



Citation: Inge Van Oost, Anna Vagnozzi (2020) Knowledge and innovation, privileged tools of the agro-food system transition towards full sustainability. *Italian Review of Agricultural Economics* 75(3): 33-37. DOI: 10.13128/rea-12707

Received: December 15, 2020

Revised: January 11, 2021

Accepted: February 08, 2021

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Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Knowledge and innovation, privileged tools of the agro-food system transition towards full sustainability

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Abstract. The two strategic documents for the future of Europe post 2020 (Green Deal) and agriculture in Europe (From Farm To Fork) recognize the important role of knowledge and innovation systems in accelerating change towards food sustainability. Researchers and advisors, together with the other actors of the Agricultural Knowledge and Innovation System, 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. The proposed text aims to clarify how a systemic and interactive approach acts towards the above strategic aims in a more effective way, starting from what has already been achieved in this European programming period 2014-2020. A specific focus will be assigned to the EIP-AGRI initiative, to its first results and to its possible evolution.

Keywords: knowledge and innovation, AKIS, interactive approach, advisory.

JEL codes: Q16.

1. INTRODUCTION

The promotion of knowledge and innovation will be a central effort of the future European policy continuing, broadening and fine-tuning the interventions already realized in this programming period.

The EC Communication (12/2019) «The European Green Deal» aims “to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use”.

To realize this engagement the EU will have to maintain and increase its intervention in order to promote knowledge, new technologies, sustainable solutions, innovations. The next Research Framework Program, Horizon Europe, will address a significant portion of the budget (35%) to new solutions for climate and also other instruments will have the same priority. The approach pursued will not only be conventional but the actions will be systemic because they will promote cross-sector, multi-actor and interdisciplinary

nary work. Data useful for innovations should be easy to access and interoperable. The growth of human capital activating education and training will play a central role.

With reference to the agricultural, forestry and food sector, the EC has published a specific strategic document (05/2020), «From Farm To Fork» that describes the sectoral strategy. «The COVID-19 pandemic has underlined the importance of a robust and resilient food system» we read in the first paragraph of the document. Below, the main changes of the supply chain's components are proposed starting with the agricultural and forestry producers which have to reduce the use of chemical pesticides and nutrients (especially nitrogen and phosphorus), GHG emission, antimicrobial resistance (AMR) and to invest in circular bio-based economy, renewable energy, seed security and diversity, animal welfare, seed security and diversity, organic production. The food system must ensure sufficient and varied supply of safe, nutritious, affordable and sustainable food to people at all times. Also, all the other actors of the supply chain (food processors, food service operators and retailers) have to realize more sustainable productive processes and promote healthier consumer choices. It's important to empower consumers to make informed, healthy and sustainable food choices and reduce food loss and waste.

The above goals are numerous and difficult to achieve. Therefore, EC is aware that some instruments must be identified to support and address the change. «To enable the transition», the promotion of agricultural knowledge and innovation systems is a key factor. Agricultural Knowledge and Innovation Systems (AKIS) area complex field where research and innovation are in direct connection with practice and connections with farmers and operators are fostered through the support of other development factors such as farmers' organisations, advisors, education, digital tools, data and knowledge sharing. Central issues concerning the AKIS involvement focus on which approach allows more effective interventions and a quicker change of the agri-food practises towards sustainability.

The role of research, advisory services and education as multipliers of the socio-economic and technical development have been demonstrated by expert authors dating back to last century (Nitsch U., 1972, 1984; Ruttan V., 1982; Alston J., 1992; Rivera W.M., 1997; Esposti R., 2000). In the 21st century scientific studies have focused their attention on methods, tools and approaches to make the components of AKIS more useful to promote a real improvement and transformation of rural territories and farms.

The different analysis came to a common conclusion: the interactive approach to innovation is the most

effective both for understanding the needs of rural territories and farms and for promoting the adoption of innovation itself.

The central topics of this specific type of intervention (Giarè, Vagnozzi, 2019) are:

- the positive co-existence between innovation arising from research and innovation arising from practice (Ingram *et al.*, 2018);
- the importance of producing tailor-made innovations analysing the socio-economic context and farmers' problems/opportunities (Sewell *et al.*, 2017);
- the need to provide frequent interactions among different rural actors (Klerks *et al.*, 2012; Hermans *et al.*, 2015) in order to promote effective development actions.

The interactive approach to innovation has been adopted by the EU as from programming period 2014-2020, particularly in the European Innovation Partnership on Agricultural Productivity and Sustainability. This initiative has promoted many innovation projects (Operational Groups – OGs) in almost all European countries with the specific feature that the main actors of the knowledge and innovation systemwork together. The EIP AGRI is working very well with more than 1800 OGs already running or finished and up until 3200 planned by the end of the next 2 years.

Also, the current Research Framework Programme, Horizon 2020, has supported the approach mentioned above with two types of projects, the multi-actor projects and the thematic networks. Thematic networks are support and coordination activities with the aim to gather all the innovation results on a specific research topic and to put together the actors that are interested into the issues or opportunities concerning an agricultural productive sector or a specific rural territory. In multi-actor projects, researchers and practitioners co-create ready to use solutions to the needs of the farming and forestry sector.

The next programming period of the European policy will continue these formats under Horizon Europe and the post 2020 Common Agricultural Policy (CAP). Moreover, the EU has chosen the interactive approach for managing the entire intervention on knowledge and innovation for the forestry and AGRIFOOD sector by focusing on the Agricultural Knowledge and Innovation System (AKIS) with specific attention to the involvement of all the actors and to the promotion of effective relations and information flows among them.

The next paragraphs aim to describe this political line and the main instruments promoted in it.

2. A STRATEGIC APPROACH TO KNOWLEDGE AND INNOVATION FOR CAP POST 2020

The intervention promoted by the future Common Agricultural Policy (CAP) for agricultural knowledge and innovation has been designed considering the experience of the last seven years. Two lessons have been very important:

- the good results of the EIPAGRI initiative with its Operational Groups and of the Horizon 2020 with the multi-actor projects, which both have adopted a partnership-based approach to co-creation the innovation,
- the problematic performance of the farm advisors and in general of the other AKIS actors who hardly relate to each other.

So, the new CAP has chosen to adopt a systemic setting, clarifying that the AKIS system is the main driving force of the next interventions. The latest version of the CAP regulation proposal provides also a definition of AKIS: “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)” (art.3, k) in which the relationships and exchanges are pointed out.

The objective of modernising the sector by fostering and sharing of knowledge, innovation and digitalisation is defined as a cross-cutting objective. It is the way for promoting and speeding up all the other nine specific objectives related to the improvement of incomes and competitiveness; the promotion of actions for environmental care, preserving biodiversity, managing climate change; as well as the support of rural people, generational renewal and enhancing food quality and healthy diets.

In the next programming phase, the role of ICT is strengthened because it creates an enabling context for other technologies and opportunities. The digital technologies had an uneven spread in European regions especially in rural areas due to lack of infrastructure, but also due to farmers and agricultural operators’ limited skills. Therefore, AKIS actors should be address also helping to minimise a digital divide and make better use of the digital novelties.

The general choice of governance, to envisage a National Strategic Plan organizing all the CAP interventions, is consistent with the holistic approach of the AKIS. It requires from the EU Member States an analysis of the single system’s components and of the organizational set-up starting from the structural and operative needs up to the actions for improving knowledge

and innovation flows. The regionalized States will have to make a greater effort than the others to coordinate the reviews and the so-called «SWOT analysis», to identify the crucial points and to choose the main actions to be taken. However, it will be a positive commitment because they will have to select the specific regional needs resulting from local demands and implement the approaches, tools, rules and administrative procedures with a common agreement. This approach should reduce the fragmentation of the AKIS and respond to AKIS actors’ requests and needs. The latter, often having inter-regional structures/organization, sustain increases in costs and work time to comply to the different regional approaches or rules.

A special attention is directed by the CAP regulation proposal to the farm advisory services. These instruments for the rural development have been in the structural CAP since the last decades of the twentieth century, then, in the 2000s, they received less attention and, finally, they were fragmented from the rest of the AKIS in a separate system focusing on cross-compliance in the CAP programming phase 2007-2013. Advising is a key area of AKIS with the task of supporting farmers in the production and in the management of farm; the role that is most recognized to advisors is to be the link between research and farm especially in the innovation adoption. Now with the wider area of AKIS aims and functions, the farm advisors need to fulfil a great number of tasks and have different types of expertise, we can mention, just as an example, the advisors’ role in innovation brokering and in the animation of rural communities in building innovative projects (Menna *et al.*, 2020). The European Commission has stressed in the proposal regulation that the farm advisory services are an essential component of AKIS because in the current programming phase there is a limited use of the funding for advisory farm services in the Rural Development Program (Measure 2) and a too low involvement of the advisors in the EIP-AGRI Operational Groups’ projects. Moreover, in some European countries, including Italy, the farm advisors do not have an operational stability because they sometimes lack an official recognition (legal or institutional) and/or the advisors are employed especially in private bodies (professional organizations, producers’ associations, groups of freelancers).

In the last year, this issue has been discussed in SCAR¹ AKIS working group (4th Report, 2019) and in European meetings of the EIP-AGRI Network (Van Oost, 2020) where some other specific considerations have been listed:

¹ Standing Committee of Agricultural Research was instituted by the European Commission in the 1974

- it's necessary to go beyond advising as linear knowledge «transfer» and move on holistic and interactive advice targeted to the farm's and farmer's context;
- the advisory work is characterized by a wide variety of methods and tools (individual advice, group advice, training, workshops, demonstration etc.);
- advisors can also act as innovation brokers/facilitators, capturing farmers' needs and sharing innovative outcomes,
- the networking among advisors from regional to national and European level improve the flow of information and knowledge;
- the advisors' training is a central need especially on emerging issues such as digital techniques, soft skills for better interactivity, innovations for sustainability and climate change, generational renewal;
- the new advisor has to cover a range of new themes and instruments: whole value chain approach, bio-based chains, dialogue with society etc.;
- it's necessary to simplify administrative procedures and control systems aiming to the quality of advising.

The next political phase envisages the funding of a variety of types of intervention such as farmers' and advisors' training, demonstration, drawing up and updating plans and studies, exchange and dissemination of knowledge and information. Compared to the current programming period these actions can be used very flexible, and can be combined and organized together to reach the goals defined in the Strategic Plan.

As mentioned above, the European Innovation Partnership for the Agricultural Productivity and Sustainability is confirmed in the CAP post 2020, again with high EU co-financing rates. It is the European intervention that has realized the systemic and interactive approach to innovation better than others and increased the volume of practice-oriented knowledge in Europe.

The aims of the EIP AGRI will be the same but the proposal regulation highlights the methodological aspects clarifying that the tasks are: «to create added value by better linking research and farming practice», to connect all the actors of the innovation chain, to promote the adoption of the innovations by the farms and to collect the needs of rural territories and firms for promoting new research.

The main instruments are still the Operational Groups that have to widen and become more creative in their projects in the direction of the co-decision and co-creating and the involvement of relevant actors. Operational Groups can now also act across borders and receive pre-financing, which will help the weaker players, such as farmers and advisors, to start up innovative

projects. Best practices discovered in the current period will be able to apply, for example continuously bottom-up and open calls, financing the preparation step of the innovative project.

The knowledge and innovation component of the CAP will be also supported by the new European Framework Program of the research «Horizon Europe» that is adopted. The agricultural, forestry, food and natural resources have their funding in Pillar II «Global Challenges and European Industrial Competitiveness» and it is Cluster 6: «Food, Bioeconomy, Natural Resources, Agriculture and Environment» with an important financial allocation: 9 billion €. This cluster, in turn, is composed by seven intervention areas: Environmental Observation, Biodiversity and Natural Resources, Agriculture, Forestry and Rural Areas Seas, Oceans and Inland Waters, Food Systems, Bio-based innovation systems in the EU, Bioeconomy Circular Systems.

3. CONCLUSION

Knowledge and innovation have a key role to play in helping farmers and rural communities meet the future challenges. Although there is already a substantial amount of knowledge available and agricultural research delivers new advancements, this knowledge is fragmented and insufficiently applied in practice. The new CAP post 2020 will make advisors, researchers and CAP networks cooperate to provide for comprehensive innovation ecosystems at Member States' level delivering qualitative services. This will strengthen the Agricultural Knowledge and Innovation System in each Member State to structure knowledge exchange and foster innovation processes.

Well-functioning of the AKISs helps to speed up innovation throughout the EU, avoid duplication of efforts, save costs and strengthen the impact of EU/national/regional R&I funding. Supported by the EIP-AGRI and its innovative Operational Group projects as well as by the many Horizon Europe multi-actor projects, the stronger AKIS systems will even more increase the EU-added value. They will encourage not only locally adapted co-creation of knowledge and innovation but also initiate systemic cross-border exchanges of knowledge and innovation within the EU.

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