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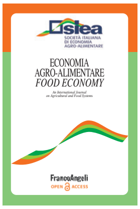

Innovation in Basilicata agriculture: From tradition to digital

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Abstract

The 4.0 technologies are changing agricultural production processes and with them the agro-food supply chains, fundamental for the competitiveness of the Made in Italy and Basilicata, a region of southern Italy. It has invested in modernization and restructuring of agricultural, agri-food and forestry farms by rural development policies, which address respect for sustainability and to reduction of renewable and non-renewable resources, preserving quality and the link with the territory.
Some Lucanian agricultural entrepreneurs, interested in experimenting with innovative and sustainable agriculture, has intensified relations with the local scientific world, the advisors, training institutions and with small and medium-sized agro-industrial enterprises, setting up clusters. Then European Partnerships for Innovation have formed inside them.
This paper analyses the eleven Operational Groups of the Lucanian European Partnerships which represent the incubators for the digitalization of agri-food 4.0. From the analysis it emerged that the maximum expression of digitization in Basilicata is Precision Farming, as evidenced by the establishment of a specific operating group, AgrotechBasilicata. However, the other Lucanian OGs can also be classified as digital because they are interested by information collection systems, software and data analysis, as well as robotics and automation.

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Introduction

The first technological developments, applied to the primary sector, date back to the second half of the last century when glass greenhouses were equipped with devices to measure and control the internal microclimate, in order to produce fruit and vegetables out of season or high-income crops. In fact, the evolution of electronics led to the affirmation of automatic control systems; these used microprocessors characterized by a high ability to adapt to the complexity of the system management, by the speed of response, by high reliability and by the progressive reduction of costs (Sica, 1996; Manera *et al.*, 1988).

Over the years, the introduction of other innovative technologies (satellites, Global Position System-GPS, Geographical Information System-GIS, dedicated software, etc.) has produced changes that have allowed, and still allow, sustainable management of the agricultural landscape. For example, Remote sensing techniques are used to monitor changes in agricultural soils, the Decision Support System (DDS) to manage greenhouse production system (Dimitrijevic *et al.*, 2015), while GIS remain excellent tool to evaluate morphological and vegetation changes in agro-forest land over time. Among its numerous applications, there are the control of hydrogeological instability, the identification of the different categories of land use, the optimization of agricultural plastic waste management (Blanco *et al.*, 2018) and mechanized management, more targeted and efficient, of some agricultural practices such as soil preparation, sowing, water and nutrient management, weeding, harvesting and sorting of harvested products (Precision Farming, Agriculture 3.0) (Falzarano, 2018; D'Antonio *et al.*, 2015; D'Antonio *et al.*, 2011).

PF is a multidisciplinary and technologically advanced form of agriculture that produces economic and environmental benefits (Medici *et al.*, 2019). These benefits are due to the reduction of the quantities of production inputs, to the labor savings (reduction of working hours and stress levels of the operator as well as management of large companies with the same workforce) to the possibility of operating in any climatic conditions and to have a fuel saving producing, at the same time, a reduction of the environmental impacts on air, water and soil. The reduction of direct (for the purchase of inputs) and indirect (environmental restoration) costs produce a significant economic improvement.

Agriculture 4.0 can be considered the evolution of agriculture 20 years ago. In the first two decades of the 21st century, the advancement of geomatics technology produced new tools and/or improved existing techniques for near-surface geophysical surveys (and therefore applicable to agricultural soil) in a robust, cost-effective and non-invasive way (Bitella *et al.*, 2015). This is the case of electromagnetic devices that were extensively used in precision agriculture, alone or in combination with information on the ground, to help delineate uniform management zones.

Today in Italy the agri-food and forestry sectors are affected by a technological revolution closely linked to the use of digital applications and artificial intelligence, which is why Agriculture 4.0 is also known as Smart Agriculture.

Its most important innovative element is represented by automated robotics which, in turn, is enriched with new technological applications: innovative sensors (e.g. optical fibres) applicable or not to agricultural equipment, software capable of automatically learning the data, advanced algorithms for 2D and 3D tomographic imaging, robots capable of moving on the ground, by means of vehicles equipped with wheels or sliding on rails, or in the air above by means of drones (Zorer, 2020; Klerkx *et al.*, 2019), and unmanned land vehicles. The agri-food and forestry sectors are affected by the multi-actor platform, a tool capable of ensuring resilience and an effective mechanism to guarantee the co-creation of knowledge and definition and implementation of innovation (Salvia & Quaranta, 2019; El Bilali H. & Allahyari M.S., 2018).

Agriculture 4.0 allows a greater guarantee of yield and sustainability of the crops, as well as production quality, potentially even in the most disadvantaged rural areas.

Italian Observatory Smart Food study on 986 farmers shows that the Italian Agriculture 4.0 market went from 100 million euros (2017) to 540 million euros in 2020 with an increase of 270% in just one year (2017-2018). When a farmer uses an agricultural 4.0 solution (55% in 2018 e 60% in 2020), he is more willing to adopt other technological solutions. The same study indicated the business management software as the first most adopted digital solution in Italian agriculture with 37%, followed by the monitoring and control systems for agricultural machinery and equipment (33%), the crop and land mapping services and precision irrigation systems, equally to 27%, the crop and land monitoring and control systems (17%), the decision support systems and remote and monitoring systems of corporate infrastructures, both to 15% and the variable rate distribution systems (10%).

The technologies of the production processes, already developed, aim at improving working conditions, optimizing production (quality and quantity), contemplating environmental (reducing the consumption of non-renewable resources to meet the needs of the present without compromising the needs of future generations) and promoting significant economic savings.

In order to optimise production efficiency, digital agriculture mainly aims to satisfy two specific objectives: 1) to produce safer and healthier food products as consumers have become more attentive to their health and environmental well-being; 2) to increase production in order to meet the growing demand both for agricultural production, which will have to exceed the existing ones by at least 70% in the next 30 years (Nicoletti, 2019), and for processed food necessary for a population constantly growing but with limited economic capacity. Regarding the first objective, in the last decade, researchers focused their attention on fast, stable and continuous, reliable and non-destructive techniques than the existing ones, able to accurately evaluate the physical and chemical parameters that contribute to defining the quality of an agri-food product. Moreover, researchers looked particular attention to the verify of authenticity and adulteration. These methods have also proved to be often suitable for both laboratories use and installation on processing lines (Fabbri *et al.*, 2019).

As for the satisfaction of the increase in demand, however, attention is focused above all on the greater diffusion of Precision Farming (Barnes *et al.*, 2019; Eastwood *et al.*, 2017; Wolf & Buttel, 1996).

The enhancement of logistics activities become an advantage for the competitiveness and the business growth. In fact, logistic innovations entail a cost reduction and the revenue growth due to the higher prices of the better quality products guaranteed by monitoring, anti-counterfeiting systems and that enhance their origin. Logistic activities are generally supported by the use of sensors and technologies, such as the Internet of Things (IoT), able to connect human and technological resources (Panniello & Pontrandolfo, 2019).

The "strongest" innovation is represented by the use of technologies in logistics as tools to innovate the product. In fact, some technologies can make smart some food products, transforming them from simple consumer products to suitable tools for data collection; this causes an immediate impact on the economy of the farm.

Finally, the computerization allows a good manage of the purchase orders because products are visible online with a considerable amount of them information, included prices, easily available for consultation.

1. Innovation in Basilicata agriculture

Italian agriculture is still indisputably traditional, with 4,11% of the total cultivated area managed with Agriculture 4.0 systems (Valmori, 2021); in Basilicata region the production sectors have not reached the same degree of efficiency, as emerges from an analysis conducted using the results of 1,759 company surveys carried out for the regional RICA sample in the period 2011-2016 (D'Oronzio & Potenza, 2020).

Fortunately, the Italian "agricultural culture" is changing: about 60 Start-up (equal to 12%) among 481 Smart AgriFood international start-up, born since 2011, are Italian ones and some of these also operate in Basilicata; moreover, investments in Agriculture 4.0 reached a turnover of 350,000,000 dollars in 2018 (equal to 5% of the global value), as shown by the Smart AgriFood Observatory of the Politecnico of Milan (Italy) and reported by Panniello & Pontrandolfo in 2019. Similarly, the Lucanian "agricultural culture" is in transition towards a new border through the adoption of paths and processes of social innovation, processes and products: this is demonstrated by the monitoring data of the PSR of the Basilicata region starting from the period 2007-2013 (D'Oronzio & Costantini, 2018, D'Oronzio *et al.*, 2020).

Geographic Information System of Agriculture 3.0 has been the digital tool most used in agricultural-forestry sector in Basilicata as testified by several scientific paper produced following applications and experiment of Agriculture 3.0 and 4.0. In fact, the GIS, individually or together with other digital tools (Remote sensing, Satellite imagery, Digital ortho-photos, 3D analysis), have been used for mapping, monitoring and control of land (Viccaro *et al.*, 2017; Dimotta *et al.*, 2017) and crops (Statuto *et al.*, 2019; Dimotta *et al.*, 2016), mapping of forest areas and variations in land use (Cillis *et al.*, 2020), mapping rural structures (Romano *et al.*, 2016) and enhancing the typical products of some areas (Claps *et al.*, 2002). Another digital solution, the Electrical Resistivity Tomography (ERT) has been used to characterize the coastal saltwater intrusion in the pine forest reserve of Metapontum (Matera) to highlight the spatial distribution of saline water in the soil (Satriani *et al.*, 2012) and to evaluate the quantitative relationships between soil electrical resistivity and root biomass to determine if resistivity tomography could detect the spatial variability of tree roots in the field (Amato *et al.*, 2009) while GPR has been used to locate losses of pollutants in groundwater (Satriani *et al.*, 2018).

PF, initially welcomed with extreme caution and scepticism, is also spreading to small and medium-sized enterprises (D'Antonio P. *et al.*, 2015) while experimental applications of Smart Agriculture have been launched for some years.

In the last decade, the regional agri-food system has been characterized by multi-company and bottom-up experiences that have led to the adoption of "territorial" and "regional" production chain models and process, product and organizational innovative developments. The phase of identifying the needs of the Lucan agri-food, agroforestry and rural world was accompanied by a simultaneous listening phase by the world of public research which identified possible innovative solutions for every production sector and made them available to a broad partnership. In the context of the European Innovation Partnership (EIP), several innovations have digital characteristics, so their experimentation / adoption is giving rise to new professional skills in the Lucanian agri-food and forestry sector in production, sales and, more generally, in the interface with all possible stakeholders.

This work analyses the digital innovations introduced by the Operational Groups (OGs) of the Lucanian EIPs, classifying them by type, by production sector to which they belong and by type of partnership. The analysis of the eleven Lucanian OGs was conducted on desk and through some interviews to partners who have applied digital innovation.

2. Materials and Methods

The rural development policies identified in the 2007-2013 and 2014-2020 community programs, and specifically in the Rural Development Program (RDP), have allowed the Lucan farmers to make important changes and innovations through specific measures. More precisely, the part of Lucanian agricultural entrepreneurs most interested in innovation has intensified relations with the local scientific world, consulting and training.

Eleven Operational Groups (OGs) of the EIP-AGRI, incubators and precursors of digital innovations (Carta & Bonfiglio, 2020), have expressed their interest in Measure 16 (Cooperation), sub-measure 16.1 (Support for the establishment and management of Operational Groups of EIP), to contribute to the growth and development of the Lucanian agri-food and forestry sectors.

The OGs, born from the voluntary aggregation between public and private actors, have a common goal: to increase productivity through already mature innovations that involve a more rational use of production inputs and, consequently, to increase the sustainability of production processes from the technician, economic and environmental points of view.

Collaborative relationship between both public and private actors play a crucial role in the development of agro-food supply chains and of the rural areas and are subject to scientific in depth analysis, also a multi-disciplinary level (Briamonte *et al.*, 2019).

In the period September 2019-July 2020, the authors analysed the eleven OGs in relation to the partnership (number of actors involved and type), the links with one or more Focus Areas of the Basilicata RDP, the problem faced and the innovation adopted. The EIP projects were then reclassified based on the digital innovation adopted, optimal for the development of the sector to which they belong. Specifically, it was verified which OGs had envisaged the use of smart agricultural techniques (precision and conservative ones) and, subsequently, which type of digital innovation they had adopted among cloud computing, data collection and querying systems, decision support systems, sensors, robotics, software, data analysis, e-commerce, more. The authors also considered appropriate to have telephone interviews with the scientific managers of the projects and/or with the representatives of the main partners responsible for innovation, in order to understand the evolution of project activities, changed in the timing of implementation due to the Covid pandemic.

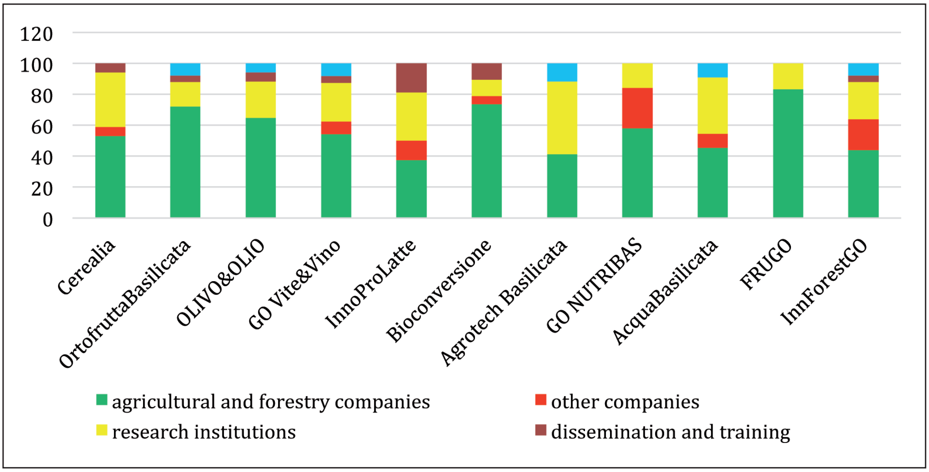
Finally, the Authors verified whether and how many OGs had applied for funding the digital innovation by means pilot projects (sub-measure 16.2 Support for pilot projects and the development of new products, practices, processes and technologies, PSR Basilicata) to have a more complete vision of the transformation underway.

3. Results and discussion

The eleven Lucanian OGs are organized by production chain and smaller supply chains, responding to the logic of the integrated strategy adopted by the Basilicata RDP and, therefore, combining competitiveness, environmental sustainability and rural development measures already adopted, among other things, also in the 2007-2013 programming (D'Oronzio & Pascarelli, 2018; D'Oronzio & Costantini, 2021).

Each OG is different from the others in terms of number and type of Partner; due to own characteristics of the EIPS, each Lucanian partnership includes research bodies, services for dissemination and agricultural, agri-food and forestry entrepreneurship (Figure 1). In detail, the research bodies are the University of Basilicata; the Council for Agricultural Research and Analysis of the Agricultural Economy (Research Centre for Livestock and Aquaculture in Bella, PZ); the National Research Council (Institute of Methodologies for Environmental Analysis) and the Lucanian Company for Development and Innovation in Agriculture (ALSIA). The University of Basilicata, represented in the different OGs by School of Agriculture, Forests, Food and Environment; Department of Sciences; Department of European and Mediterranean Cultures and the School of Engineering, is present in all partnerships and it plays the role of leader in four of them. ALSIA is present in eight OGSs and its role is to transfer innovations while it is research body in the OG AgrotechBasilicata, operating on the Precision farming, thanks to the recent incorporation of the regional research centre Metapontum Agrobios.

Figure 1 - Composition of Lucanian EIP partnership



Source: Our processing of Basilicata region monitoring data

The presence of these research bodies in the Lucanian EIP projects is the result of the work of the regional research table set up by the establishment of the Lucan bioeconomy cluster (D'Oronzio *et al.*, 2000).

Agricultural and forestry entrepreneurship, on the other hand, is represented by single or associated farms (cooperatives, consortia, producer organizations), as well as wineries and oil mills and this is a very important particularity since the numerousness enriches the "transmission of knowledge" and promotes the potential for disseminating innovation to a greater number of users. In fact, the innovative agricultural, agri-food and forestry companies of the EIP play a crucial role both in ensuring the introduction of radical changes in the production practices and indicating most sustainable new trajectories, generating a domino effect on the territory.

Six partnerships have the consultant (spin-off, professional associations, professional people) in the partnership team and in seven OGs there are other companies, as a high school agricultural institute, municipalities, a company for the development of the milk supply chain, agri-food processing companies, a local authority for observation on hydrogeological risks and others. In six OGs, there are also numerous non-beneficiary actors, represented by agricultural and forestry companies or Lucanian municipalities, as in OG InnForestGO.

Already from a first analysis, it emerges that the OGs have launched an innovative ferment in the primary sector of Basilicata which aims to bridge the gap between those who use new technologies and those who still do not do so for technical, economic or social reasons. In particular, many OGs have foreseen the use and the diffusion of digital technology, among the possible innovative solutions that have been identified by production sector, included the forestry one which in Basilicata had not yet experimented with participatory innovation (Costantini *et al.*, 2018).

About 82% of the total OGs, that is nine OGs, are identified as digital OGs because they adopt digital tools in their activities to support implementation of the project; they are Cerealia, OrtofruttaBasilicata, Olivo & Olio, Vite & Vino, AgrotechBasilicata, Nutribas, AcquaBasilicata, FRUGO, Innovation and Management of Lucanian Forests (Table 1).

Table 1 - Main innovative tool used by "digital" OGs

Production sector	OG	Innovative tool					
		Cloud compunting	**Remote sensing and GIS**	**SSD**	**Sensors**	**Robotic**	**Satellites**
Cereal farming	Cerealia		X	X	X	X	
Horticulture	OrtofruttaBasilicata		X	X	X		
Olive growing	OLIVO&OLIO		X	X	X	X	
Viticulture	Vite&Vino	X	X	X	X		X
Dairy animal husbandry	InnoProLatte						
Meat husbandry	BIOCONVERSIONE				X		
Transversal project on Precision Farming	Agrotech Basilicata		X	X	X	X	X
Transversal project on Healthiness of food products	Nutribas		X	X			
Transversal project on Water in agriculture	AcquaBasilicata		X	X	X	X	
Minor chain: Cultivation of hazelnuts	frugo		X		X		
Forest	Innovazione e gestione delle foreste lucane	X	X				

Source: Our processing of EIP data

By analysing relating to digital innovations, it is clear that seven OGs (Cerealia, OrtofruttaBasilicata, Olivo & Olio, Vite & Vino, AgrotechBasilicata, Nutribas and AcquaBasilicata) share and disseminate the PF by means of different technological innovations able of interacting with each other them, but all aimed at rationalizing and optimizing the use of productive inputs, renewable and otherwise.

These OGs spread the usefulness of sensors, from the simplest ones for measuring soil water content in order to limit its waste, irrigating improperly (AcquaBasilicata) to more complex sensors for the control and monitoring of the soil-plant-atmosphere system (OrtofruttaBasilicata and AcquaBasilicata) up to digital ones mounted on tractors (Cerealia, OrtofruttaBasilicata, Olivo & Olio, Vite & Vino, AgrotechBasilicata and AcquaBasilicata) able to read the data detected and transmitted via satellite remote sensing or drone flight.

Digital sensors are closely linked to the use of "DSS" which in turn are strongly supported by OGs Cerealia, OrtofruttaBasilicata, Vite & Vino, AgrotechBasilicata and AcquaBasilicata as they are able to support farmers in strategic decisions and/or to find solutions to problems that they are not able to solve with operational research models. DDS are dedicated software able to operate actuators to satisfy the different needs of plant species and to control and monitor the various cultivation activities, from soil preparation to localised manuring (Cerealia, Olivo & Olio), from sowing to fertilization and irrigation (Cerealia, OrtofruttaBasilicata, Olivo & Olio, Vite & Vino, AgrotechBasilicata), from defence of plants to the need to cover them (OrtofruttaBasilicata), from the reduction of pesticides (NUTRIBAS) to the harvest of fruit (OrtofruttaBasilicata, Vite & Vino).

The OGs Vite & Vino and FRUGO highlighted the usefulness of GIS applications in the creation of thematic maps that allow to evaluate the natural vocation of some territories in order to influence the choices of young farmers, inducing them to invest in specific sectors, such as viticulture and hazelnut cultivation.

Another GIS Application has been taken into consideration to realize a Dedicated Geo-Databases and an interactive Web-GIS portal, consultable and updatable daily, by project partners and other users, with project data and meteorological and agricultural ones observed in the field, georeferenced and collected through specific applications for smartphones and Tablet. This application was conceived by the OG Vite & Vino.

The OG of the Forestry chain has implemented a Knowledge-Based System (KBS) platform where researchers, entrepreneurs, technicians or other people, however previously qualified operators, can enter technical-scientific information, research results, personal work experiences and so on. It can be consulted thanks to its database and it is an interactive system capable of responding when a user asks something about the forestry chain.

Unfortunately, the introduction of digital technologies in the Lucanian agriculture have not yet given results entirely positive: some methodologies, such as drone flights for PF, are not always economically advantageous and sustainable for small agricultural farms while they are more effective at territorial level (Cerealia, Olivo & Olio).

In the case of the KSB (InnForestGO) platform, it seems that no significant number of registrations have yet been made by possible users who could interrogate it to solve own problems. In this regard, it is important not to forget that many farmers over 60 are unable to use computer; moreover, they have poor knowledge both on last technologies and foreign languages (especially English) so they have many difficulties to manage digital tools and operate with them.

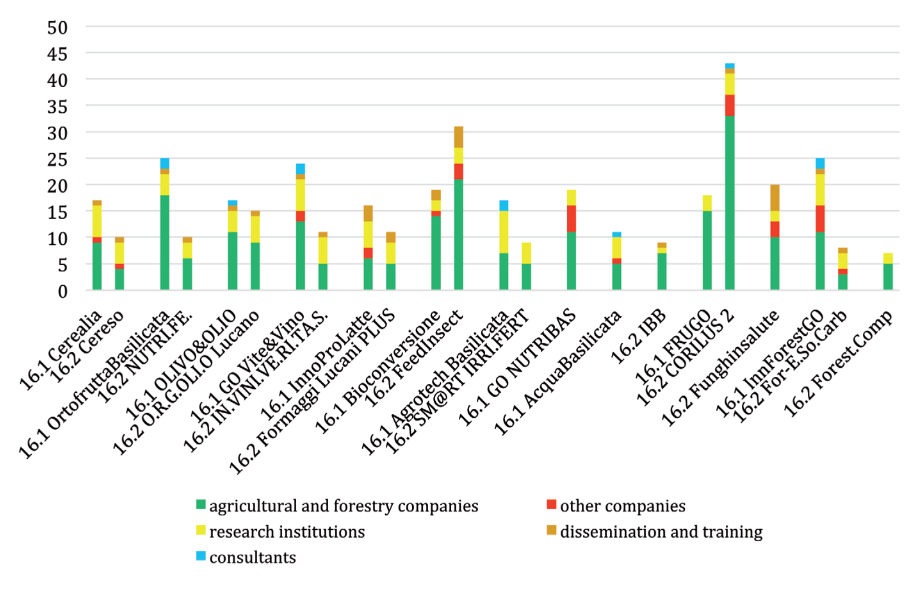
Finally, it must not be neglected that the high-performance network (narrow band) does not cover the entire Basilicata region while broadband is almost absent in rural areas while many digital tools need of them.

From the analysis of the 12 partnerships financed by sub-measure 16.2 it emerges that nine of them can be considered the natural continuation of the work started by the OGs; however, there is a numerical reduction of "agricultural and forestry companies" (Figure 2) probably due to the fact that the projects financed by sub-measure 16.2 mainly activate experimentation actions. In detail, the reduction of the farms has been more consistent in the partnerships of 4 projects (Cereso, NutriFe, IN.VINI.VE.RI.TA.S., For-E. So.Carb), less marked in the partnerships relating to the projects of the olive growing and dairy farming sectors, as well as that headed by ALSIA, the main promoter of digital diffusion. Contrary to the trend, the number of farms is significantly increased in the FeedInsect and Corilus2 projects, respectively of the livestock sector and minor chain, this last both for numbers of partners and typology of the same. Moreover, Corilus2 is the only one that provides for the figure of the consultant.

In the digital field, there is the continuous and strengthened use of all the technology/instrumentation connected above all to a more advanced and widespread precision farming. In particular, the project presented by ALSIA (SM@RT IRRI.FERT) envisages the experimental development of a flexible pilot platform of smart farming for the management of agricultural irrigation and ferti-irrigation practices.

The digital technologies considered in sub-measures 16.1 and 16.2 have been applied in process and product innovations but none have concerned e-commerce.

Figure 2 - Comparison between the partnerships of projects 16.1 and 16.2



Source: Our processing of EIP data

A note must also be made on the dissemination and transfer of results as well as communication activities that have suffered delays and changes in the period under review, due to the Covid-19 pandemic which hindered the normal continuation of activities in Basilicata as in the rest of Europe. For this reason, the OGs have resorted to webinars, streaming, video recordings on multimedia platforms or social networks, such as Facebook and Youtube. Only in a few cases it was possible to carry out the demonstration in the field, for the presence of specialized equipment.

Covid induced everybody to work in a different way, remotely through computers, smartphones and tablets; so, it is very likely that people, until they are completely certain will prefer this work option.

In summary, the precision agriculture of the AgrotechBasilica OG is the expression of digitized production, through satellites, drones, proximity sensors, etc. The remaining OGs can be classified as digital as they present robotic-automation digitization processes regarding information collection systems, software and data analysis.

Conclusion

The innovation of the supply chains fully answers needs of territorial production specializations and their excellences, adopting more advanced agricultural techniques, more responsive and immediate to the logic of the market and to EU policies oriented towards sustainability. One of the most recent innovations concerns the introduction of 4.0 technologies into the primary sector in general; they are changing agricultural production processes and with them the agri-food chains, fundamental for Made in Italy and especially for the economy of some Italian regions such as Basilicata with its productions linked to the territory.

The widespread use of digital technology will positively influence the Lucanian supply chains as it will allow:

- better working conditions;
- greater environmental sustainability;
- economic and social growth thanks to inclusion of new knowledge and professional figures, start-ups and so on.

The establishment of the EIP in Basilicata, stimulated the implementation of a new knowledge transfer model based on collaborative approaches and on the co-development of innovation. The EIP offered the opportunity for partners to transfer innovations and improve their skills; therefore, Lucanian OGs used innovative technologies that affect the environment, reducing the use of non-renewable resources, as soil and water, and pesticides; they define the certification schemes, implementing techniques for monitoring and defence against hydrogeological risk or erosion of the soil. The most common innovative devices introduced in Lucanian farms are sensors, drones for remote sensing useful for the production of digital mapping systems of wooded or cultivated (olive groves, vineyards, fruit and vegetables and so on) areas, Decision Support Systems aimed at a better management of fields and production processes in order to eliminate all possible factors that determine yield drops and consequent damage to the economic management of the farm.

The spread of open, interactive and dedicated platforms to be used for the dissemination, information, training and transfer of knowledge is very interesting and useful for the cultural growth of Lucanian agriculture, or better, both of the entrepreneurs directly involved as partners and the others who have indirectly joined. Through information events that are being carried out digitally, it is possible to reach a greater target of beneficiaries; this requires careful communication and awareness of dialogue only with companies that are attentive and ready to respond to new methods thanks to their specific skills. In fact, some Lucanian farmers are making considerable efforts to have more knowledge and skills on digital technologies because they have understood that these can help them find solutions that best suit their needs and that by using them to the best they can obtain greater benefits.

The OGs that have experimented with digital innovations represent incubators where it is possible to continue the experiments that must also include tools for the development of food 4.0 that are absent today.

Unfortunately, not all farmers are ready to start digital innovation processes due to economic and cultural shortcomings and not all rural areas offer equal opportunities for the necessary digital coverage. To relaunch the Lucanian agri-food industry, therefore, greater support is needed from the Regional Authority with particular attention to both the promotion of the training, to increase the knowledge, and the provision of funding, to spread the digital technologies.

Currently, the Authors consider the development of the Lucan EIPs on digital innovation to be inadequate and not exhaustive, since their implementation has slowed down due to Covid. For this reason, the study foresees a second phase, ongoing to implement the results. The authors will monitor some aspects, which they consider fundamental:

- partnership still operational;
- degree of innovative application achieved in the farm;
- difficulties (if) encountered in applying the innovation;
- impact of innovation on production and sustainability;
- degree of satisfaction of the farmer with respect to innovation;
- willingness and interest of the farmer to continue the innovative activity even at the end of the project.

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