AKIS and advisory services in *Italy*

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

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Executive summary

The present report provides a comprehensive overview of the Agricultural Knowledge and Information System (AKIS) in Italy, with a focus on local Farm Advisory Services (FASs). It has been conceived as an update of the report for the AKIS inventory drafted in the framework of the PRO-AKIS project in 2015 (Caggiano, 2014). Relying on the analysis of the recent changes in national and European policies and on direct interviews with stakeholders and advisors, the present report describes the evolution of Italian knowledge system in matter of agriculture and rural development.

Italian AKIS reflects the complexity of both national administrative system and agricultural sector. Whereas the first his highly de-centralized, with the National Government setting general rules that Regions are deemed to adapt and apply to their territory, the second highly varies according to the manifold environmental and socio-economic features of Italian countryside.
As a matter of fact, the Italian AKIS is a complex multi-actor and multilayered system, characterized by a large number of entities and governance levels, with countless actors and stakeholders that work on overlapping topics but with specific fields of expertise and areas of competency.

The degree of cooperation and integration varies deeply according to the kind of actors involved, the Region they belong and the policy framework within they act but generally speaking, at local level, cooperation measures for innovation introduced by past and present RDPS, as well as local learning and innovation networks, have contributed to the development and/or the strengthening of relations among such different actors and, in particular, between farmers and advisors on the one hand and the research world on the other. On the contrary on a more national or interregional level liaisons seems to be weaker, essentially dependent by formal agreement or institutional cooperation frameworks. Outside Rural Development policies, relationships capable of involving different actors along the knowledge supply chains are mostly project-based, with scarce long-term perspective. There's a lack of coordination that only in recent times has been addressed by national and regional authorities by mean of *ad hoc* coordination plans. With specific reference to FAS, the obligation to establish a farm advisory

system provided by REG EU 1306/2013, has brought to a new regulatory system setting up rules for the acknowledgment of FAS providers.

The survey carried out among services providers describe a FAS that still has scarce connection between research and farmers' knowledge needs (82% of respondents has classified it as medium or low), strongly dependent on support coming from agricultural policies. Also, the topics addressed by advisors are more concerned on traditional themes (access to RDP measures, cross-compliance, and farm management) than innovative ones (use of digital equipment, marketing and logistics). On the other hand, advisors have a strong and variegated background that allow them to deal with a large variety of issues, from a technical and managerial point of view. 60% of the interviewees have access to some kind of skills development program. Professionals are required to undergo regular training organized by the regional professional orders.

The relationships with other AKIS actors vary depending on the type of advisor considered. Freelancers have stronger links with private enterprises, such as other advisory organizations, universities, farmers' organizations and public authorities. Instead, advisory organizations have strongest links with farmer-based organizations. In both cases, there are linkages with Operational Groups, which operate in several Italian regions.

Table of Contents

List of Tables

List of Figures

Abbreviations

ALSIA	Lucanian Agency for Development and Innovation in Agriculture
AGRIS	Agricultural Research Agency of Sardinia
AKIS	Agricultural Knowledge and Innovation System
AIAB	Italia association of organic agriculture
AICS	Agency for Development Cooperation
ARA	Livestock Breeders' Association of Basilicata
ARAS	Regional Breeders Association of Sardinia
AS	Advisory Services
CAI	Agricultural Consortia of Italy – Consorzi Agrari d'Italia
CAP	Common Agricultural Policy
CIDFA	Consortium for Agricultural Dissemination and Training
CIFIV	International Center for Veterinary Training and Information
CNAAL	National Order of Agrotechnicians and Graduate Agrotechnicians
CNR	National Research Council
CONAF	National Council for Agronomists and Professional Foresters Order
CRA	Council for Agricultural Research
CREA	Council for Agricultural Research and Economics
EAFRD	European Agricultural Fund for Rural Development
ENEA	National Agency for new technologies, energy and sustainable economic development
ERDF	European Regional Development Fund
ERSAT	Regional Agricultural Development and Technical Assistance Agency
ESF	European Social Fund
ESI	European Structural and Innovation
EU	European Union
EUTR	European Union Timber Regulation
FAS	Farm Advisory Services
FIRAB	Italian Foundation for Research in Organic and Biodynamic Agriculture
FLEGT	Forest Law Enforcement, Governance and Trade licensing scheme
FNOVI	National Federation of Veterinary Doctors
FONDAGRI	Foundation for agricultural advisory services
GDP	Gross Domestic Product
GDO	Large-Scale Retail Trade
GVA	Gross Value Added
INEA	National Institute of Agricultural Economics
IPA	Italian Partnership Agreement
ISMEA	Institute of Services for the Agricultural and Food Market
ISPRA	Higher Institute for Environmental Research
ISS	Higher Institute of Health
IZS	Experimental Zooprophylactic Institute

INRAN	National Research Institute on Food and Nutrition
ISTAT	Italian National Institute of Statistics
LAG	Local Action Group
LSU	Livestock units
MA	Managing Authority
MAECI	Ministry of Foreign Affairs
MATTM	Ministry for Environment, Land and Sea Protection
MI	Ministry of Education
MIBACT	Ministry of Cultural Heritage and Tourism
MIPAAF	Ministry of Agricultural, Food and Forestry Policies
MISE	Ministry of Economic Development
MIUR	Ministry of Education, University and Research
MTI	Ministry for the technological Innovation
MUR	Ministry of University and Research
NOP	National Operational Programme
NRN	National Rural Network
ROP	Regional Operational Programme
OG	Operational Group
PO	Producers organization
PNR	National Research Programme
PRIN	National Plan for Research Infrastructures
RADI	Regional Agencies for Development and Innovation in Agriculture
RaF	Report on the state of forests and the forestry sector in Italy
RDP	Rural Development Programme
RI	Research Infrastructures
RIS3	Regional Strategy for Research and Innovation for Smart Specialisation
S3	Smart Specialisation Strategy
SISEF	Society for Silviculture and Forest Ecology
SPIR	Strategic Plan on Innovation and Research for Agriculture, Food and Forestry
UAA	Utilized Agriculture Area
UILA	Italian union of agricultural workers
WWF	World Wide Fund for Nature

1. Main structural characteristics of the agricultural and forestry sector

Italian territory is laid right across the Mediterranean Sea. Its position has provided the Country with unique historical, environmental and geological features that have shaped national social and economic tissue over the centuries and still have effects on modern Italy.

Operating a rough division of the Italian territory in two halves such a difference is highlighted by the composition of land use, with a strong prevalence of agricultural areas (52% vs 39% of total land use) and, on the contrary, a minority of built-up areas (8% vs 12% of total land use) in Southern Italy in respect to Centre-North. Also, the distribution of the Gross Value-Added (GVA) stresses significant territorial differences, as in Southern Italy there is a slight prevalence of services in respect of Centre North (79% of total GVA vs 72%) at the detriment of manufactures (22% vs 30% of the total GVA).

Nowadays Italy is an advanced economy, highly oriented toward services. However, territorial differences still reverberate in national economic and social assets, to such an extent that a significant gap in per capita GDP – and in other indicators – between the regions of Centre-North and Southern Italy still persists (Table 1), with performances that move away from the European average according to a north-south gradient.

Table 1. Italy: main social and economic indicators and indexes

	Population	Population density (inhab/Km^2)	GDP (million euro)	Per Capita GDP (euro)	Employment rate (15 - 64)	Unemployment rate (15 - 64)
EU - 27	446,824,564	106	13,483,857.12	30,177	68.4	6.8
Italy	60,359,546	200	1,765,421.00	29,248	59.0	10.2
North-West	16,093,286	278	580,111.24	36,047	67.3	6.6
North-East	11,652,827	187	408,053.96	35,018	68.9	5.6
Center	12,016,009	207	380,983.04	31,706	63.7	8.9
South	13,957,942	189	270,706.50	19,394	45.1	17.5
Islands	6,639,482	133	124,114.90	18,693	44.2	18.9

Source: Eurostat

Information on the agricultural sector

Italian territory is spilt in two eco regions (temperate and Mediterranean) that give rise to 33 ecological subsections, also due to the climatic action of the Apennines,

a mountain chains that cross the Country lengthwise. Such a various environmental context has produced a likewise agriculture, and has contributed to the plethora of products, traditions, uses and techniques that has been characterizing Italian agriculture for centuries by now.

The joint action of climate and morphological features, therefore, has produced a manifold agriculture that cannot be fitted in a single model, either from a business or technical perspective.
Side by side with the intensive, market-oriented agriculture of the main plains and valley bottoms there are countless little farms, devoted to small or quality productions, mostly distributed in mountain or internal areas whose function as providers of environmental services is far more important than their economic outputs. These two main types of agriculture deal with completely different sets of issues, since intensive agriculture struggle in a much more competitive market, strongly oriented to the long (often international) value chain, while facing sustainability issues, mostly tied to water consumption, pesticide usage and soil pollution. On the other hand, quality agriculture is essentially valorised in short, alternative value chains, where positive externalities are more promptly acknowledged than in traditional markets. Generally, this type of farming is strongly reliant on public support, mainly payments to areas facing natural or other specific constraints, because the lack of basic services, secure markets and the exposure to climate change constantly threaten the continuation of its activities.

Although the “twofold speed” of Italian agriculture is a common feature all across the country, from a macro perspective the agricultural sector shows some relevant structural and economic differences between North, Centre and South that are a direct consequence of the different economic and social framework (Table 2). In southern Italy agriculture in far less profitable than in the rest of the Country as the amount of value added per hectare is 2,756 €/ha versus 3,627 €/ha. Generally, the agricultural sector of the Northern districts appears to be much more competitive and intensive, with greater holdings and higher values of GVA per workers. On the other hand, in southern Italy there is a clear prevalence of more sustainable agriculture, with a greater quota of organic farming and a prevalence of small farmers.

Also, the distribution of the standard output across the main productions reveals a certain difference between Northern, Centre and Southern Italy, with a stronger contribution of permanent crops (grapes and wine above all) in the North, where

they sum up to the 51% of the total crop output, also thanks to a relevant contribution of viticulture (37%).

Table 2: Structural and economic indicators of Italian Agriculture

	Italy				EU 27
	North	***Centre***	***South***	***Total***	
UAA (ha)	4,441,170	2,088,310	6,068,670	12,598,150	156,662,970
Whereof: organic	*339,837*	*420,606*	*1,197,597*	*1,958,040*	*11,445,112*
Holdings	280,360	178,850	686,470	1,145,680	10,282,790
UAA/Holding	*15.8*	*11.7*	*8.8*	*11.0*	*15.24*
Livestock units (LSU) (thousand)	6,490	717	2,262	9,468	118,089
Whereof: Bovine	*2,896*	*363*	*1,295*	*4,554*	*57,457*
Swine	*1,840*	*89*	*108*	*2,036*	*31,917*
Sheeps and Goats	*64*	*128*	*609*	*801*	*7,471*
Workers in Agriculture, forestry and fishery (thousand)	288.1	125.6	430	843.7	7,903
% on total workers	*2.43*	*2.60*	*7.16*	*3.72*	*4.06*
Gross Value Added (million €)	16,110	5,686	12,931	34,727	220,725
% on Total GVA	*1.74*	*1.60*	*3.48*	*2.10*	*1.83*

Source: Eurostat National Accounts (2019), Farm structure survey (2016); Sistema di Informazione Nazionale sull'Agricoltura Biologica – SINAB (2019)

In central Italy, there is a prevalence of horticultural productions (52% of the total crop output), while in Southern Italy, where permanent crops are responsible of the 48% of vegetal productions output, fruits alone contribute for the 20% of the output generated by cropland. As for arable land, they have a certain economic importance in the North since their contribution is 29% of total agricultural production (20% in central Italy and 115 in southern Italy).

Information on the forestry sector

According to FAO, woodland covers 31.5% of the Country (EU-27 average 37.8). However, some regions are much more forested than other (as an example, the 70% of Liguria region territory is covered by woods). Despite such an importance in territorial terms, forestry has a marginal value in the Italian economy as it contributes to the national GVA with one of the lowest values in the Alpine area, except Germany. In Italy a solid and nationwide timber industry has never developed: fuelwood accounts for the 63% of the total metric cubes retrieved in forests (In 2017 EU 27 average was 23%, according to Eurostat). Consequently, sectorial contribution to the National workforce is very limited. Only 5.9 out of 100 workers in agriculture is employed in forestry and logging; taking in consideration

wood-related industry in respect to the total NACE activities, such a percentage goes down to 2.7%.

Italian forestry sector suffers from the extreme fragmentation of wooded land, traditionally managed as coppice and maintained as a supply of firewood or small working timber for the farm own use, to the extent that today a real wood industry exists only along the Alpine arch.

Because of the mutated socio-economic condition of the countryside, today Italian forests are largely under-managed, to the detriment of their ecological sustainability.

In more recent years, a new vision of forest management, aimed at conjugate its environmental functions with its economic values, brought to the valorisation of the woodland in alternative and more efficient ways. Small wood-energy supply chains, for the heating of public buildings, for instance, are multiplying all along the Apennines, while the simultaneous conversion of old coppices to high forests, to enhance their recreational value for the benefit of local tourism has become a widespread practice as well. On the other hand, as the demand of non-wooded products (berries, mushrooms…) is growing, alternative forms of management are gaining room alongside traditional ones.

2. Characteristics of AKIS

2.1. AKIS description

The Italian AKIS is a complex multi-actor and multilevel system, characterized by a large number of entities and governance levels. This is mainly due to the division of roles between the State and the Regions and Autonomous Provinces (Trento and Bolzano), which have the jurisdiction over agriculture. This institutional arrangement has led to the raising of 21 regional AKISs, that differ from each other by organizational models, contents, procedures.

As a matter of fact, this specific administrative configuration implies different levels of definition of the AKISs and their coordination structures, which also reflect the cultural and relational specificities of the regional territories as well as the policy and administrative approaches of the regions. From a national perspective, the Italian AKIS, as a whole, is strongly interconnected with the regional ones and permeated by actors and knowledge flows that only in some cases are restricted to the national or regional/territorial level. In general, several organisations, both in the research (e.g., CREA, CNR) and in the productive world (i.e., farmers' unions), are actors, indiscriminately and actively, in the national and the regional AKISs. It is also worth to note that the relational dynamics of the different actors are not always shaped by common approaches applied to different levels and territories. For instance, farmers' unions generally follow common logics within the different AKIS, while the relations of research institutes and universities are more often shaped by the individual behaviour of the respective researchers.

An in-depth description of the Italia AKIS is provided in the following sections.

2.1.1. AKIS actors and knowledge flows

In general, Research is under the responsibility of both the State and the Regions, Education is under the National authority, Extension and vocational training fall within the responsibility of the Regions.

Research, for instance, is carried out by different subjects, both private and public, with the first being very active on the territory and often at the service of specific sectors of primary importance at local level. On the other hand, public research

relies on the action of a consistent number of bodies that are connected to or directly supervised by Ministries or Regions, in addition to universities.

Likewise, education is mainly a public State competence, although private subjects and public bodies can establish their own education institutions. Vocational training is under Regions' jurisdiction since 1978 and training activities are carried out by specific training agencies that can have both public and private nature.

Agricultural research

Agricultural research in Italy is spread among a high number of actors, including institutions of promotion and funding and implementation organisms.
Among the first ones, the Ministry of Agricultural, Food and Forestry Policies **(MIPAAF)** is the main responsible for agricultural research, through the provision of specific funding, coordination of R&D policies and supervision over the most important agricultural research organism in Italy (Council for Agricultural Research and Economics -CREA). However, other Ministries are involved in the field of agri-food and forestry, including the Ministry of Education, University and Research **(MIUR)**, which is responsible for the whole national research policy and the NOP "Research and Innovation", the **Ministry of Health**, the Ministry for Environment, Land and Sea Protection (**MATTM**) and the Ministry of Economic Development (**MISE**) that is responsible for the NOP "Enterprises and Competitiveness".

The Regions and Autonomous Provinces are responsible for the management of European programmes (RDPs and ROPs), but they also allocate their own resources to regional projects and/or to their own instrumental research institutes.

Among the *public implementing organizations*, in addition to the regional instrumental institutions, there is a consistent number of bodies connected to or supervised by Ministries, such as:

- Universities, with their departments and schools, operating under the MIUR responsibility who is in charge of coordinating and financing them;
- the National Research Council (CNR), with its 7 Departments and 91 Institutes distributed throughout the country, is funded and supervised by the MIUR. The agricultural research is mainly, but not exclusively, concentrated in the Department of Biology, Agriculture and Food Science;
- CREA, that is the leading Italian research organization dedicated to the agri-food and forestry supply chains, funded and supervised by the MIPAAF. It was

established in 2015, from the merging of CRA (Council for Agricultural Research), INEA (National Institute of Agricultural Economics) and INRAN (the National Research Institute for Food and Nutrition) and It is articulated in 12 research centres throughout the country;

- the Institute of Food Services for the Agricultural Market (ISMEA) and the Institute L. Spallanzani (animal science), funded and supervised by the MIPAAF;
- the National Agency for new technologies, energy and sustainable economic development (ENEA), funded and supervised by the MISE;
- the Higher Institute for Environmental Research (ISPRA), funded and supervised by the Ministry of Environment;
- the Higher Institute of Health (ISS) and the Experimental Zooprophylactic Institutes (IZS), spread throughout the whole national territory, funded and supervised by the Ministry of Health;
- the Italian Agency for Development Cooperation (AICS), funded and supervised by the Ministry of Foreign Affairs, that implements measures to enhance environmental impacts and mitigate the effects of climate change, focusing particularly on water, soil, climate and biodiversity;
- other public institutions, depending on different Ministries, deal (but not in exclusive way) with issues related to agriculture such as the National Statistics Institute, The Study Center of the Chambers of Commerce Guglielmo Tagliacarne srl and others.

The Regions and Autonomous Provinces can regulate and fund agricultural research programmes tailored to local needs and territorial specificities. They can manage research projects directly, carrying out the research through their institutions, centres or Regional Agencies for Innovation in Agriculture (RADIs) (e.g., Piedmont, Autonomous Provinces of Bolzano and Trento, Sardinia, Sicily), participating in a research consortium, or by means of public and private institutes selected through competitive bids. Some of the regional research centres are also an excellence at national level (e.g., the Edmund Mach Foundation, which include tha Istituto Agrario di San Michele all'Adige, in Trento Province; the Research Centre for Fruit and Vegetable production in Emilia Romagna Region - CRPV, etc.) and, in some cases, they also work as extension services, such as the Laimburg Research Centre for agriculture and forestry in the Bolzano Province.

Private agricultural research is very dynamic, especially at territorial level, and is carried out mainly by a variety of actors, including:

- private research institutes (e.g. FIRAB – the Italian Foundation for Research in Organic and Biodynamic Agriculture, www.firab.it (see BOX 1), EURAC (http://www.eurac.edu/en/Pages/default.aspx)),
- university spin-offs (e.g., HORTA srl, https://www.horta-srl.it/),
- food industries or other sectors enterprises (chemical, mechanical, etc..) that provide productive inputs,
- agricultural enterprises with high added value (e.g. large farms in the wine sector), agri-food cooperatives, farmers networks (e.g. Rete dei Semi Rurali, https://www.semirurali.net/),
- Producers Organisations (PO), farmers cooperatives, consortia,
- polyvalent analytical laboratories (e.g. ISVEA, http://www.isvea.it/), Applied Research Institutes and Technology centres,
- Foundations, associations, scientific societies and others (e.g. SISEF - Society for Silviculture and Forest Ecology).

Among these actors there are also Technological Parks and clusters (e.g., Puglia Food Technological District, https://www.darepuglia.it/) that are *public-private partnerships* involving local authorities, universities, public research institutes and private research organisations.

Box 1 FIRAB - Italian Foundation for Research in Organic and Biodynamic Agriculture

The Italian The Italian Foundation for Research in Organic and Biodynamic Agriculture (FIRAB) was established in 2007 thanks to the initiative of its founding members: AIAB (Italia association of organic agriculture), UILA (Italian union of agricultural workers), Legambiente (ONG) and the Italian Biodynamic Association. It promotes farming experimentation and research-action, while encouraging farmer-to-farmer exchanges of knowledge to disseminate practical, technical and scientific experiences, also through strengthening the network of demonstrative farms in Italy and Europe.
It is also one of the most relevant points of reference for the political and cultural debate on organic farming and bio-dynamic agriculture, particularly by promoting the democratization of research and socialization of farming practices and knowledge.
Over the years, FIRAB gained a lot of experience in multi-actor projects at both EU (H2020, 7FP and LIFE projects) and national and regional (EIP-Agri OGs) level, playing different roles in carrying out activities ranging from scientific research to dissemination and practical experimentation of farming methods.
In fact, FIRAB promotes, supports, carries out and disseminates innovations in the field of organic and biodynamic agriculture, from production to consumption, directly and/or collaborating with both public and private bodies or institutions.
In this scenario FIRAB works to carry out research and innovation activities capable of expanding the knowledge base for organic and biodynamic agriculture, through the integration of scientific and local knowledge, between researchers, advisors and farmers,

and between research, training and technical assistance, promoting a participatory research model.
This transdisciplinary and wide activity makes FIRAB very well embedded within the different AKISs across Italy, and well connected with actors that range from policy makers to researchers and farmers.

Private research organisations are in general connected or work synergistically with the main public research institutes.

Global expenditure in Research and development (GERD) in the agricultural sector is interested by an increasing trend, considered the five-years frame 2014-2018. Anyway, a closer look to the figures in table 3 shows that such an increment is solely produced by the expenditure in the Higher education system, while governmental and private non-profit sectors has reduced their disbursements. The trend in overall employees' number follows spending capacity: the number of workers in Higher Education sector have increased of an overall 68%, while Governmental research bodies have reduced their employees by 10%.

Table 3: Total expenditure on R&D on Agricultural science by sector

Sector	**2014**		**2018**		***Variation 2014 to 2018***	
	GERD	**Employment**	***GERD***	**Employment**	***GERD***	**Employment**
Government Sector (GOV)	301,902	5,894	270,478	4,948	*-10%*	*-16%*
Business Enterprise Sector (BES)	NA	NA	NA	NA	*NA*	*NA*
Higher Education Sector (HES)	228,637	4,962	329,068	7,861	*44%*	*58%*
Private non-profit sector	28,263	476	9,017	NA	*-68%*	NA
Total	**558,802**	**11,332**	**608,563**	**12,809**	***9%***	***18%****
% of GDP	**0.03**		**0.03**			

** Private non profit sector excluded.*
Source: Eurostat

Education and vocational training

The Italian education system is mainly a public State system and it is coordinated by the Ministry of Education, University and Research (MIUR), which is in charge of all education, from primary school to university level.
However, private subjects and public bodies can establish education institutions. Such non-state schools can be either equal to State schools (called *scuole paritarie*) or merely private schools. These latter cannot issue qualifications.
The Government directly funds state schools, while *scuole paritarie* receive state contributions according to criteria that are set annually by the MIUR.

The Italian education system includes early childhood education and care (0-3 and 3-6), primary, secondary, post-secondary and higher education. It is organised according to the principles of subsidiarity and of autonomy of institutions, with different competencies shared between the MIUR, the Regions and local authorities. Both schools and universities have a high degree of autonomy: they define curricula, widen the educational offer, organise teaching. Particularly, at higher education level, universities have statutory, regulatory, teaching and organisational autonomy.

Education in agricultural and veterinary fields is provided by:

- secondary schools, namely professional institutes (focused on Agriculture and Rural development) and technological institutes (focused on Agriculture, agro-food and agro-industry). In Italy there are 153 Agricultural Institutes, 9 of which are oenological ones. Forestry is not central in the curricula of these schools, but there are some relevant exceptions, usually established by direct intervention of local administrations (e.g, the “Forestry school” in Ormea (CN) is a higher secondary school devoted to the training of forestry workers).
- Higher Technical Education-Training, addressed to under-graduate and implemented through the cooperation of secondary school, University, enterprises, professional training services/extension. The initiative is defined and funded by the MIUR, in collaboration with the Ministry of Labour, Health and Social Policies and the Ministry for Economic Development, and is within the jurisdiction of Regional Administrations. Agrofood is one of the five fields of activity;
- University.

Access to university is solely for students with an upper secondary school leaving certificate. The Ministry of education and individual institutions establish the specific conditions for admission.

Currently, throughout Italy, there are 24 Departments of Agricultural Sciences, 1 University School of Experimental Agricultural Sciences, 13 Departments of Veterinary Medical Sciences, but many other Faculties (for example, biotechnology, environmental science, economics, etc.) contribute to agricultural education.

In addition to these institutes there is also a small number of other organizations (agro-food firms, local institutions and associations) which promote post-graduate courses regarding specific issues. They still represent a marginal activity if compared to that of the Italian Universities but are assuming a considerable role for their capacity to catch the rising needs of the sector (Brunori et al. 2011).

Vocational training is under Regions' jurisdiction since 1978 and it is financed through different sources of funding that increase the occurrence of overlapping:

- European Funds (ESF, EFRD, EAFRD);
- NOPs (National Operational Plans) and ROPs (Regional Operational Programmes);
- Regional funds (co-financed by Provinces and Municipalities).

In addition, continuous training for agricultural operators is also supported by the National Joint Interprofessional Fund for Continuous Training in Agriculture (**Foragri**), a private fund set up by an initiative of farmers' and workers' unions, thst draws on the resources of 0.30% of the total amount of wages paid to the National Institute of Social Security (INPS).

Training activities are carried out by specific agencies that can have both public and private nature (private agencies engaged in agricultural training are often under the control of farmers' unions). In some cases, RADIs (e.g *Veneto Agricoltura*, that is the Veneto Region's Agency for Innovation in the Primary Sector) or public-private participated societies (e.g. *Dinamica* society in Emilia Romagna) provide training both to farmers and other people interested in agricultural and rural activities, advisors and Region's staff.

At *public* level, Experimental Zooprophylactic Institutes provide internal training through the **International Center for Veterinary Training and Information** (**CIFIV**), with the aim of strengthening internal skills and generating, disseminating and

sharing technical-scientific knowledge on food safety, animal health and welfare, environmental and biodiversity protection.

At *private level*, the professional orders of agronomists, veterinarians and agrotechnicians are responsible for setting up and maintaining the respective codes of conduct and lifelong learning programs. Access to the professional orders is regulated by national laws and it is subject to a specific examination. There are four professional orders:

- the **National Council for Agronomists and Professional Foresters Order** (**CONAF**), established in 1929 and currently representing about 20,000 professional members. It has the aim of promoting the development and defence of the profession with a strategy based on knowledge and innovation through continuous professional training.
- the **National Federation of Veterinary Doctors** (**FNOVI**), established in 1946 and currently representing about 33,000 vets.
- the **National Order of Agrotechnicians and Graduate Agrotechnicians** (**CNAAL**), established in 1946 and currently representing almost 13,000 professionals.
- the **National College of Agricultural Experts and Graduate Agricultural Experts** (**CNPAPAL**), established in 1929 and enrolling agricultural experts qualified by state or equivalent agricultural technical institutes, and those who have a three-year university diploma or degrees related to agricultural matters.

Extension and advisory

The regions can provide *public* extension services directly (e.g., Valle D'Aosta, Campania and Sicily), or through their own technical structures or supervised private entities, such as the **Regional Agencies for Development and Innovation in Agriculture (RADI)**. However, in the last 10 years, the provision of these services has been significantly reduced or stopped due to substantial cuts in public funds, and some of these structures were also dismissed.

Among the public actors Research Institutions supervised by the Ministries (e.g. CREA, CNR) and the Universities provide advice that are complementary to an applied research, although they are not officially in charge for providing support services.

However, in the last 15 years, there has been an increasing role of the private sector due to: 1) the privatization of advisory services started in early 2000; 2) the development of new support functions to provide within the multi-actor projects implemented under Measure 124 (RDPs 2007-2013) and Measure 16 (RDPs 2014-2020).

Private advisory services providers are mainly **freelance** agronomists, veterinarians and agrotechnicians and their associations, as well as farmer-based organisations, which include **producers' associations**, **farmers cooperatives**, **consortia**, **farmers networks** (e.g., Rete dei Semi Rurali), the **Farmers' Unions** (Coldiretti, CIA, Confagricoltura, COPAGRI).

Technical advice and training are also provided by **upstream industries**, as well as by **agro-food industries** and **GDO**, whose services supply is linked to the contract farming. Beside the actors who have always been part of the agricultural and rural sector, there is a growth of **organisms from other sectors** providing a variety of services mainly related to the management of innovation projects.

A more in-depth description of advisory suppliers is provided in chapter 4

Other actors and networks shaping the AKIS

The Italian AKIS is shaped by a plurality of actors that, beyond its traditional components, play a fundamental role, influencing the system or some parts of it, shifting relational balances, interacting with farmers and consumers, developing collective planning skills, lobbying the decision-making process.

In the first place there are the **farmers** and **forest operators**, a very heterogeneous group of actors in terms of age (young/old), gender (men/women), socio-economic aspects (large/medium/small farms), cultural values and territorial identity (local inhabitants/newcomers), type of farming system (modern/traditional, intensive/extensive, full time/part time, conventional/organic) and geographical aspects (north/south, lowland/hill/mountain). Farmers' behaviour, their role and capability to shape the AKIS vary depending on these keys to the reading and their combinations.

Other key actors are represented by **farmer-based organizations and networks** and other bodies engaged in the promotion of local and typical food products (e.g. producer associations and cooperatives, *DOP and IGP consortia, Slow Food, etc.*), as well as networks promoting biodiversity (e.g. *Rete dei Semi Rurali*) or particular

social issues related to agriculture (e.g. networks of educational/social farms), land protection (e.g. *Agricoltori custodi*) or the sustainable management and use of forests and forest landscapes (e.g. *Foresta Modello*). These actors are often drivers of innovation, inspiring farmers and foresters to interact and identify common problems and possible solutions to solve them. These processes have led to significant changes in the behaviours and strategies of farmers and forest operators (Brunori et al., 2011). **Operational groups** (OGs) themselves can be identified as key players within the AKIS, because they stimulate reflection on mutual problems and the search for possible solutions, as well as contributing to the development of a relational network between farmers/foresters, advisors and researchers, which goes beyond the boundaries of project lifetime.
Among these actors, there are also the associative, research and network structures that have been operating in **organic farming** for several years (e.g., *AIAB, FIRAB, FederBio, etc*.) sharing practical and scientific expertise that have fostered the consolidation of relationships and collaborative approaches among organic operators. These actors have been real drivers in stimulating the transition of agriculture and, more generally, of rural areas towards models for sustainable development, of which **bio districts** (meaning geographical areas where producers, farmers, public associations and administrations work together for the sustainable management of local resources) represent one of the most significant expressions, positioning themselves as new interlocutors within the AKIS.

An emerging role is played by organizations that represent new societal needs. These include consumer organizations/movements (e.g., Solidarity Purchasing Groups - GAS) or multi-actor networks (e.g., Food communities) engaged in the development of new approaches about food and learning processes between producers and consumers.

There are also **Environmental organizations** (*WWF, Legambiente*, *etc*.) which, in addition to contributing to the development of new awareness about environmental issues and the spread of "good practices" among farmers and forestry operators, in some cases also act as pressure groups at the political-decision-making level (more generally on the various components of the AKIS), stimulating reflection on topics such as bio-economy, circular economy and green chemistry.

At the local level, other organizations interact with farmers and forest operators, as well as with other AKIS actors, including public administrations. These are institutional or informal organizations variously engaged in initiatives promoting

local socio-economic development (e.g. *LAGs*, local associations aimed at the enhancement of specific territorial resources) or in the protection of environment and landscape (e.g. *Forestry, environmental and agri-food units of the Carabinieri*).

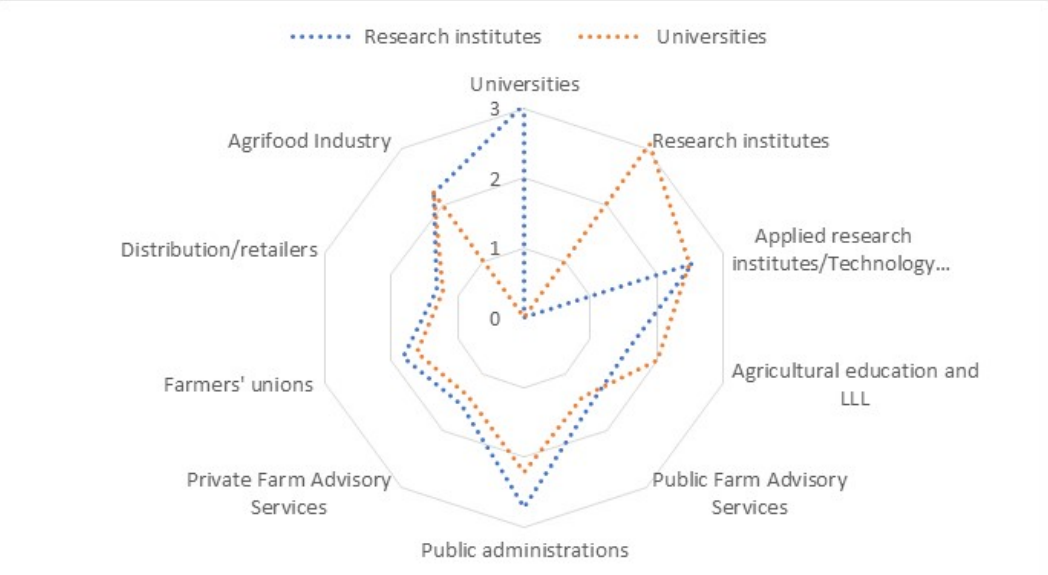
The knowledge flows between Italian AKIS actors vary according to the dimensional scale under consideration (national, regional and local) and the reference regional AKIS.

In general, at local level, the recent cooperation measures for innovation introduced by the RDPs 2007-2013 (Meas. 124) and 2014-2020 (Meas.16), as well as local learning and innovation networks for sustainable agriculture (e.g. Food Communities, local organic networks, etc.), have contributed to the development and/or strengthening of relations between the different actors of rural development and, in particular, between farmers and advisors on the one hand and the research world on the other, as confirmed by interviewees. In the case of cooperation projects, these relationships are in general not formally structured beyond the project timeline, since they develop between the persons involved in the project partnership (not between institutions). However, they have given rise to networks with permanent and consolidated relationships, thus providing the basis for new project partnerships, as demonstrated by the project continuity of several partnerships from Meas.124 to Meas.16. In many cases, the actors of these networks also include small local enterprises (agribusinesses, input suppliers, etc.), local administrations, consumers. Therefore, they can be considered as micro-AKIS where an interactive innovation transfer model is implemented.
Beyond the local dimension knowledge flows become more formal and are characterized by a low degree of system-perspective (64% of interviewees).
In all macrosystem relations, those observed at local level (e.g. group of farmers-advisor-group of researchers = strong relation) become more blurred (total of farmers-universities or research institutes = weak relation), while institutionalized relationships are more easily recognizable, in which representative institutions are more involved. This means that there are strong relationships between universities and research institutions, because formally agreements exist between institutions or they belong to the same platforms or clusters (Fig. 1).

Similarly the relationships between administrations involved in knowledge and innovation, the research (Research institutes, Applied research institutes/ Technology centres) and the farmers' unions (which historically are the formally recognized representative bodies of farmers), that have a relevant role in the definition and implementation of R&I policies, are equally strong, while the

relationships with advisors are more occasional and informal and mostly refer to administrative and project-related issues.

Figure 1. Relationships between Research Institutes / Universities and other AKIS actors in Italy



Source: Our elaborations based on interviews

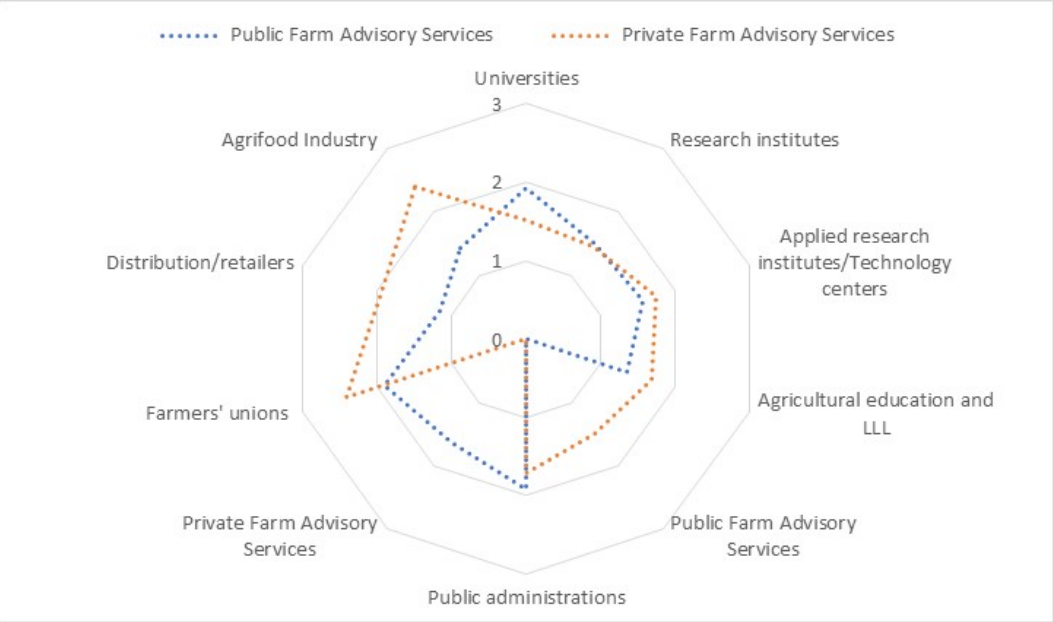
On average, interviewees report that the flows between all other subjects are weak or based on random/project relationships, with the exception of those between companies providing agricultural inputs and Agrifood Industry (processors, etc.) on the one hand and private advisory services, farmers' unions, farmers' cooperatives and Producers Organization on the other, which assume a rather stable structure.

Concerning advisory, the public services show relatively stronger knowledge flows with the public administration and the universities, while private services show more intense flows with the agri-food industry and the farmers' unions (Fig. 2). This last finding is mostly motivated by the use of external staff (private advisors) by the farmers' union for the provision of advisory services.

Some knowledge flows strongly differ depending on the region: in Veneto or in the Autonomous Provinces of Trento and Bolzano, for example, there are very strong linkages between farmers and agricultural institutes, which provide training, specialized services and applied research, differently from other regions. In Campania, on the other hand, there is a good connection between farmers and

training institutes, which assess knowledge needs on the ground and develop suitable training interventions.

Figure 2. Relationships between public / private advisory services and other AKIS actors in Italy



Source: Our elaborations based on interviews

Interviewees fairly agreed that the traditional model of knowledge transfer is still very rooted in the Italian AKIS, although in recent years there has been a certain development towards forms of interactive transfer, which are beginning to become more and more popular at the local level. However, in highly dynamic sectors (e.g., viticulture, but also others that may be different depending on the specific characteristic of the region) interactive and circular models are more frequently applied.

It is also widely accepted that the capability of advisory services to bridge research and knowledge needs of farmers is medium (46% of respondents) or low (36%). In this respect, advisors claim that the problem is not intercepting the needs of farmers or the research, but rather to find the funds to involve researchers in searching for solutions: often the needs (e.g., those related to climate change, new pests, etc.) have very different timeframes compared to the timing of calls for proposals and selection.

2.1.2. Policy framework at national level

At national level the main programming tools are:

The 2014-2020 **National Research Programme** (PNR), managed by the MUR and based on the interministerial concertation on research needs and expectations, outlines the framework and defines innovative actions aimed at supporting the transition of the system to a knowledge-based economy. Accordingly to the Smart Specialisation Strategy, the PNR identifies twelve areas of expertise of the Italian research system, including Agrifood, on which effective national and regional governance policies and instruments have to be structured to ensure a significant impact on the socio-economic development of the country.

The 2014-2020 **National Plan for Research Infrastructures** (PRIN) identifies investment priorities in terms of Research Infrastructures (RI), with the aim of supporting the organization of a high-quality national network of RIs of international level, whilst ensuring their long-term sustainability. The PNIR is part of the PNR program and is managed by MUR .

The **2014-2020 Partnership Agreement** (IPA), between the European Commission and Italy, defines country's priorities and arrangements for the effective and efficient use of European Structural and Innovation (ESI), including research and innovation funding.

The **2014-2020 National Smart Specialisation Strategy** (RIS3) identifies five national thematic areas (among which Health, nutrition and life quality and Smart and sustainable manufacturing, energy and environment) and twelve regional thematic areas of specialisation. A governing body of RIS3 in Italy (Cabina di regia) and the working groups for each of the five areas of RIS3, based on a model of multilevel governance, play the role of coordination.

The **2012-2020 Strategic Plan on Innovation and Research for Agriculture, Food and Forestry** (SPIR), outlines the strategy, defined through a broadly participatory process between the Ministry of Agriculture, Food and Forestry (MiPAAF), the Regions, enterprises, productive sectors and researchers, for national and regional policies and programmes on R&I. It does not provide financial resources, but rather aims to coniugate the priorities of the European policies and, on the other hand, of national and regional administrations.

It defines six priority areas of innovations and research needs within which R&I and sectoral policies are planned at different levels.

The **National Forestry Strategy**, currently in a draft form, is going to updtate the "*Framework Program for the forestry sector*", that is still in force. It will be effective for twenty years and provide a new vision of the forestry sector based on the sustainable management of the resources, also by mean of multidisciplinary scientific research, technical assistance and training.

The **Regional implementation tools of interventions** in the field of agricultural research and innovation, advisory and vocational training mainly rely on European Funds: the European Regional Development Fund (ERDF) and European Social Fund (ESF), which are implemented through Operational Programs (OP), and the European Agricultural Fund for Rural Development Programme (EAFRD). In fact, in the last few years, many regions have repealed the regional legislation, or, in any case, they do not apply it because of the significant reduction of dedicated funds. Currently, 11 regions and the autonomous province of Bolzano dispose of a regional law concerning the R&I and/or advisory services.

In 2016, each region released a **Regional Smart Specialization Strategy**, usually, with attention also to other innovation policies, such as the Start-up law and innovative financing tools. Each region has adopted a different policy mix, using tools usually targeted to support public-private partnerships, innovative projects of SMEs, networks and innovative clusters, and the implementation of pre-commercial public procurement. Research and Innovation Strategy for Smart Specialisation (RIS3) areas have been included in NOP and ROPs for the use of ESI Funds.

Whithin the **Rural Development Regulation** n.1305/2013, Priority 1 "Fostering knowledge transfer and innovation" includes the following Mesaures:

Table 4: Planned public expenditure by RDP Measure

RDP Mesaures	***Public expenditure (planned)***
Measure 1 "Knowledge transfer and information actions"	231,3 million euros
Measure 2 "Advisory services, farm management and farm relief services"	147 million euros

Submeasure 16.1 “Establishing and managing the European Innovation Partnership (EIP) Operational Groups (OGs)"	185,5 million euros
Submeasure 16.2 “Support for pilot projects and the development of new products, practices, processes and technologies”	156.2 million euros
Total	**720 Meuros**

Source: NRN (www.reterurale.it)

The EIP-Agri is applied by different models across the RDPs which, basically, reflect the specific approaches and the roles attributed to local research and innovation agencies, as well as different funding schemes. Measures 16.1 and 16.2 are applied indifferently to implement the EIP Operational Groups (OG).
Finally, with reference to the obligation to set up the FAS, introduced by the 2007-2013 CAP reform and further enlarged by the 2014-2020 CAP Reg. 1306/2013 (articles 12-14), a decree of MIPAAF (2016) provides a national framework for the regional implementation of FAS, by including:

- principles governing the distinction between advisory and administrative activities concerning the management and inspection of applications for public funds;
- minimum requirements for the training and skills of advisors and the need for lifelong learning;
- accreditation rules for advisory providers accessing european funds (while the accreditation procedures are under the responsibility of the Regions and Autonomous Provinces);
- estamblishment of a national register of advisory providers;
- establishment of a quality certification system at national level.

The ministerial decree was agreed with the Regions and the Ministry of Health.

2.1.3. Coordination Structures

In tune with the multi-level governance of the Italian AKIS, the coordination structures are articulated by area of knowledge (R&I, education and advisory/extension services) and at national and regional levels.
In this context, coordination arrangements (bodies and procedures) have been set up primarily to address inter-institutional collaboration and dialogue aimed at ensuring a certain consistency of policy, programmes and projects design and

implementation, as well as and avoiding, as far as possible, overlaps and double funding.
Three levels of coordination, with respective entitled bodies, can be identified, as follows:

National level

- the **Ministry of Agricultural, Food and Forestry Policies** (MIPAAF), which is in charge of the development and coordination of agricultural, forestry, agri-food and fishing policies;
- the **Ministry of Education, University and Research** (**MIUR**), which at the time of this study is internally shared between two ministries, the Ministry of Education (MI) and the Ministry University and Research (MUR), that is responsible for the whole national research policy, for the National Operational Programme (NOP) "Research and Innovation" and for the general administration of education at national level;
- the **Ministry of Health**, which deals with food safety and veterinary public health and operates on a territorial level through the Experimental Zooprophylactic Institutes (I.Z.S.);
- the **Ministry for the Environment (MATTM)**, which deals in general with the environment and biodiversity protection, including Natura 2000 areas, protected areas and agricultural sustainability;
- the **Ministry for the technological Innovation** (MTI), which deals with technological innovation and digitalization;
- the **Ministry of Economic Development** (MISE), that is responsible for the NOP "Enterprises and Competitiveness";
- The **Ministry of Cultural Heritage and Tourism** (MIBACT), that has specific competences on landscape and natural heritage protection.

Research is mainly under the responsibility of the MIUR. Some research is also channelled through the other ministries according to their specific demand.

Regional Level

In general, the distribution of competencies within the Regional and provincial administrations is specular to the ones of the Ministries, with few exceptions.

Inter-regional and trans-regional level

The coordination bodies at interregional and transregional level are aimed at defining common vision and support for implementation, mediating different positions and articulating demand about R&I policies and programmes. The two main coordination bodies are the Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research (box 2) and the National Rural Development Network (box 3).

Box 2: The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research

The network was established in 1998 and since then it has been playing an increasing crucial role in coordinating the design and implementation of European, national and regional legislation, policies and programmes regarding agricultural R&I and advisory services.

It is composed by the representatives of the administrations who are responsible for the design and implementation of agricultural R&I and advisory policies at regional/A.P. level, it is organized by thematic groups (themes/value chains) and its secretariat is held by Tuscany Region. The activities are ensured by regular meetings, the organization of discussion events, frequently by involving other experts and representatives from the MIPAAF, and the drafting of notes and opinions.

Since 2001, the Network has been officially recognised by the Conference of Presidents of the Regions and Autonomous Provinces as an instrument of institutional liaison between the Regions and Autonomous Provinces and the Ministries (MIPAAF and MIUR), with the aim to guarantee operational synergies and cost-effectiveness, and stimulating the competitiveness of the national research system at all levels of its implementation.

Over the years, the Network has effectively carried out a meaningful work of coordination, promotion and direction of public research, through the articulation of the demand, to better target the needs of the different territories, the definition of objectives and priority actions for research and experimentation, and its delivery (guidelines, procedures and types of funding).

Among the others, the activities carried out by the Network concern:

- the realisation of some interregional innovation and research projects aimed at addressing agricultural issues shared by several regions and PAs;
- preliminary documents concerning the transversal objective of “Agricultural Knowledge and Innovation System” (AKIS) for the CAP reform post 2020;
- formulation of qualified views on research plans of the national research bodies (i.e., CREA);

- technical support to the Standing Committee on Biodiversity of Agricultural and Food Interest, chaired by MIPAAF, for the definition of the new National Plan on biodiversity of agricultural interest;
- drafting the strategy for innovation and research, within the Strategic Plan for Innovation and Research in Agriculture, Food and Forestry 2014-2020;
- member of the Editorial Committee of the Portal of Knowledge and Innovation in the agro-food system (www.innovarurale.it).

Mammuccini M.G. et al. (2010)
Vagnozzi (2008b)

Since 2007, the National Rural Network plays a different function relating more to networking in view of connecting operators across the rural areas and promoting their effective participation in rural development (NRN in box 3). This role implies a wide range of target groups (Institutions engaged in rural development as responsible authorities and implementing bodies; socio-economic partners; wide society) and of activities, which range from networking to technical and methodological support to the managing authorities, until the organization of territorial events targeted to rural operators.

BOX 3: The Italian National Rural Network (NRN)

Italian Rural Network have been implemented according to the specific National Programme approved by EC for the period 2014-2020. It aims at supporting policies for agricultural development through the exchange of experience and knowledge between rural territories, as well as better implementation and management of Italian rural development programmes. The programme also aims at enhancing visibility of rural development policy, actions and achievements, whilst bringing together all actors involved in rural development throughout the entire territory of Italy.

The promotion of innovation in agriculture, food, forestry and rural areas is one out of four main priorities of the NRN. This involves supporting policy interventions for EIP-OGs, improving linkages among research, knowledge exchange and advisory in agriculture and agri-food sector, and finally the up-take of innovation at farm level.

In practice, NRN has been carrying out four types of activities in these fields:

- Dissemination of innovations cases and best practices, through the setting up of a national inventory of applied innovations and the promotion of communities of practices. The website www.innovarurale.it is devoted to the dissemination information on research and innovation in agriculture.
- Networking related to OGs in Italy through communication and knowledge exchange among main actors of EIP system. This implies also the participation of NRN representatives to SCAR meetings and other European and national activities/groups concerning EIP;
- Specific methodological and practical support activities concerning measures 16.1 and 16.2 for Managing Authorities, OGs, and other concerned actors in

order to facilitate and improve quality of projects. This includes advisory and information activities addressed to groups or in one-to-one mode, and also the provision of an open access data base concerning Italian OGs and their characteristics. Advisory and information activities are fed by analysis of innovation needs and processes at national and regional level;

- Analysis of demand and supply of innovation in Italy within the national and regional AKISs.

Other activities of the NRN regard vocational training targeted to different types of rural actors (farmers, young farmers, organic operators, public administrations) and provide by digital platforms. The web platform http://www.rural4learning.it/site/was created to support Rural4Learning. and it aims to transfer experiences, knowledge and good practices in rural development to students of agricultural institutes and universities of Italy. The web platform includes learning courses, videos, database of the farms participating to the projects and of the study visits. The modules include Rural4Kids, Rural4School, Rural4University and FarmLab.

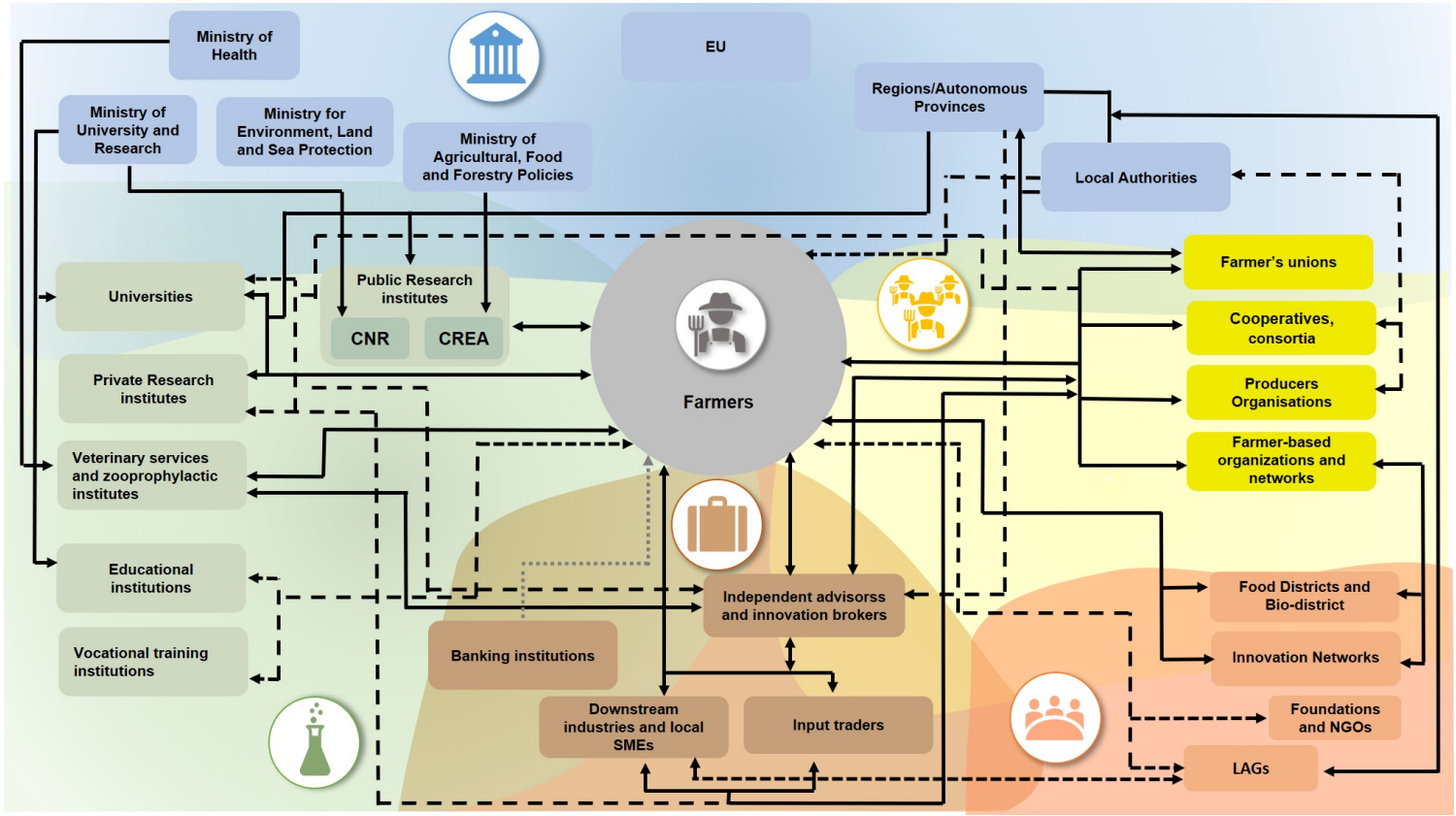
The general website of the RRN is www.reterurale.it.

www.reterurale.it

European Commission (2020)

2.2. AKIS diagram

Figure 3. Diagram of the relationships among actors of the Agricultural sector in Italy



Source: Our elaborations based on interviews

Legend

- Public authorities
- Research and education organisations
- Private sector (for profit)
- Third sector farmer/farmer-based organisations
- Third sector NGO (non-profit)
- Strong Linkage
- Weak Linkage

2.2.1. FKIS diagram

Italian Forestry knowledge Innovation System (FKIS) presents a high number of actors operating at different levels, often scarcely connected the one each other.

This lack of integration is a direct consequence of the historical structure of the forestry sector in Italy, traditionally composed of countless plots belonging to owners who are often "literally unaware" of owning a forest parcel. Moreover, outside the alpine arch, the productive functions of Italian woodland have been often neglected or limited to the provision of fuelwood or working material for the farms or farmers' household. As a consequence, with the exclusion of some relevant exceptions, a proper wood supply chain has never established in Italy. However, direct interviews with stakeholders have clearly revealed the presence of some "excellences" both from the point of view of the integration of actors and from a supply chain perspective.

Research institutions, being them private or public, with regional or national jurisdiction, are surely one of those excellences, as they have been working closely with the main timber industries and forestry companies for many years now, to the extent that some spin-offs aimed at innovation transfer have arisen from forestry departments in some Italian Universities.

Moreover, some research and extension services are strongly engaged in promoting a new vision of the forest as a provider of environmental services that is reaching forestry community beyond the productive sectors, with the direct involvement of owners and smaller forestry companies. In such a framework good relationship between NGOs and forestry Consortia/Cooperatives have already been established in order to promote a more systemic approach to silviculture and timber industry. Unfortunately, at a Regional level, only in a few cases these new liaisons have become formal networks connecting research, advisory services, farmers and forests. Operational Groups have been the privileged mean to obtain such a new collaboration, although still with a marginal role (according to national NRN, just the 6% of the OGs already established in Italy have forestry as a main focus). In a view of a wider involvement of the forestry actors, in some regions, Measure 9, concerning the setting up of producer groups and organizations, has allowed members to get access to support activities on the development of entrepreneurial and commercial skills and the organization of innovative harvesting and working processes.

Given the peculiarities described above, as a matter of fact the whole system of wood industries is not related to primary production, since the 80% of wood processed in Italy is purchased from abroad. As a further consequence, such a state of the art prevents forest owners from taking care of their property, since it has no economic value for them. Wood industries and forestry companies are the only recipients of innovation services, as they are more willing to invest in new processes and products, also with the support of advisors.

Therefore, actions at regional level mainly target local timber industries and local forestry companies, also because only few regions, (essentially those in the Alpine space) have their own in-house research and advisory institution that could address the needs of small enterprises or forest owners. The forestry knowledge system is still grounded on a traditional model of information transfer, mainly relied on the direct relationships between advisors and wood industries, without involving the vast majority actors (micro forestry enterprises, owners, lumberjacks…), that are targeted by advisory and extension services exclusively on mandatory matters (e.g. work security). According to NRN (2019), only ten regions out of twenty require mandatory training for forestry operators. Some of them also provide for special training courses for "forestry instructors", professionals that are called to support training needs of local operators. The education system of secondary schools (technical and vocational institutes) is not functional to the forest knowledge system since its curricula don't deal with silviculture and forestry related topics. Again, there are some relevant exceptions, usually established by direct intervention of local administrations (e.g., the "forestry school" in Ormea (CN)).

At a regional level the forestry sector as a whole is trying to overcome its shortcomings, by promoting, in the framework of the S3 strategy of the Regional Operational Programmes, regional clusters between wood industries that should gather all the actors involved in the supply chain, including service providers and firms in connected sectors. On the other hand, new actors in the scene of Italian silviculture have adopted a new approach to communication aimed at closing the gap between research and other actors and stakeholders, that are often unaware of the most recent advancement in silviculture and forestry sciences. For instance, the Italian Society for Silviculture and Forest Ecology (SISEF) is particularly active in scientific disclosure, mainly through new media, while "Compagnia delle foreste", that is a communication enterprise of national relevance, supports private and public actors in forest-related communication needs and has matured

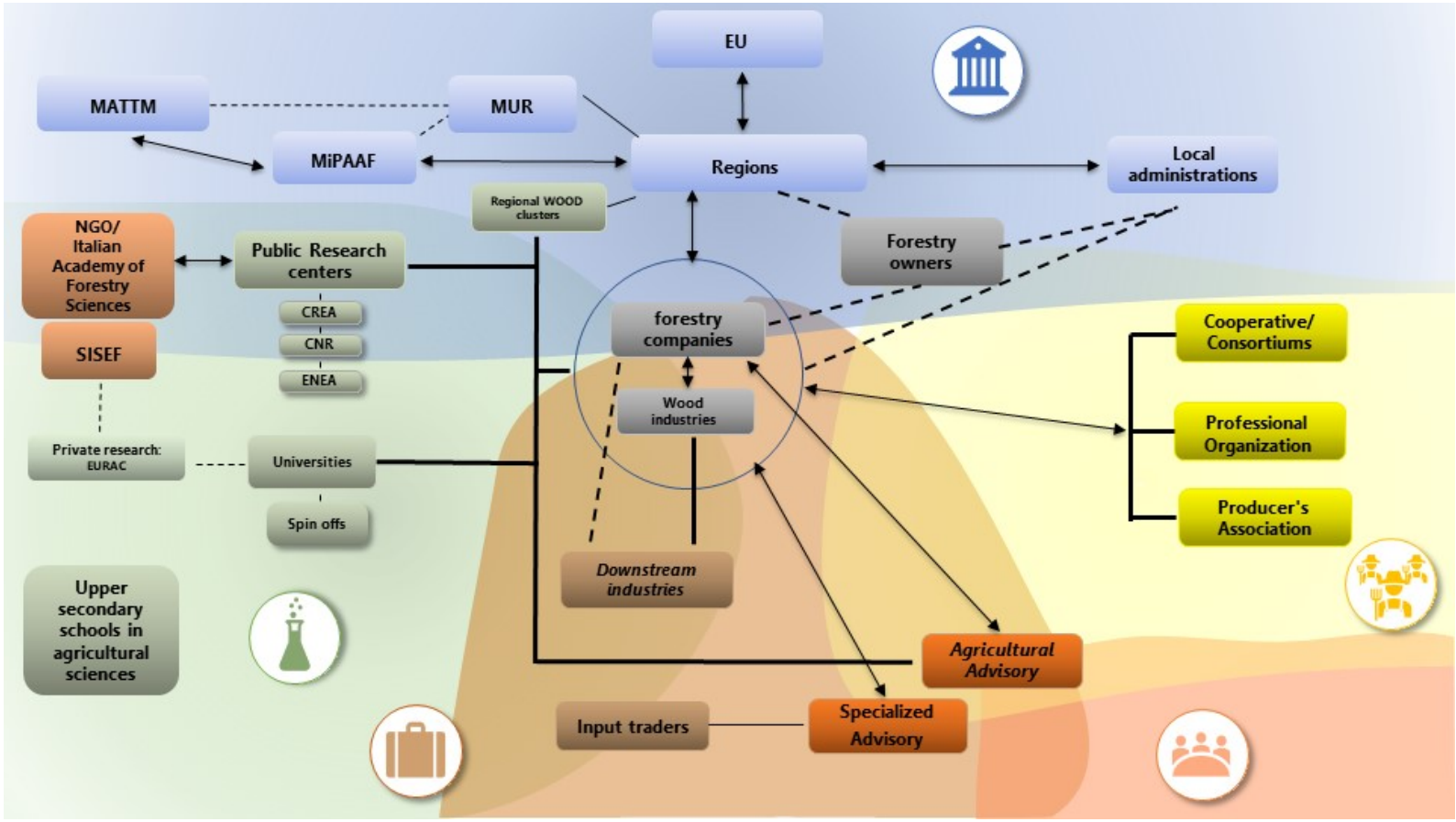
a relevant experience in providing extension services and designing demonstration activities.

The Italian NRN already has a role in bringing together actors and stakeholders. For instance, it has been the main promoter of a more participative approach aimed at making available to the forestry community the most recent facts and figures concerning the sector. This output was the first Report on the state of forests and the forestry sector in Italy (RaF), which has been able of putting together 161 different actors. NRN is also active in supporting service providers and forest operators by organizing workshops on specific technical subjects (e.g.: on the management of old coppice stands).
In order to properly address the inherent lack of updated information on Italian forestry, a framework agreement between ISTAT, CREA, ISMEA, MIPAAF has been signed with the aim of establishing a unitary platform for data collection and exchange.

The challenges of the Forestry Knowledge System
The challenges of the knowledge system concern:

- Forest operators, who needs to know about forest management, personal protective equipment but also to understand the implication for their work of applying full “due diligence” (Regulation (EU) No 995/2010, laying down the obligations of operators who place timber and timber products on the market (EUTR)).
- Timber traders, who need to comply with the requirements of the “Forest Law Enforcement, Governance and Trade licensing scheme” (FLEGT) licensing scheme (Reg. EU 2173/2005).
- The timber industry, that must be made aware of ground-breaking business opportunities related to wood and design industry, also with a special eye on the use of local timber and on circular economy.
- Upcoming CAP, that also need to address the need for training on agroforestry and related practices.

Figure 4. Diagram of the relationships among actors of the forestry sector in Italy



Source: Our elaborations based on interviews

Legend

- Public authorities
- Private sector (for profit)
- Third sector NGO (non-profit)
- Research and education organisations
- Third sector farmer/farmer-based organisations
- Strong Linkage
- Weak Linkage

3. History of the advisory system

In Italy, the need to disseminate and transfer agronomic knowledge to farmers was first raised during the 1st Meeting of Italian scientists held in Pisa in 1839. Following this debate, in 1863 the first Itinerant Chair was established. The Itinerant Chairs of Agriculture were for almost a century the most important institution of agricultural education and training, especially for small farmers, benefiting from the contribution of teachers, graduates in agricultural sciences, from schools and technical institutes. The educational activities were carried out through lectures in public spaces, farm visits and market day advice. In addition, many Chairs published brochures and newspapers. Since the early years of the 20th century, the Chairs had a close link with the Ministry of Agriculture, Industry and Trade. In 1907, a first measure regulated the life of the Chairs and the recruitment of personnel. In 1935 Chairs were transformed into provincial agricultural inspectorates, which had the responsibility for technical education, assistance to farmers, experimentation, improvement of agricultural production organization and the technical inspection of all projects applying for public subsidy. The Agricultural Inspectorates maintained their original structure until the transfer of administrative responsibilities concerning agriculture and forests to the Regions.as set by Constitution in 1947 (art. 117).

Since then, agricultural advisory service has been a competence of the Regions and it is a complex operational reality, in terms both of facilities and advisory provision. In fact, the 21 regional services' systems differ, both quantitatively and qualitatively, depending on historical political choices and peculiar structural configurations.

During this period, the first laws regulating the **professions of Agronomist** (Law 7 January 1976, n. 3 "New organization of the profession of Agronomic Doctor and Forestry Doctor") and **Veterinary Doctor** (D.Lgs.C.P.S n.233/1946 concerning the reconstruction of the Healthcare Professions Orders and the discipline of their practice) were issued. With later modifications, they are still in force today.
The first financial, normative and cultural fundaments of an Italian system for transferring and disseminating innovation in agriculture, were laid by the Council Regulation (EEC) N° 270/79, that co-financed a government initiative aimed to train experts to be hired by public administrations and professional organizations delegated to carry out agricultural advisory services.

Subsequently, the Multiregional Operating Programmes (Reg. EEC 2052/88 and followed 1989-1993, 1994-1999) gave the opportunity to complete the regulatory framework through promoting new advisory services' management's procedures aimed at connecting innovation and knowledge resources with local needs of training and advice.

At the beginning of the 1990s, the Government approved the **National Plan of Services** for agricultural development and began to discuss the second reform of Structural Funds with the European Commission. This National Plan established a "Services' system" and specified the authority of each actor and their coordination. Regions gain a wide degree of autonomy: particularly, they hold function of orientation, coordination and control of information and training activities carried out by private organizations; moreover, they promote no patentable research and experimental activities of collective interest.

Normally, regional laws followed a linear approach to innovation and the system was restricted to a few components, such as the **RADIs**, who managed the services' system, the **farmers' unions' technical bodies**, the universities and research organizations located in the regions. In this period, the farmers unions played an important role in training professional advisors and offering extension services at farm level on the basis of projects assigned to them by the regional governments (Brunori et al., 2007).

Despite the financial scale of interventions and a general programming stuck to policy guidelines, rarely the advisory services were used for the implementation of development policies (Vagnozzi, 1998). The search for high structured solutions aimed at facilitating the interconnection between entities (such as formal agreements or negotiating tables), on the one hand, laid the foundation for their governance while, on the other, created a strict system which focused more on scientific innovation rather than on user satisfaction (Vagnozzi, 1998).

Similarly, trained skills employed in the different regional structures did not found a suitable exploitation, so that their cognitive and methodological potential has gradually decreased. More generally, the lack of monitoring and evaluation led the services system to increasingly pursue self-referential goals aimed at justifying the existence of structures rather than to promote development (Di Santo et al., 2006).

In the early 2000s, the reduction of funding led progressively to stop many public activities which did not find autonomous sources to continue (Vagnozzi, 2008). In

this period, the regional agricultural services' systems experienced a first attempt of restructuring by introducing competitive bids, entitling additional actors to make part of the system, reducing progressively the range of tasks directly performed by the Regional Agencies for Agricultural Development and Innovation, making the farmers pay a part of the cost.

Meanwhile, the reform of the CAP (EC Regulations no. 1782/03 and 1783/03) reaffirmed the importance of advisory and development services, calling for the establishment of voluntary advisory system (Farm Advisory System – FAS) aimed at supporting farmers with the commitments of cross-compliance, which could be funded under measures 114 and 115 of Rural Development (EC Reg. 1698/2005). Particularly, these measures were aimed to support, respectively, the costs for the acquisition of advisory services and the start-up costs of individuals who started a service activity. The establishment of the FAS required on average 2-3 years in all the Regions for its design, setting up and implementation. In spite of everything, the desired reform of advisory services, aimed at increasing their effectiveness as well as their integration in the knowledge system, were not fully implemented.

However, measures related to FAS and the use of advisory services have, to some extent, been instrumental in revitalising the extension and advisory system, so that some regions redefined the role and the functions of the Agencies for Agricultural Development and Innovation within the local AKIS, at least where they had not already been dismantled.

Besides, during the same 2007-2013 programming period, advisory providers showed very few attempts to support innovation processes that were funded by measure 124 "Cooperation for development of new products, processes and technologies" for the RDPs. In fact, agricultural advisors, especially freelancers, found it hard to re-think their role other than the traditional ones (Cristiano and Proietti, 2014b). While, on the other side, some new entrants were emerging, and farmers' unions started to act as innovation support services.

As this brief historical excursus shows, the Italian service system suffers from a heavy dependence on European funds, resulting in a lack of continuity without a coherent medium and long-term strategy (Labarthe and Caggiano, 2014).

In the last ten years several of the traditional suppliers have undergone a re-organisation, involving both the range of provided services and the dedicated staff, due to the economic crisis and the cuts in resources assigned to knowledge system, that affected particularly the agricultural sector (see Appendices 2 and 3).

This has mainly involved the public services, also determining the dismantling of some regional Agencies for Agricultural Development and Innovation.

4. The agricultural and forestry advisory service(s)

4.1. Overview of all service suppliers

The Italian Agricultural advisory services are characterized by the presence of a variety of suppliers with different objectives and organizational patterns.

Since the implementation of the RDPs 2007-2013, due to the EU innovation policy, the agricultural advisory services scenario has undergone two important changes. The first concerns the appearance of new players, mainly acting as innovation support services; on the other hand, there is a reorganization of structures and services to support multi-actor innovation processes by those who already carrying out traditional agricultural advisory activities (Cristiano and Proietti, 2018; Cristiano et al., 2019; Cristiano and Proietti, 2014). More recently, the entry of players from the ICT sector specialized in the provision of services related to the use of a vary of digital tools at farm level has further widened the scenario of services' suppliers.

So that, compared to the past, currently, there is a greater participation and proactivity of a plurality of services providers. Besides, some of them are also involved in European research projects, which favours an international exchange of experiences and skills development/diversification, leading to professional improvement.

Currently, services providers in Italy can be clustered as follow:

- *Public providers*

The number of public providers performing advisory services is quite limited. In general, they are restricted to the former **Regional Agencies for Development and Innovation** which provide a wide range of services (e.g., research and innovation, training, extension, information, networking, demonstration farms, etc.) and, in some cases, have been mandated to support the innovation processes funded through measure 16 of the RDPs. In some cases, these organisms have been recently restructured to act as catalyzer of the different partners and play innovation brokering functions within cooperation measures. Depending on the case/region, they can aggregate the relevant partners around the project idea, assess the market feasibility and the economic sustainability of the innovation, support its implementation across the producers and coordinate the wider dissemination of the project results (farm visits, final congress, press release).

Another relevant actor is represented by the **Experimental Zooprophylactic Institutes** which are reference bodies for veterinarians. They provide research activities, advisory, training information and laboratories of analysis. Due to their roles, they are also quite active within OGs, being able to detect problems and to act, in some cases, as catalysts for actors.

Among the public actors we should include **Research Institutions** supervised by the Ministries (e.g., CREA, CNR) and the **Universities**. Although they are not formally services providers, they can provide advisory services that are interdependent to an applied research. Moreover, since the implementation of RDPs cooperation measures, they have become very active in supporting co-innovation processes, often through spin-offs that have been specifically created (Cristiano and Proietti, 2014). These organisms often own **experimental fields**, where demonstration days can be organised for stakeholders of specific research projects.

In some regions (depending on RDP delivery system), also **LAGs** (public-private partnerships) have shown a certain proactivity in supporting co-innovation processes and, to a certain extent, to provide some services in rural areas.

- *Private providers*

Within the private sector, Farmers' Unions and freelance advisors (agronomists, veterinarians and agrotechnicians are registered with a professional order), with their associations and networks play a key role.

Farmers' unions

Historically, farmers' unions have been the main service providers in Italy. In the past, the three main unions (Coldiretti, CIA e Confagricoltura) represented very different typologies of farms and interests, and social and ideological differences, but today their ideological positions have smoothed out and their programs and requests are often very similar. After the crisis of the '80s-'90s, they have gained a formal role as main interlocutors of the Government, at national and regional levels, in the formulation and implementation of the national/regional agricultural policies (often in almost exclusive way). Their organization is generally based on a centralized and hierarchic model of representation, decision and control which, until a few years ago, has given low space to specificities and needs at local levels, strengthening the national leadership and weakening the local management that has been progressively flattened to CAP applications and cross-compliance training and advice. The EIP-Agri implementation and the growing demand for

innovation services from the territory has been pushing the farmers' unions to take back skills and abilities that have been lost (both in expertise and in number of employees) due to their progressive involvement in bureaucratic tasks. This is happening by means of staff training (e.g., on brokering functions), outsourcing of some activities to expert freelance advisors or specialized advisory bodies, implementation of new tools for coordinating and monitoring services throughout the region(s). The functions recently provided by the Farmers' Unions within the co-operation projects include needs assessment, partnership organization, dissemination activities, support to the partners in project development and implementation, tailor-made services to solve complex problems, support to access to resources, knowledge exchange and demonstrative farms.

Freelance advisors

Advisors, veterinarians and agrotechnicians, depending on their experience and specialization, may provide:

- core services, generally funded by the public sector;
- highly specialized private services (e.g. oenologists, veterinarians, etc.);
- services on behalf of upstream or downstream enterprises or other providers.

Currently, about 63.000 agronomists, veterinarians and agrotechnicians are registered with a professional order (cfr. **CONAF**, the **FNOVI**, the **National Order of Agrotechnicians and Graduate Agrotechnicians,** the **National College of Agricultural Experts and Graduate Agricultural Experts** in § 2.1.1.), even if not all of them work as private professional advisors. Usually, private advisors provide services within larger farms which rely on either continuous or periodical support for specific activities (such as the soil preparation, sowing, fertilising, weed, disease and pest control, etc.).

Frequently, freelance advisors are organized in associations or networks for economic opportunity and the organization of the services provided. Among them, it is worth mentioning **Fondagri** (**Foundation for agricultural advisory services**), a national network of freelance advisors working across all Italian regions that was set up in 2007 by the three professional orders, and the **Tuscany Network of Farm Advisory – Rete Tos.ca**, that joins advisors with different areas of expertise and different geographical coverage through a network contract, thus allowing a more flexible coordination mechanisms in comparison to a society. Within this type of providers there are also forestry services, which are mainly

offered by **D.R.E.AM. Italia** (60 employees) and **Compagnia delle Foreste** (8 employees). This last is specialized in scientific disclosure and publishes the reference review for the national forestry sector named **Sherwood**.

- *Cooperatives and other farmers-based organisations*

Farmers' cooperatives, producers' associations, POs, consortia, farmers networks and other farmers-based organisations, generally represent a solution against the fragmentation of agricultural supply. Many of them, particularly cooperatives, are engaged in collecting, processing and marketing of agricultural products supplied by their members, also establishing quality standards of productions. These organisms provide other activities for the benefit of their members, such as business advice, business management services, technical advice aimed at promoting the dissemination, use of new technologies with low environmental impact (organic and integrated control) or introduction of quality systems and, in case of cooperatives, application for recognition of quality labels. Moreover, in the last years, all these actors have been also involved to a certain extent in providing new services within cooperation projects, particularly through articulating farmers' needs, identifying innovative solutions and spreading innovation between the farmers and across the local supply chains, thus widening their field of service provision. In some cases, this has been possible thanks to a support strategy developed by their associations, such as Confcooperative and Legacoop (Cristiano and Proietti, 2014).

Among them, agricultural consortia were a reference actor in the past, acting as commercial intermediaries between the farmers and input makers (fertilizers and pesticides, machines, feeds), also having special public competencies. Since the '80 their role decreased and in 2006 they definitely lost their residual public competencies to become private cooperatives. Very recently, in July 2020, 21 agrarian consortia founded **Consorzi Agrari d'Italia** (CAI), a national structure that aims to provide a range of services to its members, first those for spreading digital technologies and precision farming.

The widening of services provided by farmer-based organisations is particularly evident and effective in some productive areas, such as those concerning sustainable and organic farming practices. In fact, the lack of specific services for this farming method has led over time to the raise of bodies from the ground (networks, associations, foundations) to support and sustain organic farming, also providing specialized services to farmers and other actors involved in the different production processes. Among the others, **Federbio Servizi** is a specialised services

provider offering technical advice, business management, financial and legal assistance, marketing, training, start-up, research/development programs and tools for innovative commercialization.

- *Upstream and downstream industries and GDO*

The **upstream industries**, producing seeds, fertilisers and pesticides, machines, ect., still have a role in providing advice through their own network of technicians working on the ground in direct contact with farmers. In fact, they offer follow up services with the aim of helping farmers in the choice and the use of input factors. In the past these services were very effective in enrolling farmers into the modernization paradigm. However, their activity has been greatly reduced in the last ten years, due to industries' budget cuts following economic crisis. If possible, an emerging role may be played by the robotics and digital systems industries.

As well, the **agro-food industries** and **GDO** may provide services to the farmers under *contract farming*, with the aim of allowing farmers to meet the quality standards and delivery schedule set by the purchaser. Generally, the practice of contract farming, that may be individual or collective (run through farmers' associations and cooperatives), entails the contractor providing farmers with improved seed, technical advice and market services.

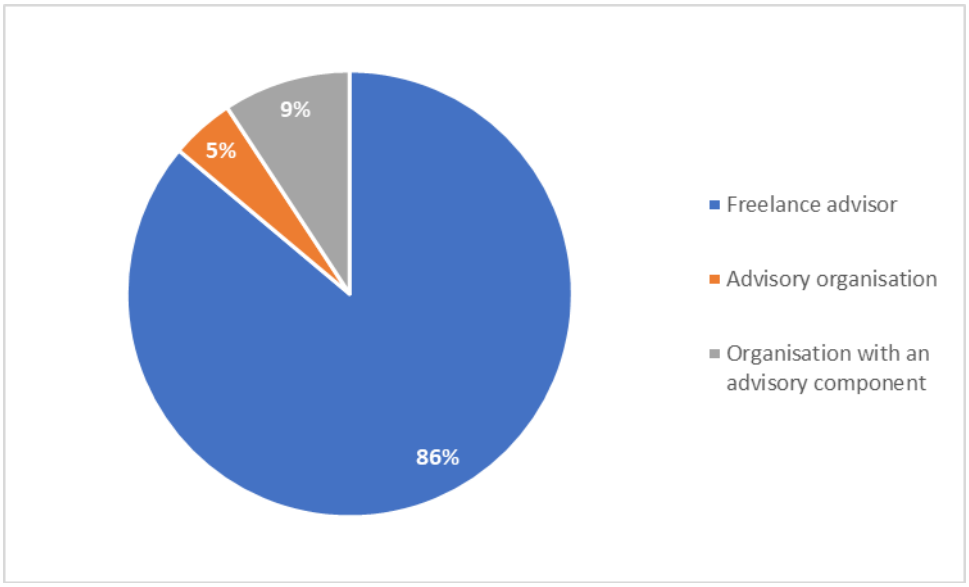
- *Providers from other sectors*

Beside the actors who have always been part of the agricultural and rural sector, there is a growth of organisms from other sector, which generally enter the market to provide innovation support services within innovation projects. In fact, the implementation of RDPs cooperation measures has led to the need for expertise in planning, facilitation, mediation, conflict management, communication, etc. Indeed, until very recently, these skills have been completely unfamiliar in the panorama of traditional agricultural advisory services. These actors generally operate downstream of the agri-food production chain or in other productive sectors, providing intermediation activities, project design and management, administrative services, and other services to the industry. Also, other organisms, that usually provide support services for the management of administrative procedures, are taking ground thanks to the procedural complexity for applying to public fund.

This general overview has been complemented by the results of a survey carried out among private advisory services providers.

The high geographical coverage, with 17 out of 20 the regions, guarantee a satisfactory representation of the Italian diversity. The total number of contributors is 108, mostly freelance advisors (86%). The advisory organizations and the organisation with an advisory member are the 14% overall.

Figure 5: Categories of respondents



Source: Our elaborations based on survey

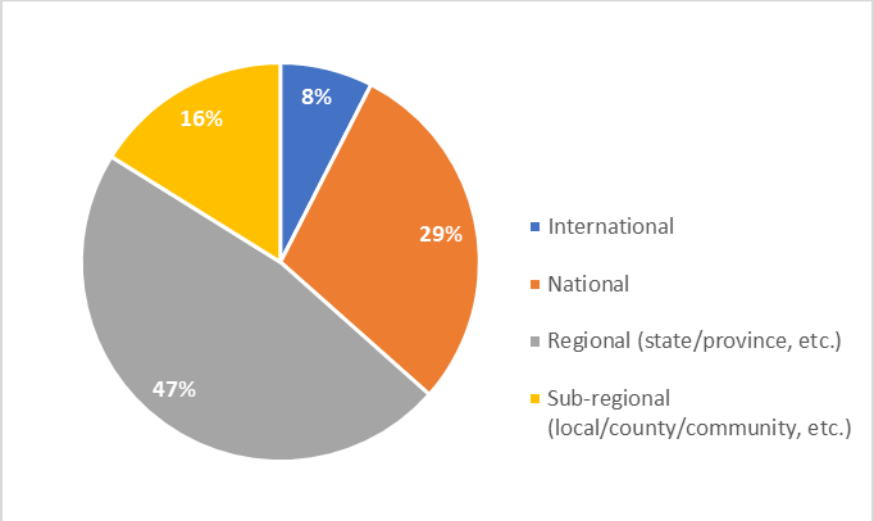
Figure 6: Category of organizations

Source: Our elaborations based on survey

Particularly, the organizations seem to be mostly represented by private/commercial advisory organizations (40%) and farmer-based organizations (27%). However, all types of advisors currently operating in Italy are represented (fig. 6).

In general, the prevailing scale of service operation is regional (47%) and only few of them have contacts with international clients, sometimes because of the language skills (fig. 7).

Figure 7: Scale of service operation

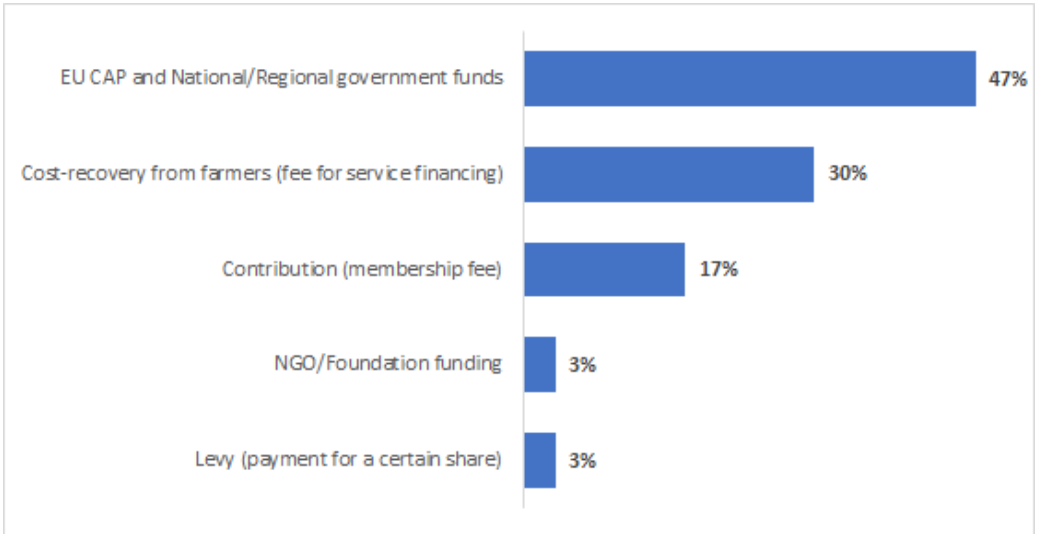


Source: Our elaborations based on survey

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

During the '90s most regions codified innovation services and funding schemes into regional laws, but currently only 11 regions and the autonomous province of Bolzano have mainteined a regional law although, in many cases, it does not provide for funding. Therefore, the main source of public funding of advisory services in Italy is the EAFRD (Measure 2 and Measure 16 of RDPs), as confirmed by the survey (47% EU and other public funds), followed by the cost recovery from farmers (fig. 8).

Figure 8: Funding sources for advisory organizations



Source: Our elaborations based on survey

Measure 2 is currently planned in 17 out of the 21 Italian RDPs, since the Autonomous Provinces of Bolzano and Trento and Aosta Valley and Friuli Venezia Giulia regions did not activate it. All 17 RDPs have planned sub-measure 2.1 (advisory services), while 13 have also included the support for training of advisors (Meas.2.3).

4.3. Clients and topics and methods

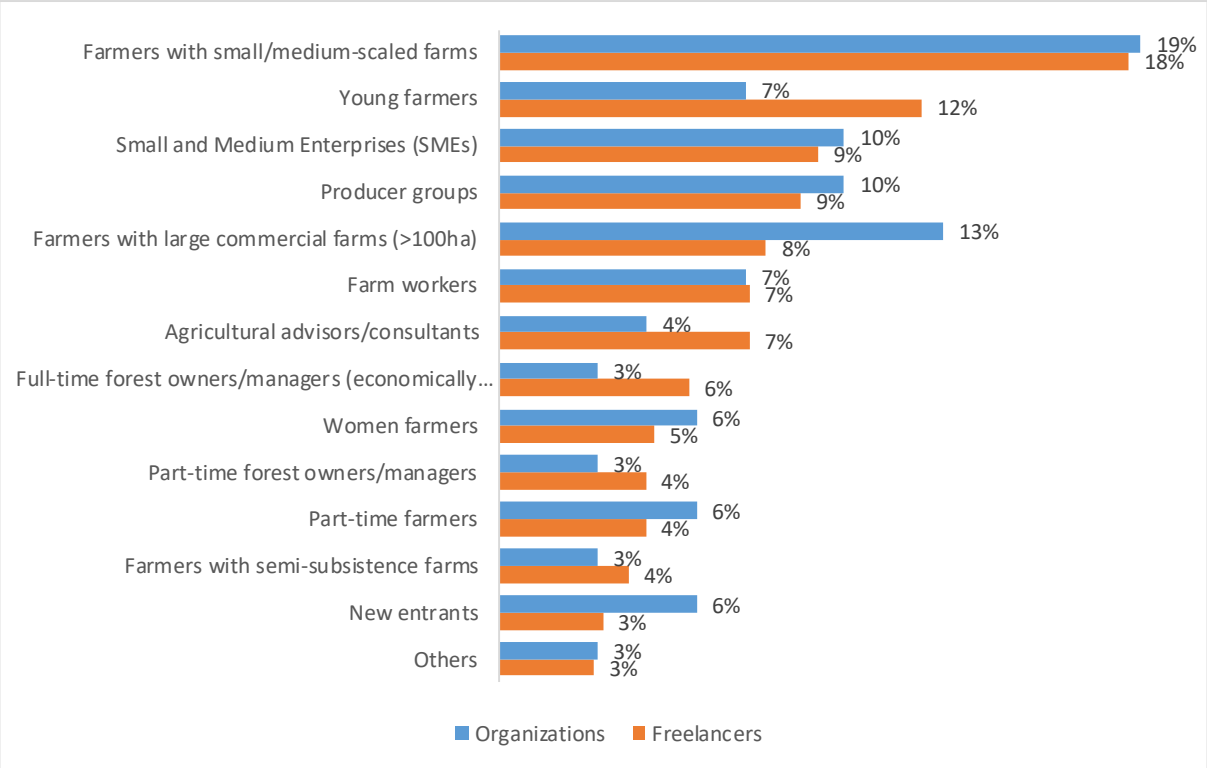
The clients and topics of advisory services vary depending on the type of service providers, topics/contents of advice, productive sector and region in which the provider operates. Therefore, it is not possible to make a general assessment without go in depth.

In general, in the last years, Italian advisory services seem to have extended the range of their clients and topics. This is mainly due to the enlargement of advisory topics related agricultural challenges and to a disruptive effect of the cooperation measures (new actors involved and new functions to play) since the previous programming period. In particular, the survey highlights a major involvement of clients from the forestry sector, namely forestry enterprises and SMEs (first processing or food distribution firms).

The survey confirms that advisory services are addressed to several types of clients (fig. 9). Small/medium farms are the most frequent target group for both organizations and freelancer, probably due to the characteristics of the Italian farms itself. However, the organizations seem to advise also larger farms, while

freelancers are more focused on young farmers, also thanks to the new entrants in agriculture encouraged by the EAFRD Measure 6.

Figure 9: Main clients of advisory organizations and freelancers

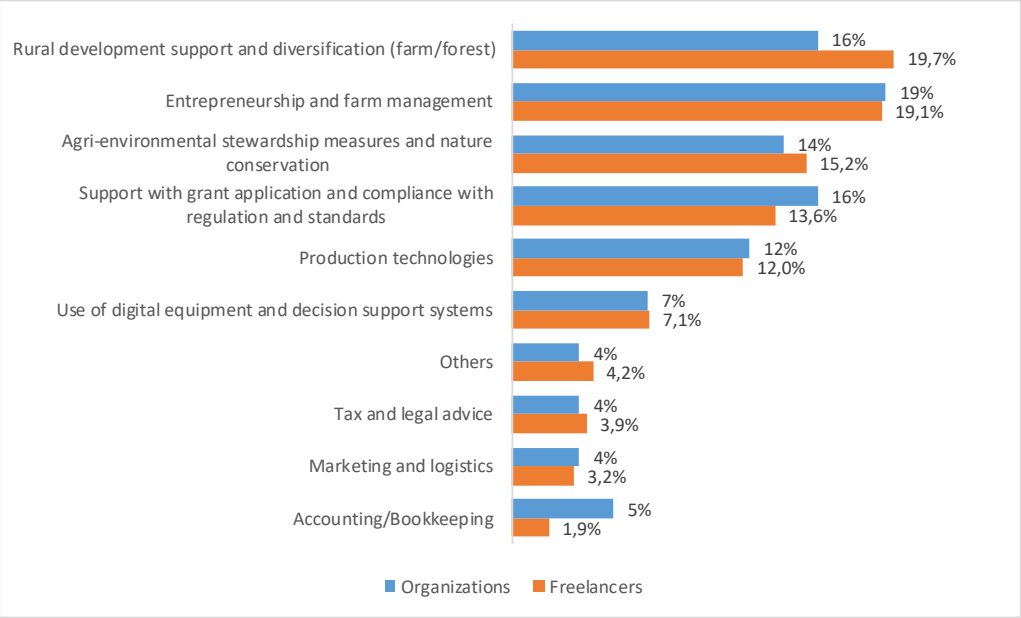


Source: Our elaborations based on survey

The contents of advisory cover a wide range of topics, that includes the traditional support for the implementation of technical processes and production reconversions, but also the support for regulatory compliance, the financial and economic management of the farm, the design of communication and marketing strategy, the use of data for financial and economic purposes (RRN, 2020).

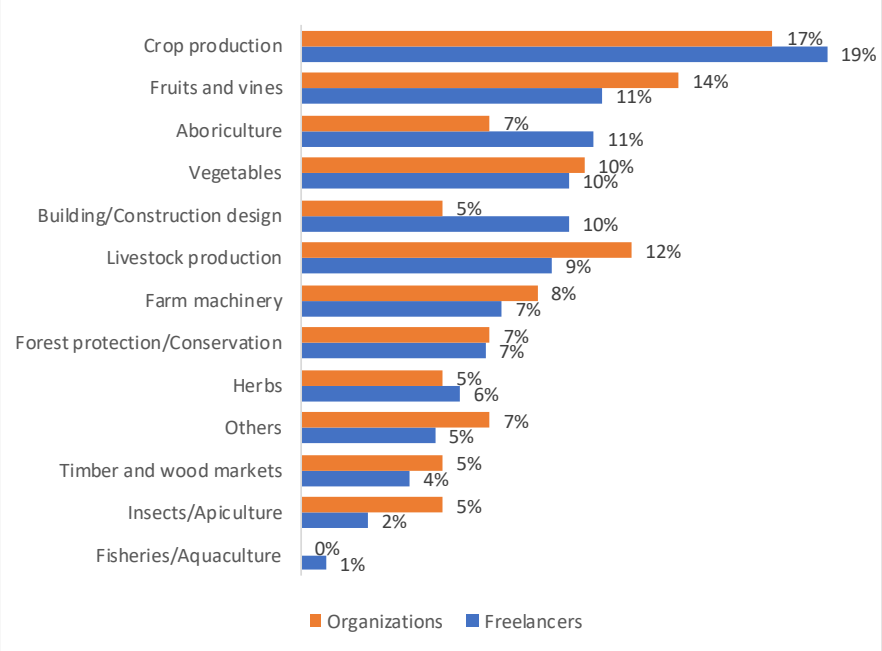
Survey respondents indicate the areas of farm competitiveness through diversification, entrepreneurship, farm management and application support and the support for compliance with agri-environmental schemes as the main topics addressed (fig. 10). The percentage of the use of production technologies and digital equipment is relevant, also due to the pandemic situation. On the other hand, the provision of bookkeeping, tax and legal service is scarce, probably because it is entrusted to labour consultants. The same is true for marketing and logistics topics, which are probably provided by specialized advisory services providers which were not involved in the survey.

Figure 10: Main cross cutting topics addressed by freelancers and advisory organizations



Source: Our elaborations based on survey

Figure 11: Main production sectors addressed by advisory organizations



Source: Our elaborations based on survey

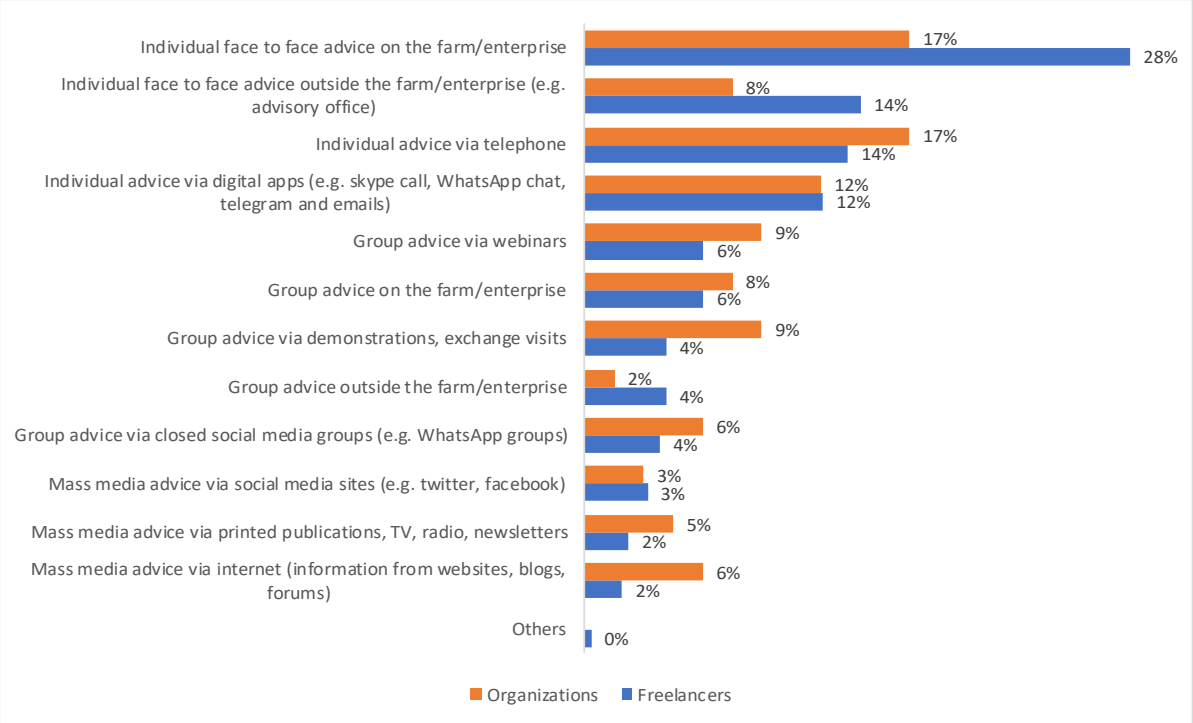
Focusing the attention on specific production sectors, the most relevant for both freelancers and organizations are crop production, fruits and vines and, in some

ways, also livestock production (Fig. 11). Fisheries and aquaculture are less frequent.

According to the survey, advisory provision seems to be outsourced only in a very limited percentage by advisory organizations, since they have necessary skills and human resources internally to provide advisory services.

In practice, the interviews revealed that the farmers' unions, which provide advice to a large number of associated farms, outsource a large part of their services to freelance advisors because the number of technical expert in-house staff has been reduced throughout the regions to a limited number of units. Moreover, in some regions, the selection criteria of Measure 2 require that organizations applying to the funding have expertise in all the productive sectors and cover the entire regional territory. This, in fact, prevents individual advisors from applying to the measure, encouraging associationism and, to a certain extent, also outsourcing.
Recent studies showed that a wide range of advisory methods and functions are used by Italian advisory services, depending on the farmers characteristics and needs and the advisory services providers expertise (Carta et al., 2019a; Cristiano et al. 2015). However, face-to-face methods are the prevailing ones, as shown by both freelancers and advisory organizations within the survey. Particularly, freelancers seem to mostly use individual face to face support on the farm, but also outside. The organizations also use other devices (telephone, skype, WhatsApp) in a high percentage. Group advise, when used, is via webinar or demonstrations, while mass media method is not so frequent, especially among freelancers.
Thus, the individual advise is the preferred method and the Covid-19 pandemic has strengthened this preference because of the mobility and reunions restrictions. In fact, the majority of respondents had to change their previous methods, increasing the use of digital supports and telephone to better reach their clients.

Figure 12: Methods used for advisory services



Source: Our elaborations based on survey

4.4. Human resources and methods of service provision

Human resource

Human resources of the organizations answering the survey have significantly variable dimensions. On average the participant to the survey state to have about 50 employees, although there are significantly larger organizations (300 employees). No relevant changes were recorded in the last five years, even if in some cases the increasing number of clients and services provided required an expansion of the staff.

The staff is mostly composed by advisors (33%). The female component is quite low. Only the 10% of the employees are females, a quota that decrease considering the sole advisors.

Figure 13: Number of employees in advisory organizations

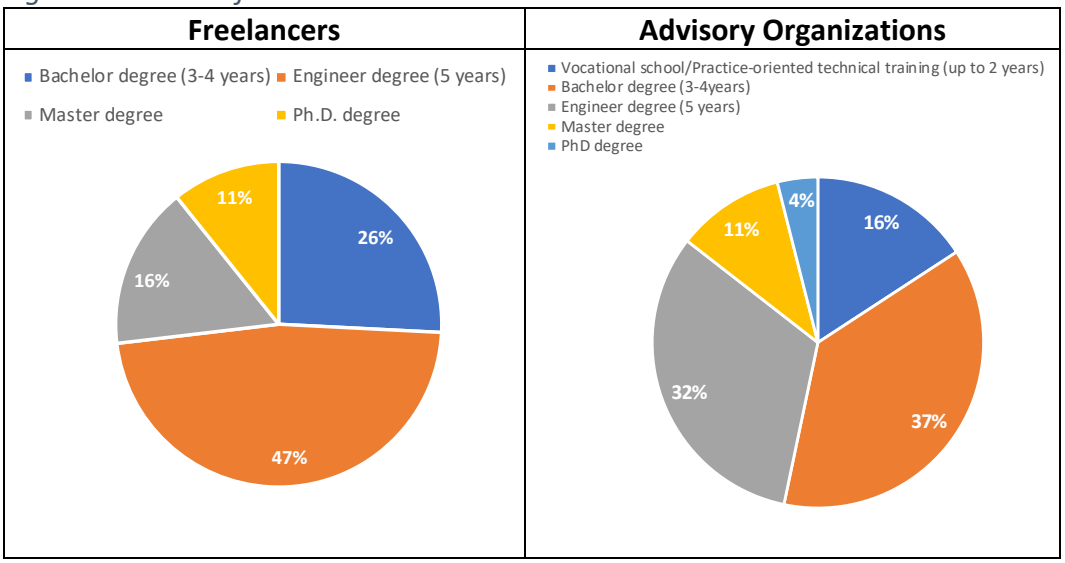
	Number of Employees (mean)
Total	49,1
Whereof: Female	*10,1*
Whereof: Advisors	*33,3*
Female Advisors	7,2
Back office activities	12,4

Source: Our elaborations based on survey

Education level of advisors

The prevalent level of education for both freelancers and advisory organizations is the degree (e.g. Agricultural sciences, Veterinary medicine), while the highest university degree (PhD) is less represented.

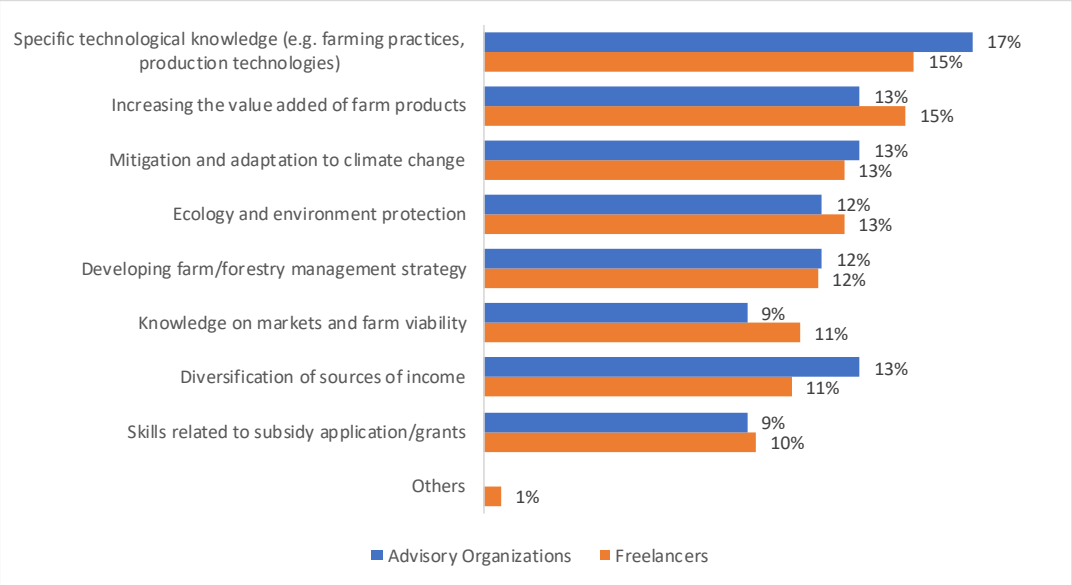
Figure 14: Level of education



Source: Our elaborations based on survey

With reference to the skills, there is a kind of alignment among freelancers and advisory organizations, for both technical knowledge and methodological and communication skills. On one hand, the technical ones are quite diversified and strong in several topics, although advisors state to be more skilled on specific technological knowledge (e.g. farming practices, production technologies) and increasing the value added of farm products. On the other hand, the self-assessment of their own skills and knowledge needs shows a proactive attitude of the advisors to keep up with changing times.

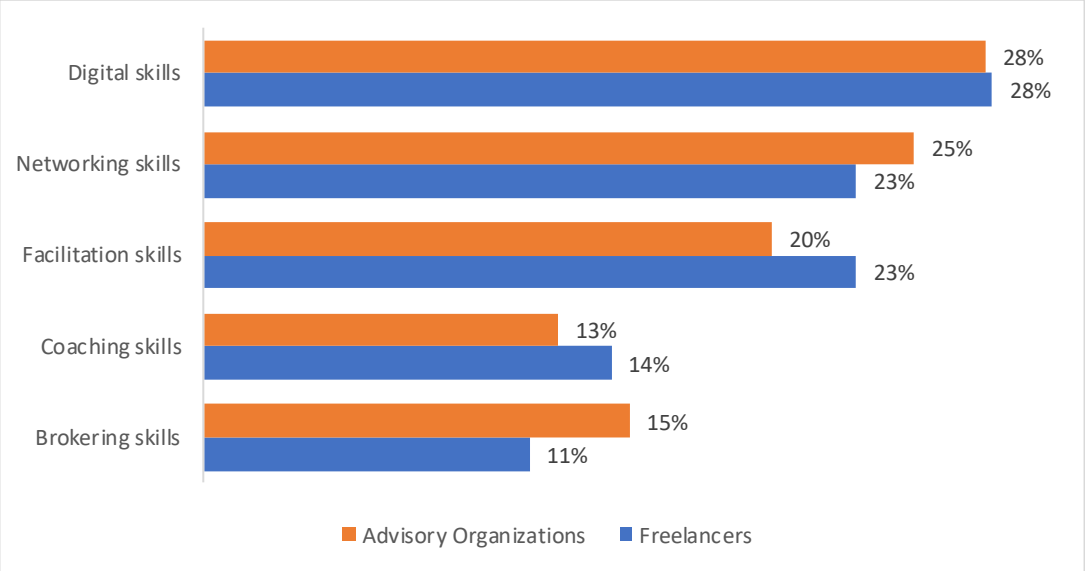
Figure 15: Technical knowledge and skills



Source: Our elaborations based on survey

Currently, digital and networking skills are the methodological and communication expertise more frequently owned by advisors; they were particularly useful during this pandemic that required the use of IT platforms and software. Rather, freelancers highlight more weaknesses in brokerage skills (mediation, facilitation, conflict management, networking, etc.), that are becoming more and more relevant and popular.

Figure 16: Methodological and communication skills

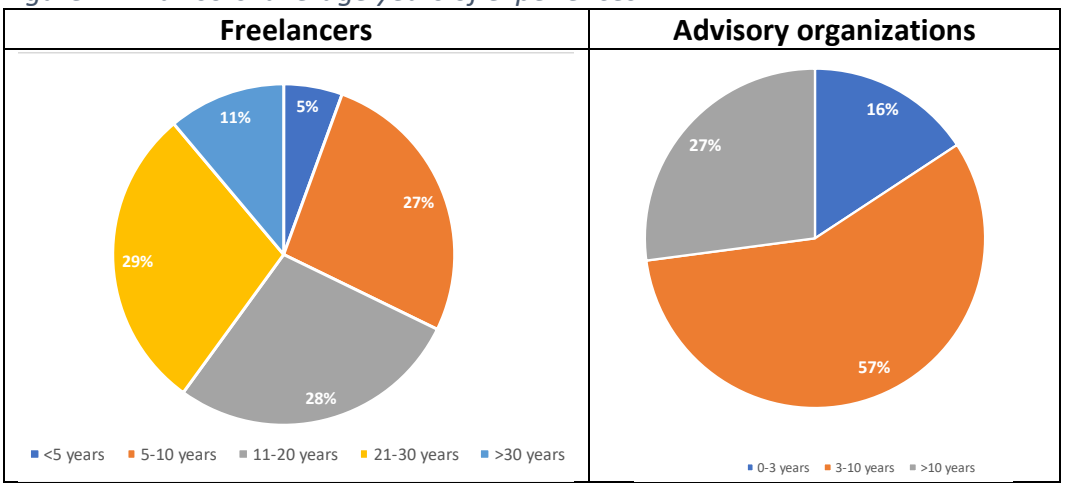


Source: Our elaborations based on survey

Professional experience in years

The professional experience in years varies significantly between freelancers and advisory organizations that seems to have, with respect to the surveyed, a prevalence of junior advisors in staff. The freelancers are mostly senior, with a good percentage of advisors with more than 30 years of experience (fig. 17).

Figure 17: Advisors' average years of experiences

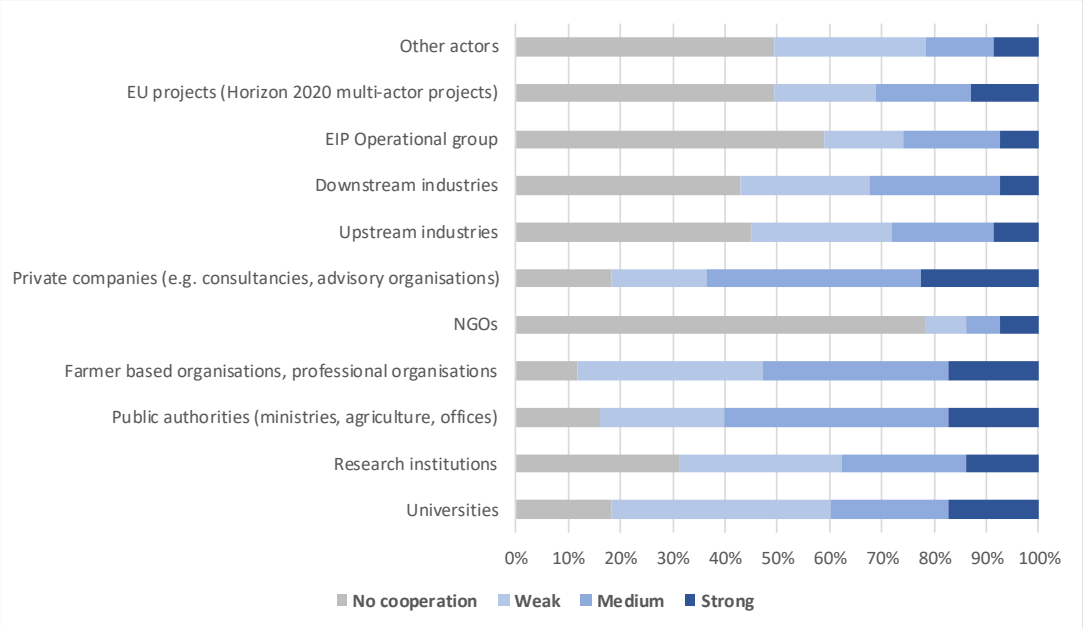


Source: Our elaborations based on survey

4.5. Linkages with other AKIS actors/knowledge flows

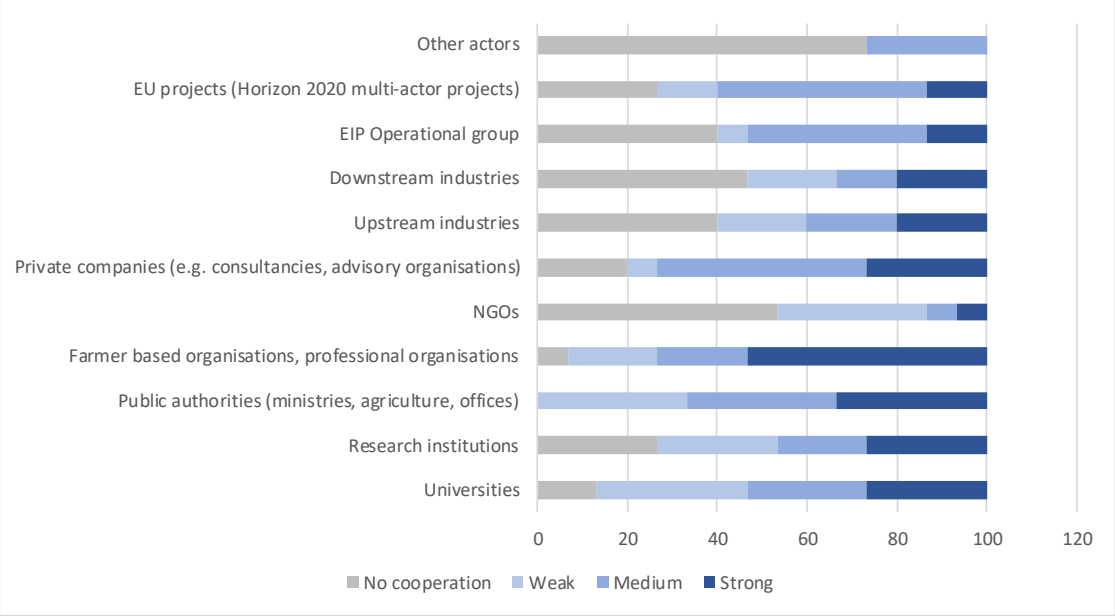
The relationships with other AKIS actors vary depending on the type of advisor considered. Freelancers have stronger links with private enterprises, such as other advisory organizations, universities, farmers' organizations and public authorities. This is because freelancers often provide advice on behalf of upstream and downstream industries, farmers' unions and other advisory organisations, university spin-offs, etc. On the other hand, organised advisory services have strongest links with farmer-based organizations. In both cases, there are linkages with OGs, which operate in several Italian regions.

Figure 18: Degree of cooperation with actors – freelancers



Source: Our elaborations based on survey

Figure 19: Degree of cooperation with actors – advisory organizations



Source: Our elaborations based on survey

4.6. Programming and planning of advisory work

Staff development strategy

Agronomists, veterinarians and agrotechnicians registered with the Professional Orders are required to undergo regular training organized by the national Councils and regional professional orders. To this aim, the professional orders are organized to provide at national level the rules and guidelines for lifelong learning, including requirements on minimum training per year to maintain the registration; while training protocols with agencies and courses are conducted under the responsibilities of national, regional and provincial levels. All the professional orders have established specific websites for the training courses and other capacity building events. Besides, information and updating of the registered is provided by monthly newsletters.

Most of the advisory organizations that answered the survey have a staff development strategy, which allows them to keep their advisors trained. On average, they receive 14 days training on topics concerning knowledge and advisory skills. However, there is not often a rewarding system to recognize good performance and incentivize skill developments for advisors.

Figure 20: Staff development strategies in advisory organization

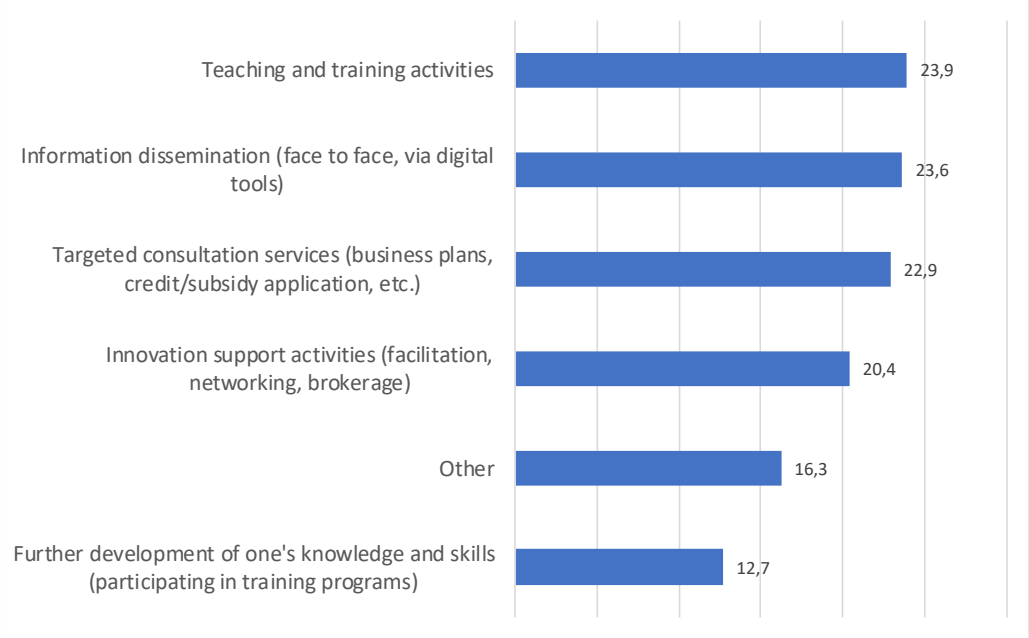
	Staff development strategy
Yes	60%
No	40%
Average days of training	14,29
	Rewarding system
Yes	13%
No	87%

Source: Our elaborations based on survey

Time allocation for advisory work

According to the survey, the time of advisors working in organizations is mostly spent on teaching and training activities, as well as on information and dissemination, while participation in training programs represents a weakness.

Figure 21: Average proportion of time (%) allocated to the following activities in advisory organization



Source: Our elaborations based on survey

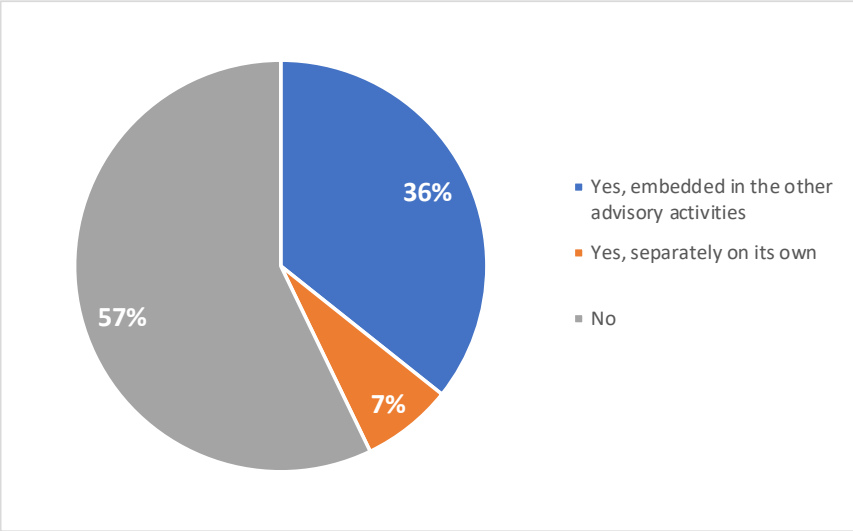
4.7. Advisory organisations forming the FAS and evaluation of their FAS implementation

Considering the variety of organisms providing advisory services (mainly private) and the decreasing of financial and human resources devoted to public advisory services, due to budget constraints, the Regions pushed the RDP to urgently cover all advisory needs at regional level. Therefore, in Italy, the implementation of the Farm advisory system is completely dependent from RDPs's (namely, current Measure 2 and previous measure 114) (cfr. § 2.1.1.). As a matter of fact, during the programming period 2007-2013, measure 114 supported about 32.100 and the most requested advisory topics were related to cross-compliance (Licciardo F., 2017). While, the actual implementation of measure 2 registers only about 6.883 beneficiaries of advisory servcies. On this regard, the most part of advisory organizations that answered the survey claim not to provide EU-FAS (57%). While, in some cases, the cross-compliance requirements, when provided, are embedded in the other advisory activities.

As a general comment, FAS implementation encountered some problems, especially during the current programming period and these mainly regard: (a) lack of attractiveness of the theme for farmers; (b) complex administrative and

beurocratic rules, which where solved by the ominibus regulation only in late 2018; (c) fear by the farmers that advisory services would be used to check effective compliance with EU standards (Cristiano, 2012).
However, it is widely recognised that the FAS has effectively supported the more diffuse knowledge of EU rules concerning environmental issue.

Figure 22: Advisory services on EU-FAS cross-compliance requirements in advisory organizations



Source: Our elaborations based on survey

5. Summary and conclusions

5.1. Summary and conclusions on sections 1 – 3

Italy is characterized by a large plurality of AKISs, representing different structuring and functioning degrees, that reflect the diversity of the country in terms of farming systems, socio-economic background, cultural values, environmental and orographic features of the territories, as well as the decentralisation of administrative functions.

These systems show different degrees of cohesion and organization, and the development of systemic thinking, common vision and system commitment by the players animating them are closely linked to the identity dimensions embedded in each territory.

For these reasons, a single country-perspective of the Italian AKIS cannot provide the real state of the art of the country, which rather requires a multi-perspective analysis, as it includes a supply chain perspective, a farming system perspective and a local one.

A plurality of AKISs, but also a wide plurality of actors, representing an asset in terms of cross-fertilization and growth of knowledge and innovation systems at different levels.

Certainly, European policies for innovation have contributed to a certain dynamism of Italian AKISs, triggering a transition process, that is characterised by the rise of new actors and a slow, but progressive, awareness about new possibilities to innovate and share knowledge. Since the introduction of the European innovation policies within the last two CAP programming periods, a general and widespread strengthening of local relational systems can be observed. This is as indicated, as an example, by the maintenance of relationships beyond the innovation projects term and by the sustainability of innovation partnerships through the different programming periods (submission of consecutive proposals from measure 124 of RDPs 2007-2013 to measure 16 of the RDPs 2014-2020). In many cases, these partnerships and/or innovation networks include a variety of actors (farmers, advisors, researchers, SMEs, local administrations, consumers), so as to be considered as micro-AKIS where an interactive innovation transfer model is implemented.

An important element that is certainly characterizing the strengthening of a country-perspective AKIS is the progressive consolidation of trans-territorial relationships, triggered by actors that are sufficiently well organised (research, advisory, input providers) to permeate the different regions, that foster the cross-contamination of the different AKIS in terms of knowledge, leading to the definition of new knowledge co-creation processes.
The greatest constraint of Italian AKISs is undoubtedly the shortage of financial resources to be allocated to research and advisory that, since several years, are exclusively restricted to European sources. Considering the dynamism and a growing awareness that arises from the territories in terms of new cooperation capacities, which have proven to be able to overcome individualism and pool knowledge sources, the absolute dependence on European funds is a missed opportunity. In fact, national or regional resources would allow to give more continuity and consistency to cooperative partnerships, allowing relationships to grow and thus feeding the AKIS.

5.2. Summary and conclusions on sections 4

The state of the art of agricultural and forestry advisory service(s) confirms the trends that have distinguished Italy for at least twenty years: the presence of a plurality of advisory service providers and the exclusive dependence of public services provision on CAP funding.

The introduction of the EIP-Agri has led to new demands for advisory services and, therefore, new subjects able to provide them have emerged. Therefore, there has been a widening of advisory providers, that now include also actors from downstream of the production chain (agri-food sector) or from other sectors to provide intermediation services, project design and management, administrative services, etc. The emergence of different service providers, as well as new models of services provision, has been facilitated by a gap in traditional advisory services that followed a progressive cut in public funds and the failure of the Farm Advisory System (Cristiano and Proietti, 2015).

Due to this breakpoint, even some traditional providers have been forced to review their role and competencies (reorganize) to meet new needs. This is the case, for example, of the Regional Agencies, which have been revitalized through the assignment of new functions within innovation processes. In several regions,

Regional Agencies play a key role as brokers, carrying out a needs assessment, aggregating relevant partners around a project idea, supporting the co-ordination of the wider dissemination of project results (through farm visits, events, etc.).

Farmers' Unions have also gone through a transformation phase, enhancing their role in supporting new innovation pathways, thanks to an internal reorganisation, the acquisition of new skills, and the outsourcing of some services.

Finally, there are freelance advisors who, being aware of the need to widen their professional skills in order to provide adequate solutions to a wider range of needs from the different territories, have started organizing themselves through innovative advisory networks and other associative arrangements. In general, they show a higher propensity to update their own networking, communication, and facilitation skills, as well as to identify the enabling conditions for acting as go-between farmers' needs and the different knowledge sources.

This phase of general re-organisation of service providers turns the spotlight on professional skills development and update. The current system of life-long learning credits provides a dynamic skill updating mechanism that is able to cope with rapid changes affecting the agricultural sector. This system has fostered the rise of a certain variety of actors that are specialised in providing technical updating services, while also bringing advisors closer to emerging research issues. On the other hand, there is also a need to systematise existing expertise (e.g. to train new generations) through a greater use of innovative approaches such as coaching.

6. Acknowledgement of partners, information sources and gaps

We would like to thank all the actors interviewed that provided us valuable information.

List of interviewed persons:

NAME	ORGANISATION	DATE
Fabbri Fausta	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Tuscany Region	July 2020
Gemmiti Alessandra	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Tuscany Region	July 2020
Patrizia Bacchiega	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – A.P. Bolzano	July 2020
Cianciosi Lucio	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Tuscany Region	July 2020
Gandolfi Ferdinando	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Campania Region	July 2020
De Franciscis di Casanova Emiddio	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Campania Region	July 2020
Coletta Lucia	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Campania Region	July 2020
Stellato Massimiliano	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Campania Region	July 2020
Pandozy Gianmarco	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Lazio Region	July 2020
Santalucia Gioacchino	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Lazio Region	July 2020
Brugna Elena	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Lombardia Region	July 2020

Luigi Trotta	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Puglia Region	July 2020
Bacinelli Mauro	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Umbria Region	July 2020
Terenzi Angela	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Umbria Region	July 2020
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Garbin Matteo	The Interregional Network for Agricultural, Forestry, Aquaculture and Fisheries Research – Veneto Region	July 2020
Restaino Rocco Vittorio	MA RDP Basilicata Region 2014-20	July 2020
Lasala Pier Michele	Farmer	July 2020
Poddie Maria Annunziata	Sardinia Region – Assessorato dell'Agricoltura e riforma agropastorale della Regione Sardegna	July 2020
Lai Elena	Sardegna Ricerche	July 2020
Medda Maria Chiara	Farmer / Advisor	July 2020
Conforti Gabriele	Sardinia Region – Assessorato della programmazione, bilancio, credito e assetto del territorio	July 2020
Bartalucci Laura	Tuscany Region – Head of the Department “Sviluppo dei partenariati europei per l'innovazione in agricoltura”	July 2020
Ulivi Angela	Freelance advisor	July 2020
Berna Enrica	Advisor - Studio BPM, Contact person fo the advisors’ network Tos.ca	July 2020
Vagnozzi Anna	National Rural Network	August 2020
Roggero Pier Paolo	University of Sassari	August 2020

Perniola Michele	University of Basilicata	August 2020
Puliga Serenella	MIPAAF – Research Department	September 2020
Trioli Gianni	VINIDEA	September 2020
De Rosa Marcello	Cassino University	September 2020
Falzarano Pasquale	MIPAAF	September 2020
Colombo Luca	FIRAB	September 2020
Sileo Rocco	ALSIA	September 2020
Zurru Roberto	AGRIS	September 2020
Selis Tonino	LAORE	October 2020
Lorenzoni Antonio	Advisor	October 2020
Diamanti Sabrina, Pecora Carmela	CONAF	October 2020
Varotto Fabrizio	Advisor	October 2020
Rossi Daniele	CONFAGRICOLTURA	October 2020
Aquila Gianpiero	Istituto tecnico agrario di Alvito (High School)	November 2020
Stefani Alessandra	MIPAAF – Forestry Department	November 2020
Miozzo Marcello	DREAM Italia	November 2020
Mori Paolo	SHERWOOD REVIEW	November 2020

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http://www.reterurale.it

Appendix 1 Overview of the organisations providing advisory services

Provision of service				Source of financing									
				Public funds			Farmers			Private	NGO		
Status of the organisa-tion	Type of organisation	Number of organisations	Number of advisors	EU funds	National funds	Regional funds	Farmers' levies	Farmers' contribu-tion	Billing services	Other products (inputs, outputs)	foundation	Other (specify)	
Public authorities	Advisory department of the Regions	**3**	**n.a**			**X**							
	Regional Agencies for Development and Innovation	**17**	**n.a**	**X*** **		**X**							
	Experimental Zooprophylactic Institutes	**10 (with 87 peripheral diagnostic sections)**	**n.a**		**X**								
Private sector	Independent advisors	**70.000**	**n.a.**	**X**					**X**				
	Advisors associations and networks	**n.a.**	**n.a.**	**X**					**X**				
	Upstream industries	**n.a.**	**n.a.**							**X**			
	Downstream industries and Large Distribution	**n.a.**	**n.a.**									**Contract farming**	
Farmer based organisation s	Farmers' unions	**4**	**n.a.**	**X**				**X**					
	Cooperatives and consortia of which POs	**5.080**	**n.a.**	**X**** **X**				**X**		**X**			

	- Fruit and vegetables - Cereals - Milk - Meat - Olive and olive oil - Others	**310** **15** **54** **25** **110** **53**											
	Producers Associations	**n.a.**	**n.a.**	**X**				**X**					
	Farmers' networks	**n.a.**	**n.a.**	**X****				**X**					
NGO													

X* Instrumental services supporting research activities

X** Innovation support services within Operational Groups

Appendix 2 – The AKIS in Basilicata Region

Basilicata is a small region in southern Italy, characterized by a rich variety of landscapes. Agriculture is its most important sector both from the economic and social point of view and regional agriculture is very specialized on a territorial basis:

- Fruit and vegetables are essentially located in the Metapontino Plain, in the Lavello Plain and in the Valley of the river Agri. It is one of the most competitive sectors of Lucanian agriculture. Regional fruit and vegetables sector is renown at the national level for the quality of its productions (strawberries, apricots, peaches and nectarines), many of which reach European markets.
- Livestock breeding is carried out on the whole regional territory, with the production of meat, milk and cheese, although in the last two decades has shown a reduction both in the number of the heads and, in smaller numbers, of the farms
- Cereal growing is especially widespread on the hills of Matera and Vulture Melfese, where durum wheat is by far the most cultivated crop.
- Vulture territory is traditionally suited to viticulture, while oliviculture has recently obtained the PDO certification

Lucanian agriculture is capable of expressing a wide range of quality products (oil, wine, cheeses, cured meat, pasta) that have become a point of strength in regional economy. As a matter of fact, there are food excellences inmost of regional agro-food compartment.

The Agriculture & Forest Knowledge and Innovation System of Basilicata is populated by many actors, in order to better meet the needs of the Lucanian food system (figure 1). Over the years there has been a positive growth in terms of knowledge and skills of agricultural and forestry entrepreneurs. The knowledge system of Basilicata presents a rich picture of actors (public and private) who move between rules and instruments of public governance with different degree of

interaction. The interviews carried out with experts and key stakeholders allowed to understand the relationships among them but have highlighted a quite faint relational system.

The main actors of the regional AKIS are listed below.

Research and Education

In Basilicata operate public and private research institutions. Over the years, the role of the Basilicata University has grown both from the point of view of the learning activities and the research.

Extension and Advisory services

The private advisory providers are well-integrated within the AKIS and include:

The Livestock Breeders' Association of Basilicata (ARA), provides veterinary services for the prevention and treatment of diseases and services relating to feeding and livestock productions.

Nine fruit and vegetable producers' organizations. They provide advisory services to their farmers.

The Agricultural Professional Organizations provide consulting services on topics such as marketing, production chains, health and safety, correct use of pesticides, and pay particular attention to the classification and quality of products With regard to the dissemination and testing of innovations, there are only a few activities already in place or in progress. For example, Coldiretti has started a training course as an Innovation Advisors (RRN Magazine, 2019), while CIA has focused its attention on the possibility of introducing fertirrigation methods in areas outside the land reclamation consortia boundaries.

Downstream industries' technical representatives provide advice on agronomic treatments and crop needs, but usually are related the use of a certain input.

Larger farms acquire the necessary managerial and/or product/service specific skills externally, often by hiring a professional or attending fairs and markets where they can learn about innovations and new markets. On the other hand, smaller, and more economically fragile farms do not receive valid support from public services and cannot afford private consultants.

Advisory public services

Public services in Basilicata have been reorganized through a series of different regional acts influenced also by the CAP. Models adopted in the region, have

changed many times, as for roles and functions, over the years. They have been characterized by a progressive substitution of service activities by including research.

In 1996, in Basilicata, an effective management of consulting services model was developed, by establishing the Lucanian Agency for Development and Innovation in Agriculture (ALSIA), the Interregional Consortium for Agricultural Dissemination and Training (CIDFA) of professional agricultural organizations and by using experimental and model farms, directly managed by the Regional Department of Agriculture.

In 2001, with regional law n. 29, ALSIA became an essential component of the Regional consulting services system through its Experimental Demonstration Farms and Specialized Services. The new organizational model provided for a greater interaction between the sectors of research and experimentation, dissemination, training and technical assistance.

However, from 2000 to 2005 the agricultural services of Basilicata started an internal restructuring of the range of activities for agricultural innovation due to a lack of skills and in order to promote a more rational exploitation of the financial opportunities offered by the RDP.

Over the years, ALSIA's involvement in the field of consultancy services has decreased for various reasons, ranging from the downsizing of experimental and model farms, to problems related to the governance of the agency itself, at the point that the Agency has been put under receivership.

In 2013, ALSIA acquired the "Metapontum Agrobios" Research Center, located in Metaponto (a sub-region on the Jonic coast of Basilicata), ALSIA's range of activities has been enriched of new expertise in the field of agronomic research.

Eventually ALSIA was last reorganized in 2015, and to date, has three action areas: a) planning and development, b) research, c) basic services. According to the law n.ro 9 of 2015 the Agency uses the regional structures and infrastructures for the exercise of its activities. In addition, the permanent staff in service at the Agency has been transferred to Basilicata Region and functionally assigned to ALSIA.

Basic services are further divided into transversal components such as the Lucano Agrometeorological Service (SAL), which collects data disseminated through the site, IRRIFREM, devoted to the collection and dissemination of data on innovative irrigation techniques, SEDI, defence service and phytosanitary monitoring and

SETI, training service for technicians in charge of calibrating spraying machines, phytosanitary alert, which provides forecast models on climate trends and possible attacks by pathogens for some crops. Also, experimental farms have been restructured in order to guarantee a more direct relationship with agricultural companies, mainly on technical issues on crop production and animal husbandry. Also multifunctionality (farm holidays, educational farms, etc..) and quality schemes, have entered the topics of ALSIA's advisory activities.

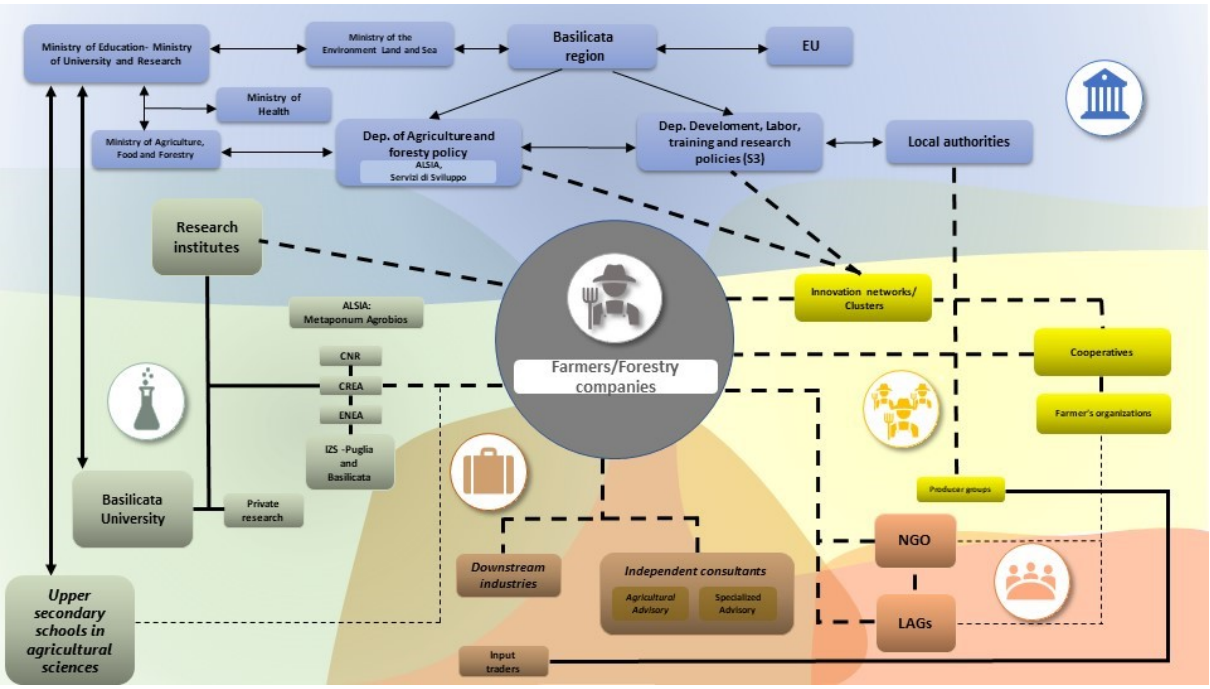
In addition, ALSIA carries out research activities in the agriculture, agro-industry, green chemistry and bio-economy sectors.

BOX A1 - Lucan's Bioeconomic Cluster

In July 2016, in Basilicata, was established the Lucan's Bioeconomic Cluster (CLB) in accordance with the Basilicata Regional strategy for research and innovation, also known as "Smart Specialization Strategy" or "S3", introduced via the ERDF 2014-2020 Operational Programme (OP). This Cluster has gathered 55 agricultural, food and environmental companies and all public agricultural research operating in Basilicata. CLB is managed by ALSIA.

CLB participated to call for proposals for "Support for the creation and management of operational groups PEI", in 2017, and it had ten projects financed. Moreover, ALSIA is partner in 8 OG engaged in dissemination activities.

Figure A1: AKIS Diagram for Basilicata Region



Source: Our elaborations based on interviews

Appendix 3 – The AKIS in Sardinia Region

Sardinia is a region with a strong pastoral vocation (with more than 3,2 million of sheeps and 270 thousand of goats, the 43% of the Italian sheeps and goats)[1], with an inherent ageing of breeders, a small medium size of farmers and very low propensity to innovation.

The AKIS in Sardinia presents a structural complexity due to the high number of actors involved not always well connected and coordinate. (Fig. A2). Also, the competences seem to be quite fragmented because the lack of a continuous synergies among the actors' activities.

Since 2003, through a series of regulatory acts of the Region, the different components of the regional AKIS (R&I, education and advisory) have been re-organized and targeted towards the implementation of a substantial intervention plan of research and technological development. This process, reflecting a strong public direction, brought to a new functional organization of the AKIS components in a systemic perspective, through defining cross cutting linkages in the research and innovation system and the attribution of the different roles and functions.

Particularly, the "Regional Plan for Research and Technological Development" (2003), defined a regional innovation strategy, mainly focused on establishing the regional R&I infrastructures along three strategic areas of intervention: i) the development of "Territorial Innovation Clusters"; ii) integration, crossing and fertilization; iii) science and technology park. Particularly, the Innovation Clusters aimed to develop new technologies and innovations in some specific fields. The Clusters identified were: a) Informatics and communications; b) Biotechnology in the field medicine, veterinary and pharmaceutical industry), in the field industry, and in agriculture; c) Environmental Sustainability and Energy; d) Traditional

[1] Source: ISTAT (2020). Database i.Stat available at: http://dati.istat.it/.

sectors (cork, stone and aggregates, agro-food, chemical, etc.); e) Technological innovation in the cultural sector.

The second regulatory process (Regional Law n.7/2007) addressed more specifically the functionality and knowledge flows within the AKIS, in order to increase the cohesion between the different components, through organizing roles and functions of the different components, including the governance structures. Meanings of the interplays between the different regional institutions were clearly defined, through creating at the same time a close integration between research, the research system and farmers' needs.

Besides, coordination arrangements of regional interventions on research and innovations included the setting up of the technical advisory bodies as a governance body and the of the Regional Register of Scientific Research and Technological Innovation, entitled to monitor and systematizing all information on public and private entities and research projects. Eventually, a research and technological innovation fund was established to support the implementation of all regional interventions on R&I, through creating synergies among all regional Public administrations and avoiding double funding.

Finally, this widespread process of systematization of the AKIS in the Region included the dismission of the Regional Agricultural Development and Technical Assistance Agency (ERSAT), the reform of local authorities and the reorganization of functions in agriculture through the establishment of the three currently main regional Agencies, AGRIS, LAORE and ARGEA. ARGEA, however, doesn't perform any advisory activity. (Regional Law N.13/2006).

All in all, the AKIS actors in Sardinia can be categorized as follow.

Research

The Agricultural Research Agency of Sardinia (**AGRIS**) is the regional agency dedicated to the scientific research and experimental and technological innovation in the agricultural, agro-industrial and forestry sectors. AGRIS promotes the transfer of the results obtained from its research and experimental activities to farms. Its competences related to the following incorporated entities: the Interprovincial Fruit Growing Consortium, the Provincial Fruit Growing Consortium, the Sardinian zootechnical and dairy Institute, the Cork Experiment

Station, the Regional experimental center in agriculture and the Institute of Equestrian boosting. However, some of the activities performed by these entities has progressively reduced, enhancing the role of private actors. AGRIS is well connected with other research and academia bodies at regional, national and international level. It is involved in several national and European project (as LIFE projects) and it is currently engaged in an important collaboration with the Agricultural High School, aimed at training to students and benefit from fruitful exchanges with the educational system.

BOX A2 – The Regional Network of Agricultural High Schools

Unlike other Italian regions, Sardinia can consider its network of Agricultural High school as an active AKIS actor. The network is coordinated by the Institute Duca degli Abruzzi, based in Cagliari, which collaborates with AGRIS in some European projects. Particularly with AGRIS vaunts a consolidated cooperation to provide a joint point of reference for technicians and farmers. Moreover, the possibility to build a direct bridge between future advisors/ farmers and research can be a good way to create the basis for a more integrated AKIS, facilitating the transfer of knowledge and innovation.

Sardegna Ricerche was established by the Sardinia Region in 1985, under the name "Consorzio Ventuno" and took its current name in January 2007. With the Regional Law n. 20/2015 it became a regional agency. The agency pursues the institutional aims of promoting research, innovation and technological development, supporting companies and providing services. Sardegna Ricerche controls four research institutes/companies: CRS4 (Center for advanced studies, research and development in Sardinia); Porto Conte Ricerche; IMC Foundation (International Marine Centre) and Pula Servizi e Ambiente. It plays a key role in the AKIS System because of the supporting activities carried out through the financing of innovation clusters projects and innovation programmes related also to the agricultural and agri-food sector. The cluster projects are not fixed but they change every 2 or 3 years, to cover different topics. At the moment under the cluster "Agro-industry" 17 projects have been financed.

IZS (Experimental Zooprophylactic Institute) carries out experimental veterinary scientific research and assessment and certification activities for animal welfare.

Extension and advisory services

LAORE (box n.1) provides technical assistance and advisory support to the farms and to transformation companies aimed at quanti-qualitative optimization of production processes and the introduction of technological and product innovations.

BOX A3 - LAORE – Regional Agency

LAORE represents the public advisory services provider in Sardinia. The main aim of the agency is to promote the development of the territories, multifunctionality, agrobiodiversity and Sardinian food products. It is a key actor in the Sardinian AKIS because of its role in providing technical assistance to farmers. Thanks to its 32 territorial offices is able to cover the entire regional territory and to be close to farmers. The principal functions of LAORE are:

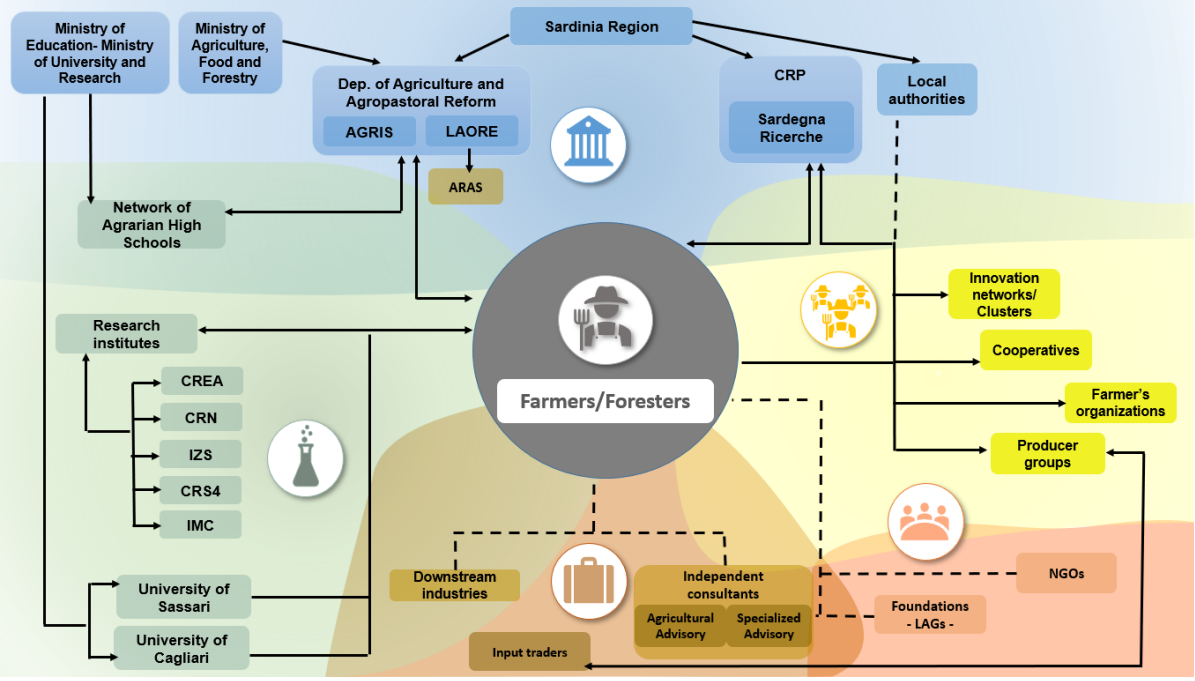
- To provide technical assistance to both public and private entities;
- To provide information and organize dissemination activities;
- To act as an intermediary between the production system and research in order to promote an effective transfer of innovations to farms;
- To promote and participate in regional, national and European projects;
- To collect and elaborate statistical data in several sectors;
- To support Local Action Groups.

Moreover, LAORE manages the list of farm advisory organizations for the RDP Measure 2. It also used to organize testing phases for farms innovations in demonstration fields, however this activity is decreasing due to the lack of human resources. It collaborates with several schools (of every grade) especially related to the school-work alternation compulsory in the Italian educational system.

Regional Breeders Association of Sardinia (ARAS) is a private association of technicians, agronomists and vets who work directly on the farm. ARAS has a milk analysis laboratory that collect and analyse information to improve the quality of the milk and related products. In the near future, ARAS might become part of LAORE.

The Region owns also some public experimental farms and other research centres.

Figure A2: AKIS Diagram for Sardinia Region



Source: Our elaborations based on interviews

The interviews carried out with experts and key stakeholders allowed to understand the relationships among the AKIS actors.

In general, the perception regarding the current agricultural knowledge and innovation systems in Sardinian region is quite low, both in terms of a systemic vision/approach than in terms of impression to be part of a system from the AKIS actors. This aspect influences the relations among farmers and the rest of the system, creating strong bilateral linkages, but weaker multilateral relations within the AKIS. The Operational Groups of EIP AGRI are perceived as a useful instrument to enhance the cohesion, in the next few years.

The transfer of process innovations seems to be harder than product innovation, requiring trustworthy relationship between advisors and farms. The transfer is basically top down through events, open day in demonstrations fields, seminars, publications, provided by the RADIs but also Universities and Research institutes. From this point of view, input traders can be said to be very effective, covering activities before performed by the RADIs (e.g. nursery and propagation materials).

Even though, these actors sometimes are not able to understand the territorial needs, but they pursue only business goals.

According to the interviewed, some sectors, primarily viticulture, livestock and fruit and vegetables, especially in medium-big farms, show major predisposition to innovate and they vaunt the frequent presence of advisors embedded in the farms.

Private advisors don't always seem to be able to bridge research and knowledge needs of farmers. Some of important aspect of improvement are lack of training for advisors, especially about business management, digital technologies, project management and communication. Particularly, these last two points are crucial to manage and carry out research and innovation projects. Moreover, from the farmers side, it would be necessary to improve innovation and knowledge transfer on ICT and Digitalization, blockchain, cost reduction and the productions of goods with a profitable end market.