSs (Figure 3). These principles represent the core capacities that LIAISON teams identified from their empirical work focussing on the co-innovation performance on all levels. They need to build on the existing capacity CD need of each MS. The five principles form also the basis for a (readiness) capacity assessment framework. Such a capacity assessment is a central element for preparing and implementing CD strategy and intervention plan for a particular MS.

The following sections explain the role of the five principles within the LIAISON Capacity Development framework. The presentations of the principles include good practice examples from LIAISON's field work.

Principle 1: Enhance networking and collaboration

Core functional capacity: Capacity to network and collaborate

Networking and effective collaboration is a key 'enabling capacity for innovation'. Policy mechanism that incentivises multi-actor engagement and brings together diverse actors are essential to speed up innovation. Collaboration requires teamwork and trust (in it various forms e.g. companion, competence, and

commitment trust10) between individuals and as well as within and between organisations. Collaborative leadership and transparent decision-making within partnerships as well as on organisational level enhance effective collaboration.

Case study: ARENA SKOG - Sweden

"We have been very good at communicating and communicating each other's needs, so we have a common consensus on what is to be done and manage to keep the plan in mind for both progress and finances."

The Arena level offers financial and professional support for long-term development of regional business environments. Their first application was denied, but the reapplication in 2016 was successful and they were then included in the program. The Arena Skog initiative led to an expansion of the value chain. A broader inclusion of the woodworking industry and several R&D institutions led to a total of 47 members in the cluster. The aim of the Arena Skog Cluster has been to develop the collaboration within the cluster through various projects and lay the foundation for taking new steps for further growth and commercialization, and to work closer with the market in the future. The project activity is divided into four areas: Forestry, wooden buildings, fibre-based industries, and infrastructure. There was a preliminary (and unnamed) project with the aim to explore and test the possibility to build urban wood construction up to 8 floors in light timber frame construction according to established rules and regulations and eventually how to find appropriate or adapted solutions. Once the project group had succeeded, which included working out the theoretical/technical solutions for these types of buildings, they were then able to apply for a pilot project with the intention of setting up a construction like that. The pilot came later, after the Arena period was finished.

The Arena Skog Cluster is a product of a long-term commitment. The Forest Industry Collaborative Forum in Trøndelag, an interest organization for forest and tree industry in Central Norway, was established following a political initiative in the County Councils in Trøndelag region in 2004/2005. Over a ten-year period, the collaboration developed. Eventually the Forum felt that the industry was ready to take bigger steps and saw the opportunity to apply for so-called Arena status through the Innovation Norway program. Arena Forest is the only forest cluster in Norway.

The forest industry in the region is characterized by its complete value chain. It has the industry needed to make full use of the raw material. This includes forest, forest industry and wood working industry and users of the products. This also means that there is a close link between the companies throughout the region, and there is a close link by using raw material from the same tree. Parts of the wood go to sawmill, parts go to the wood processing industry, and sawdust goes from the sawmills to the wood processing industry. It is also an industry that is characterized by many small businesses that account for very large value creation. It is a rural industry with a tradition of close cooperation with the public policy instruments and authorities.

Principle 2: Embrace diversity

Core functional capacity: Capacity to work with diversity

Interactive innovation to tackle complex societal problems requires different actors, at different levels (multi-level) bringing multiple frames of reference, complementary sources of knowledge and diverse range of policy options to tackle a problem. Although 'managing' diversity is challenging, having diversity is an essential requirement for successful interactive innovation. This goes beyond diversity in terms of multiple actors involved in a project to diversity in programme design to have a portfolio of mechanisms to promote interactive innovation. Programme design should be innovative in terms of allowing for a certain level of duplication and failure e.g., provide a variety of policy mechanisms, reflect and gather evidence on their effectiveness and scale up the mechanisms that are most impactful.

Case study: PIIMAKLASTER DAIRY CLUSTER12 - Estonia

The Estonian PIIMAKLASTER Dairy Cluster is an open non-profit association of farmers, milk collectors and processors, dairy societies and sector umbrella organisations. The purpose of the association is to find new opportunities for creating added value from the perspective of the dairy production and processing chain, improving the economic performance of sector enterprises and increasing global competitiveness through cooperation and various innovation activities. The cluster is focused on areas of research and co-creative innovations. There are 23 different farm members supported by a set of partners representing research, market actors and supporting organisations.

The cluster's funding model offered the opportunity for a diverse range of actors with diverse needs to work together on a range of activities and projects over a prolonged period. The main focus of the dairy cluster was to drive technical incremental innovations aligned with important concepts such as competitiveness and efficiency through a practical and farmer needs-led approach. The cluster operated as an NGO and received funds on the basis of their general strategic objectives and their multi-annual Activity Plan. This plan included a set of fully developed innovation project proposals to be implemented within the timeframe. The members of the cluster also paid a small annual membership fee. The cluster operated as an effective tool for cooperation between the relevant actors in the Estonian dairy sector based on long-term strategic objectives, not just a set of unrelated projects. The interaction between internal actors and external partners was based on functional, rather than formal relationships. All partners of the cluster were full participants in the co-creative innovation process within the cluster. Decision making regarding which areas of activities will be undertaken, e.g., specific project selection, was managed by the members of the cluster (farmers, dairy plants, dairy societies, sector umbrella organisations). Nevertheless, the other partners (researchers, market actors, supporting organisations) were key actors throughout the whole process of developing the conceptual and technical aspects of a variety of new projects addressing farmers and sector needs.

Effective facilitation processes played a key role within the cluster. The board member/chairman, who acts effectively as the manager of the cluster, facilitator and driving force of their effective cooperation. Additionally, the shared decision-making process has helped to ensure the acceptance by all the members of the cluster.

Principle 3: Create space and ability to act

Core functional capacity: Capacity to engage and act

Interactive innovation requires 'room for manoeuvring' and change within an organisation, sector and system as a whole. It required individuals in partnerships and networks to have the 'power' or be empowered and able to act in response to their reflections and the changing environment. Creating space for interactive innovation means partnerships and networks have a level of autonomy to self-organise and have access to required knowledge and information. This also means they need the space to take risks, fail and learn from failure. Programme design to speed up interactive innovation needs to provide this space in terms of flexibility in project design, mechanisms for agile adaptive project planning and implementation and simplicity of administrative procedures.

Case study: Rural Innovation Support Service (RISS) - Scotland13

"It's a bit of a mindset shift because before it would have been getting together and getting the answers and trying to solve the problem, rather than getting together to figure out what the problem is in the first place."

The Rural Innovation Support Service (RISS) provided facilitated support for collaborative innovation between actors throughout the entire food and drink supply chain in Scotland. This programme was implemented on national level and funded though Scottish RDP funding. RISS filled a gap in the innovation landscape by strategically requiring supply chain collaboration in the initial development stage, rather than supporting projects with only producers and/or land managers aiming to create innovations in isolation.
RISS creates the space for multi-actor groups including farmers, supply chain actors, researchers, government representatives, cooperatives etc with expertise, experience, skills or a financial stake in innovative outcomes to interact and jointly develop social, organisational, commercial and/or technological innovations. The RISS programme in itself was innovative as it provided the catalyst for innovation. Inspiration, planning and development all took place throughout the groups' engagement in a non-linear iterative cycle, leading to the realisation of a project plan. That project plan was then submitted to another funding body for continued research and testing of the idea or pursued as a commercial venture.

Having supported more than 40 groups over the course of 3 years, RISS has engaged and connected actors who do not normally collaborate in a process where supply chain issues are tackled from a holistic, integrated perspective. One of the key elements within the RISS group process that helped foster this consistent collaboration was a funded facilitator. Furthermore, flexibility in programme design was crucial within RISS' implementation. The actors were allowed to iteratively explore their topics without following strict procedures that may inhibit the innovation process and the partners were entrusted to carry out their groups with minimal oversight.

Principle 4: Foster reflection and learning

Core functional capacity: Capacity to reflect, learn and adapt

Interactive innovation is essentially a transformative and social learning process with at its core (self-) reflection and reflexivity to improve practices and challenge individuals' and organisations' own norms and assumptions. This requires the establishment of effective and relevant review, monitoring and evaluation practices and systems so this reflection takes place on programmatic as well as project level. This should consist of combining more formal monitoring with regular reflection on what (outputs/results) is being done and how (process) it is done, why this is happening (lessons learned) and how to adapt project implementation. This reflection and learning on multiple levels should be an outcome by itself and shared across MS and at multiple levels.

Case study: Capacity Development for Agricultural Innovation Systems14 – International

The Capacity Development for Agricultural Innovation Systems (CDAIS) project aimed to strengthen the agricultural innovation capacity of individuals and organisations to make the AKIS more efficient and sustainable in meeting the demands of farmers, agri-business and consumers. The project was funded by EU DG-DEVCO and implemented jointly by Agrinatura-EEG and FAO. The capacity development (CD) interventions in eight pilot countries in Africa, Asia and Latin America were demand-driven and integrated the development of individuals' and organisations' functional capacities through different types of interventions such as coaching, bridging events and policy dialogues

In the pilot countries, AKIS actors were brought together in new and existing partnerships to address commonly identified challenges and opportunities in specific value chains. In these countries the CD process was operationalised through the facilitation of an interactive five-stage learning process including capacity needs assessment, development of a CD action plan and regular reflecting, leaning and documentation (RL&D). CD interventions were implemented on multiple level and interventions depended on the context and ongoing programmes and funding opportunities in each country. The regular RL&D was part of an integrated Monitoring, Evaluation and Learning (MEL) system on country as well as programme level to support implementation and enabled project teams to contribute actively and explicitly to programme level learning.

Reflection and learning were at the heart of the CDAIS programme design through the implementation of an interactive five-stage learning process and the focus on monitoring for learning instead of accountability. The MEL system was designed to track, monitor and evaluate outcomes in a participatory manner that enabled, on the one hand, learning and capacity development of project partners and, on the other hand, experimental learning by the AKIS actors in the value chains. Creating opportunities to regularly reflect upon and reassess interventions in a given context should be embedded within innovation projects and programmes design.

Principle 5: Promote fair governance on multiple levels

Core functional capacity: Capacity to develop, translate and implement (inclusive and) responsive policies and strategies based on need

How innovation is framed or understood has a major impact on the dynamics of multi-actor co-innovation partnerships and to their sense of its successful undertaking. Hence, MS/national implementation agencies need to be able to effectively interpret and implement policies and policy instruments based on need and translate the MA approach into local context. On one hand, policy mechanisms need to be responsive and flexible, whilst on the other hand create stability.

Case study: Hessian EIP-AGRI Project Group15 - Germany

The Hessian Ministry for the Environment is the EAFRD managing authority. It developed a strategy for the continuous learning within the multi-level governance system of EIP-AGRI implementation. The managing authority studied the framework provided by the EU Commission and constructed a self-learning system, which consisted of well-established institutes and procedures for their communication and cooperation. From the beginning, the idea was to provide support to Operational Group project applicants and to allow for an ongoing revision of Directives that will steer the next round of co-innovation group funding.

In the Hessian RDP M16 is considered a cross-cutting measure. This implies that proposals do not need to fall under any specific topic area to be eligible for funding. They just need to serve different goals (e.g., climate change, employment and others). The formal responsibility for approving applications and later, for being the main contact point for the Operational Groups (OG) lies with the administrative unit of the RP Giessen specialised in dealing with farming, forestry and rural development. This unit is an intermediate regional body. The RP Giessen team (speaking the language of the OG and of the administration) has to deal with and translate the requirements of the Funding Authority. The Hessian Ministry has also appointed the Institute for Rural Development Research (IfIS) as the official Innovation Support Service. As an independent research and consultancy institute IfIS has been advising already many beneficiaries during their proposal development phase.

Together, the managing authority (Ministry), the granting authority (RP Gießen), the IfIS, and the public farm advisory service (Landesbetrieb Landwirtschaft Hessen, LLH) formed a so-called Project Group (Projektgruppe) in 2014 (chaired by the Ministry). This EIP-AGRI Project Group coordinates and monitors the application and selection cycles for new OG projects. The Project Group was also responsible for drafting the 'Directives of the State of Hesse for the Promotion of Innovation and Cooperation in Agriculture and Rural Areas', which specify the conditions for OG funding in Hesse. Since the first issuance of the Directives in 2015, the Project Group has continuously revised them, based upon experiences from the monitoring of RDP implementation by the ministry as well as by systematic feedback from the RP Gießen unit and the IfIS team. The Thünen Institute also provided feedback based on the external interim evaluation of the OG measure in 2018.

All organisations involved (Managing Authority, Granting Authority, ISS and Farm Advisory Service) have highly professional teams who are eager to make co-innovation a success. The Project Group chaired by the Ministry unit serves a multi-actor cooperation within administration to learn from the ongoing experiences by those persons administrating the funds, dealing with beneficiaries, supporting and selecting new applications. New administrative procedures offered by the Commission were put in place (e.g. lump sum, cost simplification) but even with this constant self-improving approach, it was not possible to fully satisfy the beneficiaries. They still perceive the financial administration and related bureaucratic requirement as major burden that is impossible to fulfil in particular for small, unexperienced actors or those without an office support team.

Adoption, adaption and expansion of existing Capacity Development support mechanisms

A variety of CD support mechanisms are already available. However, the support landscape is diverse (and potentially fragmented). It is often not clear which CD support is available for whom and at which level. For example, across the HEU programme, there are a variety of CD mechanisms, including a specific part under Pillar II for the funding of projects aiming at widening participation and strengthening the European Research Area. The work programme for Cluster 6 lists a variety of CD calls under Destination 7 for the CD of AKIS actors from local (micro) to national (meso) level and beyond, for example the strengthening the NCP, various macro and meso level partnership and networks, improving national AKIS organisations, deepening the function of ISS and the building of the capacity of AKIS actors to improve implementation of the MAA. Furthermore, there are also existing CD support mechanisms from outside the rural policy domain, which are very relevant and could be adapted to fit in the rural innovation policy domain.

Annex 7: 'How to guides' for enabling environments from the Horizon 2020 LIAISON project

In accordance with Article 114 "Modernisation" of the CAP Strategic Plans Regulation (SPR) all EU Member States are required to build stronger Agricultural Knowledge and Innovation Systems (AKISs) to intensify knowledge exchange and speed-up innovation. The aim is to help farmers, foresters and other rural businesses to meet the economic, environmental and social challenges they face in their transition towards more productive, profitable and sustainable production systems.

A well-functioning AKIS should enhance knowledge flows within the national/regional innovation ecosystems characteristic of all Member States by systematically and intensively connecting all people and organisations that generate, share, and use knowledge and innovation for agriculture and all interrelated fields (value chains, environment, society, consumers, etc.). Very importantly, it should also strengthen links between research and practice and promote opportunities for the co-creation of new ideas and innovative solutions – the so-called "interactive innovation" approach that is embodied within the EIP-AGRI.

Interactive innovation describes the collaboration between actors to make the best use of complementary types of knowledge (scientific, practical, organisational, etc.) in view of co-creation and diffusion of solutions or opportunities ready to implement in practice[133]. In practice, co-innovation processes need a particular management. Such an innovation process management consists of various tasks and requires an associated set of competences and skills. For example, the term 'facilitation' is often used as a catch-all phrase in the EIP-AGRI or AKIS context to describe the complex management of the co-innovation process over the lifetime of a multi-actor project as well as the organisation and facilitation of a workshop or a project meeting[134]. Facilitation helps to ensure the understanding and the co-creation of actors who come from different background but offer complementary capacities needed to reach the common goal.

This brief aims to highlight opportunities for optimising the enabling environment for interactive innovation by strengthening management of the innovation process. This enabling environment is not only but to a very high degree driven by policy programmes, administrative rules and procedures including the tasks official innovation support services are commissioned to provide. The target groups are policy makers, officials in the field of agriculture, forestry and rural development as well as associated innovation support service providers: individuals and organisations that are aiming to ensure that co-innovation projects and networks achieve their objectives while applying a truly interactive innovation processes.

This brief emerges from lessons learnt of co-innovation practitioners. The LIAISON 'How to Guides' shed light on the tasks, roles and responsibilities that co-innovation facilitation covers in order

The five key issues addressed by the LIAISON 'How to Guides' are:

- Coming Together
- Good Planning
- Healthy Partnerships

[133] Synonyms are 'co-creation' or 'collaboration for innovation' or 'co-innovation'.
[134] Note that this text defines 'facilitation' as "the act of helping others to implement a process without getting involved in the process yourself".

- Connected Partnerships
- Achieving Impact

The preparation of these Guides was based upon evidence from case studies undertaken across Europe and in many different rural contexts.

Since innovation process management and facilitation tasks change with the progress of a co-innovation project, the Guides refer to three common phases that consortia pass through when co-designing their innovation (Figure 1): Partnership building, Co-creation, and Dissemination/exploitation, while Networks represent the centre of all interactive innovation activities.

The five 'How to Guides' are supported and complemented by two further Guides:

- 'Participatory Methods for Facilitating Co-innovation Projects' present lessons learnt from multi-actor projects when it comes to the facilitation of group processes and the management of the collaboration within the innovation group or with external stakeholders. At the same time, it is the gateway document for the facilitation methods and tools (20) for the particular purpose of multi-actor project facilitation.
- The other Guide leads the user to the 37 tools for the 'Evaluation and Impact Assessment of Co-Innovation'.

Coming Together

LIAISON's How to Guide 'Coming Together' highlights tips and tricks for co-innovation practitioners who have a shared idea and aim to work on it together. It explores the early phases of working in partnership, including ideas generation, ways of accessing networks in order to create a partnership for co-innovation, and relevant considerations around funding. An idea for a co-innovation activity does not appear out of nowhere but may originate from: an individual person or organisation (an actor); a formal partnership such as a project consortium; an informal partnership such as a cluster or network; a call for proposals on a certain subject by a funding body. Usually the core group knew each other from e.g. earlier collaborations, membership with the same association, or they studied together.

Public institutes can provide support based on an innovation support programme. For example, the RISS Programme helps to shape an idea, to build a multi-actor partnership or the preparation of a project application. Such an innovation brokerage service can explain who else is interested in a certain topic and find out whether there is potential for joining another group. Other types of support can be provided to groups that finalised a project. They will need information on a follow-up programme that provides funding for e.g. the commercialising of their 'invention' as the example of the TRUE project shows. These two, as well as other LIAISON case studies, show that co-innovation groups tend to emerge out of existing formal or informal networks. Various forms of innovation network exist but they all bring together people with common interests and/or common problems, e.g. farmers' associations or other NGOs, cooperatives, official rural networks, study courses, village/industry initiatives, and friendships. For policy makers, two aspects are important in this context:

- Existing networks, which are delivering knowledge exchange and innovation, are excellent seedbeds for new and divers multi-actor projects. However, these networks need a continuous management, which requires funding. Since membership fees are often insufficient for the personal costs, a form of institutional funding might be needed.

- It can be difficult for less connected individuals or smaller organisations to finding out about and gaining access to such networks. Publically funded innovation support services with such connections can help to find the right networking opportunities for these.

Good Planning

The How to Guide 'Good Planning' explores the ways to lay a strong foundation for working together in multi-actor projects with a focus on establishing models for group structure and leadership, adopting clear and well-matched roles and responsibilities, fostering trust and good communication, and planning ahead for monitoring and evaluation. The responsibility for this challenging step of effective and efficient planning for future co-innovation lays within the groups. In particular, the leaders of such initiatives have to apply participatory methods that help everyone in the group to express and share their ideas, fears, expectations, agreements and disagreements in greater depth, and thereby agree upon common goals for the project. Good facilitation skills foster mutual understanding and help to build trust - an essential foundation of all partnerships.

Policy makers and officials in the field of agri-food, forestry, rural development and the related education and training institutes can help to overcome related challenges for making the interactive innovation approach a success. Decision makers in policy and education can make sure curricula are enriched and trainings offered for the formation of a) Interpersonal skills for managing difference of opinion and to facilitate decision-making; b) Technical skills for the development of innovative approaches; and c) Functional skills for the engagement in co-innovation. Functional skills refer to leading (contributing) to longer-term group processes and understanding partners' interests and motivations. Learning to speak 'different languages' is of particular importance. This refers not only to foreign languages such as English, but also to the languages used by scientist, farmers, foresters, value chain businesses or administration where misunderstanding or lacking communication are often hampering cooperation.

A common success factor of consortia, which are practicing interactive innovation, is the genuine sense of involvement and encouragement experienced by participants. The leaders or facilitators in charge, therefore, need to have a good understanding of participatory methods to recognise and value the differences and diversity of all project members.

Healthy Partnerships

The How to Guide 'Healthy Partnerships' highlights key learnings from LIAISON that can help improve the quality of collaboration, communication, and co-ordination in multi-actor partnerships. An effective leader is a critical driving force for coordinating the co-innovation process all along the duration of a funded project. Competencies needed include both 'hard' technical and 'soft' functional skills, in order to have the ability to guide partners, and to engage with different target audiences. It is the responsibility of the project management team to monitor the quality of the interactivity of those working on the envisaged outputs.

Both, an effective and encouraging project management, and the relating facilitation tasks and skills are the two essentials for the steering of this special type of innovation projects. The rather technical project management skills are based on training and work experience of the management team. However, agriculture, forestry and related studies or trainings often hardly cover the topic of project management. For that reason, the provision of support (e.g. funding) for the training of actual or future multi-actor project coordinators can improve the delivery of co-innovation projects. Such well-targeted training addresses the organisation of the complex processes from planning, organising, managing, and controlling, to budgeting, monitoring, testing, and realisation of the interactivity as well the delivery of the foreseen technical, organisational or social innovation. The facilitation tasks and skills can, but do not have to, be delivered by the management team. External facilitators or skilled consortium members are needed. LIAISON studies highlight that the tasks and skills in facilitation involved vary greatly from group to group. The facilitation skills required to work with a short-term, farmer-led initiative be different from those needed to co-ordinate a long-term multi-stakeholder project with international partners. In most cases, providers of innovation

support services working under a tender for the Ministry are not able to help with the project management and project-related facilitation tasks.

Connected Partnerships

LIAISON's How to Guide 'Connected Partnerships' explores the opportunities and barriers to cooperating effectively with other individuals or organisations from the wider network because effective innovation is enriched by knowledge sharing through continuous dialogue not only within the consortium but also with a set of external stakeholders. This engagement starts with the early phase of coming together and lasts throughout the lifetime of the project or even beyond e.g. during the commercialisation of the innovation.

It is good that many funders have already the expectation – or the official requirement – that not only the findings but also the activities during the working phase of the project have to be shared with others outside the co-innovation project, especially the potential users of an innovative solution. This requirement might be subject of an interim review done by the funder. In order to comply, however, the beneficiaries need to have sufficient resources (and time) reserved for an encompassing stakeholder engagement. It would help less experienced applicants for a co-innovation project when the funders raise awareness for these particular resources, which the consortium will probably need and might have overlooked. It would be good if consortia could be encouraged to make such adjustments during the negation phase with the funding in preparation for the official granting.

At the beginning of the project, the teams need to carry out the exercise of identifying and involving relevant external stakeholders, and also periodically reflect on, amend and update this task as the project activities develop and new opportunities arise. Officials from policy, administration (managing/granting/funding authorities) and from relevant publicly funded networks can help by bringing together those public servants working in the same thematic field with the consortium. In many contexts, public servants do still not see themselves as active players within the AKIS, but they could have many opportunities to enhance the impact of innovation projects.

Co-innovation does not only involve collaboration within the group of fixed members but can even include the effective involvement of new cooperating partners throughout the project. In such cases, funders can contribute by allowing for flexibility and encourage the project management team to undertake an amendment in order to address the unexpected needs of a co-innovation consortium.

For the various situations, the project managers and/or co-innovation process facilitators need participatory tools. LIAISON offers a toolbox with facilitation tools for the stakeholder involvement (see Participatory Methods and Tools3) and for the assessment of their ongoing work (see Impact Assessment and Evaluation Tools3). In any case, the use of the 'right' language is crucial not only for the internal communication (see above) but also for the engagement of others from outside the project.

Achieving Impact

The How to Guide 'Achieving Impact' explores ways to maximise impact of the outputs and achievements of co-innovation projects. It focuses on the sharing and disseminating as well as the creation of a legacy from the co-innovation activity. It highlights that project groups will benefit from having a clear and well-planned dissemination strategy for its results and innovative solutions.

As highlighted for the early phase of building the group, well-functioning knowledge and innovation networks play a key role again because the results and lessons learnt from experiencing co-innovation will feed back into the formal and informal networks again. This embedding of achievements reached by the co-innovation activities is crucial for the emergence of new ideas and additional co-innovation groups. Well-working networks, maintained by an ongoing facilitation, require funding in order to fulfill the task of ensuring the dissemination and long-term impact of the outputs delivered by co-innovation projects.

The official requirements for the consortia to deliver a strategic plan for the communication about the project, for the dissemination of interim and final findings as well as the exploitation of results is common for EU framework multi-actor projects. This is helpful and could be an example for other funding programmes supporting co-innovation. However, the preparation of meaningful and supportive plans, including the related risk assessment measures, is a challenging task in particular for less experienced project leaders and their teams. Programme designers and/or granting authorities as well as official or privately commissioned innovation support services could offer information and training on how to develop and implement these strategic plans. Communication, dissemination and exploitation will always be different between projects. There is no standard template to be used which makes individual training and learning even more important. Moreover, the hot topics of the protection of intellectual property and related competitive advantages and the related Open Access rights are areas that require professional advice from a public institute. Otherwise, the consortia have to commission very costly external consultancy services (e.g. a public relations agency or a solicitor), which they can often not afford. At this point, public support could be provided by the new funding measures for various forms of advice for farmers, foresters, and rural entrepreneurs.

Policy and administration can also help a co-innovative consortium to achieve impact by the provision of timely guidance to new or other funding. Important is also to allow for synergies between different funding programmes. For example, if an innovative activity requires an investment, access to funding will be a key for the innovation's adoption. Such groups might explore where funding can be accessed and how it can be combined with the currently used programme. Access to (new) funding often turns out to be an extra and unforeseen 'project' for the project teams. For that reason, they will profit from e.g. a funding guide, mentoring or business incubator programme for co-innovators who are planning to enter a new market.

Granting authorities or other officials in charge for a co-innovation project might find the technical reports less satisfying as they had expected. It appeared that project participants – in particular, those with a practical point of view – tend to be challenged by identifying and describing the impact of the innovation they had created together. To understand such reasons, however, might help the officials to provide well-targeted support. Co-innovating consortia may find it difficult

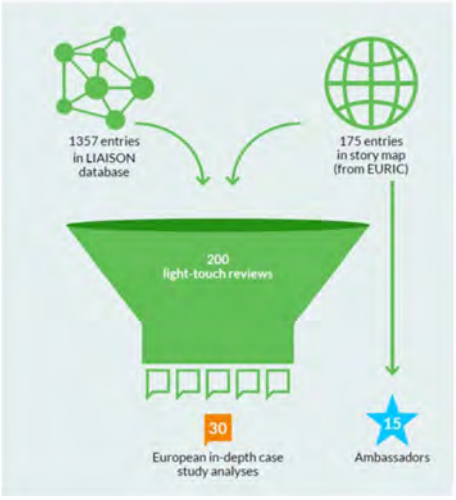
- to recognise and appreciate the value of their activity to the wider (and distant) community, who are not directly involved in the innovation.
- to change people's mindsets and support the creation of attitudes that are receptive to change.
- to assess societal or environmental benefits. In contrast, economic benefits are easier to assess (and more immediate).
- to value their personal role in contributing to societal goals such as the mitigation of climate-relevant emissions.
- to measure and show their success with a convincing quantitative or qualitative measurement.

Public institutes engaging with co-innovation consortia can point the project management teams to the methods and tools for the assessment of co-innovation processes, of linkages within the group or with external stakeholder networks, and the impact assessment for the project's results.

Closely connected with the five How to Guides, which show good practices from various types of groups or project consortia applying the interactive innovation approach, LIAISON teams have developed an encompassing toolbox for the facilitation of interactive innovation and evaluation and impact assessment. Two dedicated Guides help users to identify and select suitable tools for their particular needs. These hyperlinked brochures provide access to the individual tools.

About LIAISON

LIAISON was a European multi-actor project that brought together researchers, actors from innovation initiatives and networks, decision-makers, and officials providing the enabling environment for co-innovation in agriculture, forestry and related rural activities across Europe. An interactive work programme guided the 17 Partner teams from 15 European countries to jointly investigate the design and implementation of international or local co-innovation projects – both inside and outside of the EU's policy framework of the European Innovation Partnership 'Agricultural Productivity and Sustainability' (EIP-AGRI). The project team learnt from their own experiences and from good practice examples of others implementing the idea of cooperation for innovation.



The results and recommendations emerge from encompassing data collection in the field. In 2018, the search through public databases provided a list of 1357 funded projects identified as cooperative and participatory (multi-actor criteria). A systematic selection process resulted in 200 projects or networks, which entered the light touch review involving all LIAISON partner teams (Figure 2). In parallel, the LIAISON

European Rural Innovation Contest (EURIC) took place in 2019. The idea was to identify and learn not only from funded projects but also from under-the-radar co-innovation initiatives on the grass-root level. An Interactive map presents the numerous entries to the LIAISON contest from across Europe. Thereof, 15 Rural Innovation Ambassadors were selected and awarded. The LIAISON Ambassador videos tell the stories of the groups' innovative ways of working in partnership.

The review of the 200 light-tough project and the EURIC laid the foundation for the selection of 30 European project groups. In total, 32 In-depth case studies provided a solid evidence base, because two international projects from other policy contexts enriched the analyses. While LIAISON's focus was to provide meaningful insights into the performance of the EIP-AGRI programme, the case studies provided lessons learnt from a diversity of multi-actor co-innovation partnerships and allowed to analyse a variety of national AKIS and policy contexts.

Annex 8 EURAKNOS Vision Paper - An EU-wide knowledge reservoir for agriculture and forestry practice

EURAKNOS H2020 project in discussion with the project's Strategic Innovation Board

This vision paper is aspirational. It reflects a 5-year vision on an EU-wide open source knowledge reservoir for agriculture and forestry practices based on outputs of H2020 Thematic Networks. The vision is based on an ideal world and is not designed to investigate the feasibility of achieving the desired elements. The presented vision results from the outputs from the EURAKNOS H2020 project and discussion with the project's Strategic Innovation Board.

Introduction

In the Agricultural Knowledge and Innovation System (AKIS), innovation in agriculture and forestry is built on the sharing and exchanging of knowledge between all key actors such as policy makers, farmers, foresters, advisors, researchers, educators, farmers' organizations, cooperatives, associations, SMEs (small and medium sized enterprises) and media. In the AKIS, some actors are mainly knowledge generators or multipliers, and others knowledge users. In the frame of strengthening the national AKISs, open access to agriculture and forestry related data and information objects enables transnational knowledge flows and exchange between relevant actors.

H2020 Thematic Networks[135] (TNs) are funded through Horizon 2020 – the European Commission's main 2014-2020 funding programme for research and innovation and may interact through the agricultural European Innovation Partnership, EIP-AGRI[136]. TNs collect practice-oriented knowledge in animal and plant production, and cross sectoral themes such as rural development to share innovative solutions, best practices and methodologies. The main aims of TNs is collecting and translating this thematic knowledge into easily understandable end-user material which provide informative recommendations, guidelines and solutions e.g. in the form of leaflets, practice abstracts, factsheets, and audio-visual outputs including videos, photos and podcasts. This material should be made available within and beyond the lifespan of the project through the main dissemination channels which farmers and foresters often use. Collecting ready-for-practice materials in an easily accessible and user-friendly common EU-wide knowledge reservoir (KR) would provide a single point of access for practitioners to discover information, giving more accessibility, longevity and visibility to resources, and stimulating interest in the implementation of knowledge and innovative practices in farming and forestry. Thus, agriculture and forestry practitioners are the main target end-users for the open source system proposed in this vision paper.

The EURAKNOS H2020 project is connecting all H2020 Thematic Networks and exploring the feasibility and sustainability of setting up such an EU-wide open source KR. In frame of this, the project's Strategic Innovation Board has reflected on the features and functionalities of such a system within 5 years during a foresight exercise that was held in Bruges on January 31st 2020.

[135] https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-brochure-thematic-networks-under-horizon
[136] https://ec.europa.eu/eip/agriculture/en/about/thematic-networks-%E2%80%93-closing-research-and

2020 Vision on a common EU-wide knowledge reservoir for agricultural and forestry practices

This vision paper aims broadly to address the question: What should an open source KR for agriculture and forestry look like, and what do we need and want from it? The paper will discuss achieving high impact, the needs of target end-users in terms of interactivity and content, and ways to secure the longevity of such a system.

The proposed KR platform will serve two main purposes:

- To be a tool for TNs to network and share opportunities and solutions to the agricultural or forestry challenges which they sought to address
- To be a destination for agriculture and forestry actors including farmers, foresters, educators and advisors to easily find and access relevant networks and information so that they can opt to implement it in their own systems.

Achieving High Impact

It is not enough to simply collate TN resources into one place: internet users have a myriad of options to find information e.g. using search engines. The proposed KR platform is to be a high impact system, meaning that it provides access to meaningful, practice-oriented knowledge to targeted actors, improving the processes of seeking and implementing information relevant to agriculture and forestry. To achieve high impact, the system must first attract TNs to provide their resources to the KR system, then end-users to engage with the information.

The system should function as a living structure, constantly being updated and enhanced. To ensure that TNs are engaged and willingly adding content, the platform will need to achieve a unique selling point: to be the unique common EU agricultural and forestry KR which end-users value and use ("Agri-Wikipedia"). Target users, TNs, and their networks should be involved throughout the co-creation process of the KR through participatory and validation exercises and consultations. The sense of co-ownership and responsibility to an open source KR will add to the likeliness to use and share knowledge, as well as to disseminate the added value out into agricultural society.

It is necessary to focus on well-defined target groups for the system to be successful, including niche markets. The content and relevant structures of the KR must be relevant to farmers, foresters, educators and advisors as the main end-users seeking information on specific areas related to agriculture and forestry activities. This should not mean that only sectorial themes will be tackled: themes like approaches for intergenerational renewal, short supply chain, or social innovation attract great interest from practitioners.

All users, including farmers, must be aware of the KR platform, attracted to try the KR platform, and experience the system positively such that they become a return user and recommend the platform to others so that the valuable and trustworthy content it contains can be further spread and utilised. This process requires that end-users perceive the KR platform to have intrinsic value by improving end-user experiences of searching for and accessing agricultural or forestry knowledge.

Providing a Positive User Experience

For the KR to go beyond being simply a comprehensive collection of resources from past and ongoing EU TN projects, it is essential that the platform enables users to quickly and easily find relevant knowledge. The platform itself should be easy to find and access, e.g. through personal recommendations or specific networking activities aimed at promoting the KR, and more general visibility e.g. through being a top result for relevant search terms within existing search engines. The KR should be available as both web and mobile app platforms. The KR should also reduce the time spent searching for accurate, relevant and high-quality practice-oriented information by utilizing a well-structured content framework based on an end-user-

oriented ontology and problem-solving approach. Existing tools can provide inspiration; the open source KR system should function similarly e.g. with a search function which filters and prioritizes results. First time users should be able to use all functions of the KR platform with great ease, requiring that the platform is available in all local languages.

Although the platform will be available for use by anyone regardless of registration, the option should be available for end-users to create an individual profile which allows the interface and its functionalities to be tailored and adapted to suit their needs according to their areas of interest and their required level of engagement, setting their own filters and preferences. It should be possible to store and personalize the KR experience for different end-users and to develop user journeys with knowledge pathways based on individual demands. It should also be possible for the KR to make connections with meteorological and market data, which farmers use on a daily basis, as a useful feature which may add to the popularity and functionality of an open source KR. When a platform is more personalized it encourages the user to feel more comfortable operating the system, which in turn leads to a higher level of engagement. To better address users' needs, analytics and interactions should be incorporated in a feedback mechanism and used for further development and improvements of the open source KR system and to provide content suggestions based on commonalities between user profiles. In this way, an individual's experience can be tailored beyond the overarching 'farmer', 'forester', 'student', 'educator' and 'advisor' user typologies.

Delivering Useful Content

Content will be obtained and regularly uploaded from past, present and future H2020 TN projects. In broad terms, the platform should contain up-to-date technical and practice-oriented information conveyed using appropriate (jargon-free) language which is easily understood and can be adapted for practice according to the end-user's context and specific needs. Materials might also include comprehensive information about recent policy and sector developments as these will impact practice. The content should be classified by sector and organized around a decision support framework which targets the knowledge needs of farmers, foresters, educators and advisors as the key end-users. The structure of the content should be organized by the problems facing each sector: if a user is seeking a solution to a problem, they cannot search for the answer if they do not know what the solution is. The information resource materials themselves can take several forms in order to visualize information e.g. text-based reports, guidelines, fact sheets and practice abstracts; infographics; podcasts; and videos. Wherever possible, open access documents should be accessible via the KR platform, while respecting and acknowledging intellectual property rights.

Quality control is extremely important. Wherever possible, automated systems should be taken full advantage of, including with respect to facilitating the upload of content to the KR platform. An easy, automated method for adding new content from projects requires interoperability of data and information systems. Furthermore, automation cannot do everything, and it is necessary to have a human element of moderation to ensure that uploaded materials are appropriate, relevant and inoffensive. (An) appropriate administrator(s) should be selected who can ensure there is suitable quality control on content that is uploaded. It is critical that content is carefully monitored to avoid providing ineffective information which may lead to lower levels of engagement. Incorporating a user feedback system will allow reviews from end-users could help to assess the quality and validity of materials once uploaded. This feedback system should include an option to flag information as outdated, inefficient or obsolete, and suggest new solutions and materials which they find relevant.

The main working language of the platform and its contents will be English. However, to further ensure an optimal personalized experience, it is essential that end-users can access the platform and its contents in their own native language. This will be achieved through automated systems, incorporating integrated user when prompted by the user. Although this may currently be difficult to achieve, it is anticipated that automated language translators will become ever-more accurate in the near future.

Although meant as an inclusive and pluralistic framework, this proposed system may be more oriented to farmers and foresters who are more digitally skilled. To be as inclusive as possible, educators, advisors and facilitators should be strongly valued as end-users who also interact with and educate other groups of farmers and foresters. Therefore, information should be made readily available as training materials for further dissemination and exploitation by advisors and educators such as teachers at vocational schools, technical colleges and agricultural universities using a problem-based learning approach with new learning methodologies. It would also be possible to connect with adult learning and lifelong learning programs including farmer learning groups and Operational Groups.

Although the focus should be on creating a digital (online) platform, equally important is that the open source KR should facilitate virtual as well as physical interactions, meetings and exchanges. The platform would also connect and display the events of various institutions so that users can search by topic and location to choose the most local and/or relevant activity to attend from a comprehensive list. Furthermore, with appropriate permissions in place, registered users can share their contact details and areas of interest/expertise for other users to search and connect with other individuals to foster and facilitate peer-to-peer and farmer-to-advisor networking as part of an interactive community experience.

Attaining a Self-Sustaining System

The EU knowledge reservoir for agriculture and forestry should be a self-supporting open source system which links knowledge collected and co-created from all AKIS levels (regional, national, international) and all types of projects including TNs and other multi-actor projects, as well as Operational Groups under EIP-AGRI and projects known by National Rural Networks. The proposed online knowledge resource must fit and perform within the existing innovation system (AKIS or AIS) which is about relationships, interconnections and knowledge flows. The use of the system will be driven by its level of interest, functionality and impact. Networking and knowledge sharing by users of the platform who perceive the KR to have intrinsic value will make other practitioners aware of the open source KR, creating a ripple effect that will motivate increased engagement. To further attract increased use of an EU-wide open source common KR for agriculture and forestry, it should connect to other communication and dissemination channels such as advisors' websites, farmers' organization websites, project websites, paper-based promotional materials (e.g. flyers, posters), various social networks, newsletters and news emails, press releases, agricultural press materials (both print media and online) etc.

A joined-up approach and concerted effort is likely to benefit all parties, hence establishing a better functioning AKISs in all member states. The European Commission may in time see an interest in the KR as an instrument linking AKIS between member states with a view to keep a critical mass of agriculture/forestry related knowledge public3. This could help counter current trends to privatize knowledge within companies to strengthen their commercial position, an approach which is becoming more and more common in the agricultural chain. A similar conclusion about the need for retaining public knowledge can be drawn from Foresight exercise done by the Strategic Working Group's AKIS of the Standing Committee for Agricultural Research (SCAR) during its 3rd Mandate.

A clear business model is needed, taking into consideration intellectual property rights. The common EU-wide knowledge reservoir provides a standardized approach and would act as a marketplace for an exchange of benefits between the broad TN and agricultural practitioners' community. This added value would warrant public funding to cover the platform's overheads. However, this funding is not guaranteed. If necessary to overcome a gap in public funding, allowing paid advertisements to feature on the platform is to be considered, as these could compromise the neutrality of the resources and knowledge content included in the platform, as well as the user experience.

Although policy makers are not a key target end-user group, they can use the KR platform to access information to understand the problems facing agriculture and forestry, and policy should be developed based on this understanding. As such, content for the open source KR will, on the one hand, be developed

based on the regulatory framework set out for farmers and foresters, and on the other hand, policy makers can make use of the KR to understand the challenges and opportunities these sectors are being confronted with. This improved understanding may contribute to closing the gap between these groups of actors, as well as with other key actors in agricultural and forestry innovation. This may result in better understanding and collaboration between policy makers and the agricultural sector, including all interrelated fields (agri-food chains, consumers, environment, biodiversity, climate, bio-based industries, rural areas, etc.).

The future EU Common Agricultural Policy (CAP)4 highlights the importance of digitalisation of agriculture and rural areas. The proposals for the new CAP include the development of strategic plans in which member states outline how they intend to meet the nine CAP objectives using CAP support instruments while responding to the specific needs of their farmers and rural communities. According to the proposal, the member states have to address the cross-cutting objective of fostering and sharing of knowledge, innovation, and digitalisation in agriculture and rural areas, and encouraging their uptake (Article 5), as well as a specific objective to enhance market orientation and increase competitiveness, including greater focus on research, technology and digitalisation (Article 6b). Most importantly, member states are asked to put forward in their CAP strategic plans a strategy for the development and better interconnection of their AKIS, and the use of digital technologies in agriculture and rural areas. Member states will need to highlight the elements of the CAP strategic plan that support the modernization of the agricultural sector (Article 102), closing gaps between science and practice and improving knowledge flows according to the CAP cross-cutting objective. Strategic approaches to ICT in agriculture and rural areas will be key to foster the digitalisation of the EU's agricultural and rural areas and systematically enhance knowledge flows.

National KRs are increasingly being developed in member states. National CAP networks can play an important role in strengthening the national AKISs through digitalisation and assisting in defining functionalities, use of coding and IT language, and facilitating the interoperability between the different KRs and the connection to an EU-wide common agriculture and forestry KR. In this way, the digital asset can adhere to the "FAIR principles" 5, meaning that resources are Findable, Accessible, Interoperable, and Reusable. CAP networks could also play a role in providing translation of ready-for-practice materials into and from local languages which contribute to agricultural innovation and rural developments. An EU-wide open source system should be promoted by National Rural Networks as well as local authorities and policy makers as a destination to store and organize resources from projects to help ensure their impact and legacy.

Conclusion

An EU-wide open source KR for agriculture and forestry will provide agriculture and forestry practitioners with a valuable 'one stop shop' for their knowledge needs. By co-creating a user-friendly interface with useful, practice-oriented content, relevant information will be more easily found and implemented by end-users. Going beyond providing a digital resource, notably by facilitating networking activities both online and in-person, will provide opportunities for improved learning from the content of the KR. Moreover, the KR platform's networking facility will make it easier for TN participants to engage in cross-exchanges and collaborations. This will help to foster an interactive EU-wide agriculture and forestry community, providing substantial EU added-value by initiating and supporting knowledge flows across Europe and beyond. Thus, costs will be reduced and overlaps between member states will be avoided.

This community based on the EU wide open source KR may also help policy makers, ensuring that policy and practice work hand-in-hand to achieve the best outcomes in practice. This vision is extremely compatible with AKIS strategies6 to strengthen links between research, practice, education and farm advisors, to enhance interactive innovation and support digital transition in agriculture. It will also substantially contribute to the United Nations Sustainable Development Goals7, particularly those seeking to end hunger and promote industry, innovation and infrastructure. The common KR platform will be an interactive tool which enables a joined up approach to addressing common problems.

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