



September 2022

TUSCANY REGION

EVALUATION SERVICE FOR THE 2014-2020 RURAL DEVELOPMENT PROGRAMME

**Innovation in Agriculture - The Strategic Plans of the Operational
Groups**
Third Thematic Evaluation Report - Analysis and Judgement (C3.2)
Technical Synthesis

Index

Introduction	2
Analysis methodology	3
Conclusions and recommendations	4

Introduction

The Thematic Report "Innovation in Agriculture - The Strategic Plans of the Operational Groups" focuses on the evaluation of the effectiveness of the implementation tool of the Strategic Plans (SP) of the Operational Groups (OGs) of PEI-AGRI (European Partnership for Innovation on agricultural productivity and sustainability) and on the first results obtained by the SPs of the Operational Groups of the Tuscany Region during the current programming period.

The aim is to assess the strategic nature of an innovative, experimental tool¹ and linked in a double thread with both the 'high' objectives of programming - to increase the competitiveness and productivity of the agricultural, forestry and agri-food sectors through the dissemination of innovation and knowledge - and with those of complex planning (integrated planning vs. ordinary planning). This has consequently entailed the need to examine their effectiveness **both with reference to how they function and how they are implemented, and to their actual ability to achieve their objectives, including the dissemination of the innovations implemented in the territory and/or in the sector concerned.**

Specifically, within the RDP 2014-2022 of the Region of Tuscany, the instrument is implemented through the Sub-measures (MS) 16.1 '*Support for the establishment and management of operational groups of the EIP on agricultural productivity and sustainability*' through which the establishment of the OG (setting up phase) is approved, and MS 16.2 '*Support for pilot projects and the development of new products, practices, processes and technologies*' that allows the implementation of innovative projects².

Finally, the main areas of investigation (focus), basically including both organisational and implementation aspects of the OGSP instrument, are recalled below in order to guide the reader in approaching the reading of the document:

- ▶ **birth of the Strategic Plan and the OG:** these aspects, linked to the project definition phase and the creation of the partnership, deepen those preconditions underlying the success of OGSPs;
- ▶ with reference to the instrument's **start-up and implementation phases**, the analysis focuses on the effectiveness of the interactive and cooperative approach of the OGSP instrument, as well as on those elements (procedural, implementation, governance) that have positively or negatively conditioned the outcome of the OGSPs, dwelling on the evolution of the implementation procedures in a key of continuous simplification operated by the regional structure responsible for the Programme;
- ▶ in the **final phase of the OGSP**, it is possible to verify the actual ability to build a solid link between the research world and the productive world and the role of the bottom-up approach in fostering the success of the SP; in this phase, attention is paid to the effectiveness of the dissemination action and, therefore, to the degree of penetration of innovation in the economic and productive fabric of reference;
- ▶ **Analysis of the distribution of OGSPs across the territory and the relevant actors:** the regional distribution of OGSPs helps to understand how this instrument has operated at a territorial level (provincial and RDP rural areas), affecting certain

¹ In some ways it is in continuity with the experience of M 124 in the 2007-2013 programming.

² Under MS 16.2, MS 1.1 'Vocational Training and Skills Acquisition Actions', MS 1.2 'Information Actions' dedicated to knowledge transfer and dissemination, and MS 1.3 'Inter-company Exchanges and Visits' could also be implemented.

sectors and areas of innovation, creating or strengthening links between the production sector and the world of research.

Analysis methodology

The **approach used** for defining the surveys and analysing the results **is mainly of a qualitative type structured through extensive recourse to so-called 'participatory evaluation'** and the **use of case studies**. The latter, identified by RT with an approach similar to that used to identify so-called 'best practices', represented a portion of the most original initiatives financed in the area and which were able to combine both a certain sensitivity towards research topics and agricultural entrepreneurship. This method, aimed at a wide and diversified audience, expressed its full potential for evaluating the effectiveness of the OGSP tool, thanks to the construction of a shared path between the evaluator and the Administration of the evaluation hypotheses, of ad hoc survey tools and of the main results achieved. On the basis of this logical path, the analysis focused on consequential phases all carried out - with varying arrangements - in agreement between the IA, the main Stakeholders (Lead Partner, privileged witnesses, Agricultural Trade Associations), the Evaluation Steering Group (GPV) and RT.

The first phase, i.e. the identification of the evaluation needs and the reconstruction of the logical framework with the consequent definition of the evaluation questions, saw the main participation of the IA and TR. During this phase, the concertation and confrontation activity carried out through operational meetings and informal interlocutions was important.

The second phase - identification of the useful primary and secondary data - was instead characterised by a more in-depth **documentary analysis** and the necessary activity of **defining the survey instruments**. For the realisation of the second step in particular, and thus the **definition of the outline for the in-depth interviews**, the GPV was convened, which represents, in general and for TR, that collective structure in charge of supporting the IA in the implementation of the evaluation process with particular attention to improving the quality of the evaluation itself.

Consequently, the **third phase was dedicated to the field investigations at the case studies**: TR identified 16 OG Leaders and the IA then organised the meetings and face-to-face interviews, which were attended by 9 privileged witnesses.

The analysis activity was completed by the geo-referencing of all the 52 projects selected with the 2016 call for proposals: the IA chose to identify on the Tuscan territory the multiplicity of partners who took part in a OGSP, overcoming the logic of the Lead Partner, which would have provided partial, if not downright erroneous information on the quali/quantitative distribution of the projects in the region. At the same time, a sort of "network analysis" was carried out with regard to the scientific partners in order to identify the most important "nodes" - in our case, the universities - around which and from which multiple collaborations depart.

The last phase is dedicated to the elaboration of the final judgement: the formulation of conclusions and recommendations has been enriched with different points of view thanks to a dynamic evaluation process presented in all its phases. Thanks to the method applied in the "Analysis and judgement" phase, it was possible to formulate more operational and useful indications to understand "what worked and what did not" in the current programming period and to provide useful elements to further strengthen the OG DP tool in the next programming cycle.

Conclusions and recommendations

Theme	Conclusions	Recommendations
<p>Definition of the SP and creation of the OG</p>	<p>In most of the partnerships directly encountered by the IA, the partnership originated through prior knowledge and unity of purpose. Frequent but resolvable issues related to initial mistrust between the different partners.</p> <p>Among the key elements for the success of a DP is the unity of purpose among the OG members: the tool available for innovation succeeds when the direction to be given to the development idea is shared and recognised within the partnership.</p> <p>This is all the more true when the actors involved in the system / OGSP come from the same context, from the same production chain, given that research organisations and private individuals other than farms are often not part of a chain but have a more horizontal character. According to the results of direct surveys, this would constitute the leavening agent for an effective success of the instrument.</p> <p>Arguably, this situation has created favourable conditions for the introduction of topics closer to production by shifting the focus to method and technology transfer rather than pure research.</p> <p>It should be emphasised that there is a top-down tendency in the transfer of innovation, albeit with several exceptions, but in general, solutions are often sought outside the agricultural context. This is not a negative aspect, but the ability of the OGSP to create bridges, which were not there before, between problems and solutions is undoubtedly a success.</p>	<p>RT, as will be better specified in the conclusions linked to the reflections on the burden on beneficiaries, introduced some simplifications to facilitate the OG in identifying a common pathway on which to base the DP (see rationalisation of themes in the 2022 call). The IA intends to emphasise this aspect as an element to be preserved for the correct thematic concentration of the different activities of a OGSP.</p> <p>In order to avoid the creation of breaking points in this working pair of unity of intentions and the same origin, it might be appropriate to institutionalise and professionalise the figure of the Innovation Broker. In fact, it is a question of finding a suitable - first and foremost 'functional' - place for this technical figure (an applied science researcher or a farmer) to contribute to the success of a OGSP. In the best experiences, these are individuals belonging to the production chains of the OGSP or, in any case, individuals who are 'known' to the partnership and who have connections (networks) with the world of research.</p>
<p>OG Management</p>	<p>The added value of integrated planning realised through the OGSP tool is to constantly involve the partners that make up the OG. Unlike what happens within the supply chains for the definition of a "business" idea (typical of BIPs) or for the concertation of a "territorial development" idea (typical of ITPs), the OGSP involves each subject of the partnership from the definition of the Strategic Project to its conclusion, passing through the - fundamental - phases of experimentation and dissemination.</p> <p>The creation of a stable network of collaboration between the OGSP members, which goes beyond the end of the project, creates the conditions for future participation in other development initiatives of the sectors involved.</p>	<p>In order to facilitate the participation of all actors, different 'rules of the game' could be established according to different needs:</p> <ul style="list-style-type: none"> ▪ Participation modalities could be facilitated for universities that provide for the start of the collaboration at the time of the assignment of the act and not at the time of the signing of the contract; ▪ SMEs could be supported by the 'single Innovation Broker (IB)': where the conductor could not participate directly in an activity (practical, training etc.) he would have a single 'recognised' channel to retrieve information; ▪ Finally, as far as the direct management of Go by the Lead Partner or the delegated consultants/technicians/IBs is concerned, it might be appropriate to introduce guidelines for the management of partnerships, which are not binding but provide practical guidance.

Theme	Conclusions	Recommendations
	<p>Moreover, for the first 52 projects selected by the OGSP call for proposals in 2017, there was an excellent mix of researchers and professionals within the OGs, but above all a significant presence of farms (40.4% in Tuscany against a national average of 27.6%).</p> <p>In the 2022 call for proposals, the recognition, i.e. the remuneration of the farmer's commitment within the OGSPs through the application of standard costs certainly marked a point in favour of direct farm participation.</p> <p>However, the investigations revealed three elements to focus on when managing the OGSP.</p> <ul style="list-style-type: none"> ▪ Collaboration with certain institutional actors (e.g. universities) is hampered by administrative rules that may cause delays in the implementation of the OGSP; ▪ For medium-small holdings, it is difficult to take an active part in the OGSPs due to their poor structuring (i.e. the lack of 'additional' personnel beyond the tenant farmer able to follow the project). These farms, however, constitute a substantial part of the Tuscan agricultural economy and it is therefore important to ensure their development (e.g. beekeeping companies, producers of chestnuts or other branded products). ▪ In practice, thanks to the testimony of the trade associations, different orientations emerged in the management of OGs: frequency and content of meetings, constant involvement of the OG, internal dialogue platforms, sharing of documentation, etc. Such differentiated situations would have contributed to the effectiveness of OGs. 	<p>In this sense, the suggestion to create training activities for potential OG coordinators is also to be understood.</p>
	<p>The introduction of a specific financial monitoring linked to OGSPs within the ARTEA regional monitoring system should also be mentioned in this context.</p> <p>The extraction of data can be done autonomously by the sector's staff: as it becomes fully operational, it will be able to build a 'self-powered' system of company and territory results for decision-making.</p>	<p>It is recommended that the use of such tools should not be continued in the next programming period, with a view to continuous improvement.</p>
<p>Lightening the burden on beneficiaries</p>	<p>Each of the elements presented in chapter 4.1, i.e. each of the corrective measures introduced by what has been described as the 'administrative simplification workshop', made it possible, according to those interviewed, to lighten certain aspects that made the start-up and management of a OGSP cumbersome. In fact, in almost all of the interviews conducted, and also in the voice of the trade associations and TR staff, one of the main obstacles encountered for the success of the project was identified as precisely the bureaucracy associated with the project. A wide variety of problems were placed within this theme: from the submission of applications for aid and payment by</p>	<p>RT can build on the experience gained in the 'administrative simplification workshop' to rationalise the lessons learnt from this process of lightening the administrative burden on the lead partners, especially in view of the new programming cycle.</p>

Theme	Conclusions	Recommendations
	<p>each partner, to the impossibility of modifying partnerships during the course of the project, to the difficulties encountered with the general reporting of expenses or training/dissemination activities.</p> <p>RT's commitment was to observe, study and intervene on various aspects from the revision of the modelling to the collaborative intervention and dialogue with the peripheral offices: the latter, accustomed to evaluating investment projects, had to adopt a new logic for the selection of innovation projects. To do this, audit trails and new manuals were introduced to standardise procedures.</p> <p>This work culminated in the re-writing in 2022 of the former MS 16.2 call for the selection of new OGSPs (ref. chap. 4.1): the effort in terms of simplification was recognised above all by the companies that took an active part in the process of revising procedures and content.</p> <p>Finally, as reported by the RT technicians themselves, all this activity has given them an awareness of both the importance of timely public action support but also of the limitations of the instrument.</p>	
<p>Information and dissemination activities</p>	<p>The implementation of the 52 OGSPs selected through the 2016 call for proposals took place during the period of the highest prevalence of the COVID- 19 pandemic.</p> <p>In addition to limitations related to production and on-farm activities, information and dissemination activities were also affected.</p> <p>However, the use of remote delivery of courses and events has had positive implications as, among other things, it has enabled much larger target audiences to be reached (e.g. some interviewees reported having invited or being invited by OGSPs from neighbouring regions to speak about their project) than could have been gathered in a physical space.</p> <p>On dissemination, the differentiation of information/training tools and channels played a fundamental role: the websites of individual projects became showcases and in many cases communication activities were accompanied by constant information initiatives (e.g. newsletters). The Tuscany Region's website also gave visibility to its OGSPs, while at the national level the <i>Innovarurale</i> platform is appreciated.</p> <p>The difficulty of involving non-professional farmers, who represent a large part of the supply chain's production base in some Tuscan production realities, is highlighted.</p>	<p>Build on the experiments in remote training/dissemination: in this sense, it is suggested to make it easier for participants to report remotely as well.</p> <p>In the future, consultants should also be involved in training activities, as they can be the real speakers of innovation initiatives: as mentioned above, both IBS and consultants could be the link between SMEs and OGSPs, so their participation should be facilitated.</p> <p>Encouraging the widespread involvement in dissemination activities of technicians working on the ground is essential to ensure widespread dissemination of the innovations developed within OGSPs.</p> <p>Extend outreach activities to an extra-regional level by encouraging the involvement of OGs from other regions working on similar issues.</p>

Theme	Conclusions	Recommendations
	<p>Dissemination activities are often carried out exclusively within the region even though the issues addressed are common to production facilities spread across the country</p>	
<p>Main results</p>	<p>The georeferenced analysis shows a good territorial coverage of interventions and supply chains.</p> <p>In particular, it emerges that projects have become more established in areas where there are companies with related activities (e.g. processing, agro-tourism, direct sales) or that make quality products.</p> <p>The investigations also showed how the innovations described in the OGSPs were in line with the core business of the companies involved: this makes it possible to say that there was a high capacity - both on the entrepreneurial and research side and on the TR side - to intercept and 'ground' the needs and objectives of the various production sectors with a certain consistency.</p> <p>It is also possible to say that the OGSP instrument has made it possible to create stable and lasting partnerships capable of raising the level of the quality of cooperation over time and of enabling the introduction and dissemination of innovations not only in the context of RDP funding - the usefulness of which is recognised by all - but also, and above all, in their own supply chain and territory.</p>	<p>Context analysis has shown that it is the companies that are most open to the market and able to renew and innovate that are the ones that hold their own in the market (this is a well-known European and Italian trend). For this reason, it is suggested that consideration be given to the possibility of accessing material investments within the OGSPs (material purchases/ renovations/ purchase of machinery), introducing non-repayable co-financing rates instead of depreciation or rental.</p> <p>In this way, a virtuous circle of promotion and strengthening of investments in the area could be created and the potential for synergy between interventions would be strengthened.</p> <p>The thematic evaluation activity carried out specifically for innovation shows how in-depth the topic can go into the 'depths' of a policy or, in this case, into the knowledge of a policy instrument.</p> <p>In the future, this additional 'critical' observation activity could be combined with the already tried and tested procedural observation activity carried out by RT.</p>
<p>Dialogue between OGSP, RTs and networking</p>	<p>During the current programming period, an activity of dialogue and exchange between institutions, OGSPs and territories/channels has arisen mainly due to the willingness and openness to dialogue of each actor.</p> <p>The role of the Leaders should also be emphasised: those encountered by the IA demonstrated their ability to easily enter into the theme of evaluation, contributing significantly to enriching the survey with their own narrative. The IA particularly noted the ability of its interlocutors (regardless of their professional background) to be able to refer with ease and appropriateness both to themes directly related to the project and to the higher objectives of the instrument. This detail could represent a proxy - once again - of a very active economic, social and cultural context, attentive and involved in the choices of what can be useful for the development of the territory, as well as a certain diffusion of the culture of evaluation thanks to the involvement of some of these subjects in past evaluation analyses or in the phases of the return of results.</p> <p>The networks thus created can be real development drivers for territories or individual research topics.</p>	<p>In order to make this collaboration constant and fruitful, it is suggested to create an unambiguous communication channel between OGSP and RT (also simply represented by a dedicated e-mail address).</p> <p>Through the NRN, it might be appropriate to relaunch the activity of supporting and expanding the existing Tuscan networks by also looking at extra-territorial realities.</p>

Theme	Conclusions	Recommendations
<p>Options for the future</p>	<p>The survey revealed that all 3 main phases related to the construction of a OGSP are important: definition of the partnership around an innovative idea; definition of the OGSP and first experimentation.</p>	<p>In the future, it may be strategic to retain each of these phases, giving more space to the experimentation phase.</p> <p>In fact, many of the lead partners interviewed asserted that the experimentation phase should be able to be extended to other possible research strands stemming from a primary study or an insight born in the process.</p> <p>Long-term effects could not be measured at this stage (the OGSPs ended in spring 2022), so it is recommended that they be verified in the ex-post evaluation.</p>

AUTOFITOVIV

Good practices for self-control and sustainable pestmanagement in ornamental nurseries

Context:

Following the appearance of new pests in ornamental plants, there have been several cases of **marketing blockades**, with quarantine areas being set up or eradication with total plant destruction. Such **pests are frequent** in the sector, but in recent years they are **multiplying** due to **increased** trade in propagation material with third countries.

Actions carried out:

- realization of a **protocol of self-control** of incoming plants; **vademecum for cases of alert/quarantine** with identification cards; **early diagnosis** using traps with repulsive interventions;
- application of **sustainable** means of **control**.

Strengths and weaknesses of PS-GO:

The PS-GO tool has proven to be **effective in testing and disseminating innovation**, but also in building **stable and lasting relations and relationships** between companies, research organisations and the local community.

A problematic element is the **inability of freelancers and resellers of technical means**, who often provide technical assistance services to the companies to which they sell their products, to **participate in dissemination meetings**: these categories play a major role in the dissemination of good innovation practices and technology transfer, and therefore need to be involved in the various dissemination activities.

GO objective:

On AVI's initiative, the **Autofitoviv** Operational Group was therefore set up with the aim of defining and disseminating '**Good Practices for Self-Control and Sustainable Pest Management in Ornamental Nurseries**'.

Project partners:

- Italian Nurserymen's Association (Lead Partner);
- 2 nursery companies (Vannucci Piante e Innocenti and Mangoni Piante);
- CNR, CREA, UNIFI-DAGRI and UNIél-DiSAA for the scientific part;
- The Georgofili Academy and the PIN society S.c.r.l. for the part of dissemination and communication.

Achievements:

Technology transfer between research institutions and the manufacturing world **has been very effective in both directions**:

- horticultural companies have been able to reduce pesticide treatments by 70% thanks to field tests carried out by the University;
- Research organisations were able to broaden the areas of experimentation and offer them on a larger scale.

Some of the techniques tested have proven to be effective and easy to disseminate, such as the **systemic use of spore catchers**.

The growing interest of companies and research has encouraged the **active participation of many technicians**. AVI hopes that this interest can grow further because technicians are essential figures for correctly and competently carrying out company monitoring activities in self-control, without which it is not possible to achieve the set objectives.

Cereali Resilienti 2.0

Diversity in cereals for climate change adaptation

Context:

The project stems from the need to **increase the ability of agricultural systems to adapt to climate change in** the long term. To achieve this, it is necessary to increase the availability of **genetic material with specific adaptation to the farm needs and organic cultivation**, through the creation of a regionally integrated seed system based on **evolutionary populations**.

Actions implemented:

- **Evaluation of the adaptation of evolutionary populations** in the various selected ranges;
- studies and actions to ensure **sustainability economics** of the project (e.g. open source licence for the seed);
- study of the **quality of flour and flour products**.

Strengths and weaknesses of PS-GO:

PS-GO is a tool that has been able to create **strong and lasting collaboration networks between different actors in the supply chain and the world of research**, the effects of which will extend well beyond the duration of the project

Participation in the PS-GO project meant that the lead partner had **to meet some expenses that were difficult or impossible to account for with its own resources**. The **rigidity of the instrument** made it impossible to account for some costs that were difficult to foresee in the planning phase but essential in the implementation phase (e.g. some materials needed for field trials and experiments).

Go objectie

the project concerns the **dissemination of cereal seeds that are 'resilient'** to the criticalities caused by climate change. The protagonists of this system will be the **local networks of farmers** who, in the identified areas, will contribute to both **seed reproduction** and **dissemination**, with the technical and scientific support of the project partners.

Project partners:

- Rural Seeds Network (lead partner);
- 3 farms (Rosario Floridaia, Progetto Sterpaia, Sara Passerini);
- Molino Angeli Alberto;
- FIRAB, UNIFI e UNIPI for the part science.

Achievements:

The **main advantages** have been for companies that also include the **product processing** stage, thanks to the consumer's appreciation of special, non 'standardisable' products. For farms exclusively involved in **primary production, the effects were more limited** and mainly concerned the reduction of production costs and the increase of sales prices.

The study **population** demonstrated a **discrete ability to adapt to climatic changes to the benefit of productivity and yields** in relation to different climate years, elements that will be interesting to verify even in this difficult 2022 characterised by widespread drought.

This new project phase has made **the transfer processes**, especially between farms and research institutions, even more effective.

COBRA

COproducts for BioRAFineries

Context:

The COBRA project was born in a context in which **traditional agriculture**, particularly cereal farming, suffered a **severe crisis** - due, for example, to a particularly dry year such as 2017 - resulting in a **record drop** in durum wheat **production** and a 12% **contraction** of the regional **UAA**. COBRA's partner farms, operating in various areas of Tuscany, have therefore sought to **introduce innovative crops** (camelina, safflower, hemp, flax) in rotation with cereals with the dual objective of **diversifying income opportunities and favouring an improvement in soil quality and the resilience of agro-ecosystems**.

Actions carried out:

Specifically, the project developed a **technical and logistical platform for the supply of** semi-processed **biomass** of the 4 crops.

The supply chain includes farms, processors, and industrial users and has developed several **innovative technological components**, some of which are already operational and others present only at a prototype level (e.g. combined harvesting systems with double cutter bar; radio frequency drying system). **Special processes** were also tested **in state-of-the-art plants** (e.g. supercritical CO₂ extraction and hemp and flax straw dehulling were carried out in plants not present at RT).

Strengths and weaknesses of PS-GO:

In fact, the PSGO represents one of the few options that make it possible to **really do research, experiment prototypes and promote innovation**: on the best of occasions, the PSGO also becomes fundamental for **teaming up on the territory**. In this sense, the possibility of **interregional partnerships** should be included: the COBRA project involved neighbouring businesses with which, however, it was not possible to collaborate actively.

GO objective:

The long-term objective concerns the **opportunity to start agro-industrial supply chains** in Tuscany from the co-products of the four selected oilseed crops. It is therefore essential to create a **regional technical and logistical platform** and to develop an articulated system of **biorefineries** that allows the maximum **valorisation of the biomass of oilseed crops** that can be used in rotation as well as working intelligently on the cultivation phase.

Project partners:

Green Chemistry Bionet (lead);
DISAA University of Pisa, CREA;
Azienda Agricola Musu Davide, Consorzio Forestale delle Cerbaie, Stella Dei, Cooperativa Agricola Il Rinnovamento, Azienda Agricola Roghi Mauro;
Agroils Technologies spa, Eco Officina Agraria srl, Effegi srl, Ricerche Sperimentali Montalbano srl, Manifattura Maiano spa, Tecnowall srl, Consorzio Polo Tecnologico Magona, Uniblocc srl;
Accademia dei Georgofili, ERATA, Legambiente Toscana AP.

Achievements:

The project, which aims to support the **circular economy** by activating a process of innovation in the local area, has succeeded in animating a number of companies linked to the supply of building materials. These have decided to **use the biomass produced with the aim of making their products more sustainable and in particular replacing mineral and/or chemical materials with organic materials**. The project is the basis from which to present other innovative ideas from the same group: the new proposal focuses on the **industrial preparation of hemp, which** has proven to be the most interesting and versatile crop.

FEEDS

Flour from insects bred on agricultural waste for feed production

Context:

For some time now, there has been a lot of interest at European level in finding **alternatives to common protein sources**, and **insects** may represent an excellent **opportunity**. The project idea was to exploit the meal of certain insects using their ability to provide low-cost fat and protein.

This is therefore not an entirely new idea: one of the GO's scientific partners (UNIFI) had already tried to work on the topic of **insect breeding in the context of the circular economy based on food waste**, by participating in several Integrated Supply Chain Projects (IPPs). At that time, however, the (mainly 'cultural') times were not yet ripe.

Actions carried

UNIFI was responsible for the **implementation of the pilot plant and the technical management of the breeding**. It then conducted investigations to optimise the breeding techniques of the two insects *Tenebrio molitor* and *Hermetia illucens*.

Nutrigene srl set out to prepare a **questionnaire to assess the sensitivity and willingness of potential consumers**.

CiRAA provided **knowledge transfer by organising various project meetings, using both face-to-face (as far as possible) and remote modes**. The focus of the project was on **training**, and **9 modules** were held to cover the main aspects of an insect farm.

Strengths and weaknesses of PS-GO:

In this case, the PS-GO tool was **a very effective way to reflect on some emerging issues ranging from agriculture to the feed industry and environmental impact**. The experience was very useful and thought has already been given to how to proceed. The partnership hopes that the tool will continue to be available to farmers with minor modifications to **streamline** some procedures.

GO objective:

The aim of the GO is to set up **a prototype plant in a pilot company using a network of expertise capable of dealing with the different aspects involved**.

The development of the breeding technique will make it possible to create **a multidisciplinary data and knowledgebase**, which will then be extended to farms in the Tuscan territory, enabling them to seize the opportunity identified.

Project partners:

L'Unitaria Cooperativa (leader);
Azienda Agricola Silvia Marchini,

CiRAA Centro di Ricerche Agro Ambientali "Avanzi (UNIFI), Dipartimento di Scienze delle Produzioni Agro Alimentari e dell'Ambiente DISPAA (scientific partners),
IM.O.FOR. Toscana (in the role of training agency),

Nutrigene (as a partner in the development of feeding trials on dogs with feed containing insect meal).

Achievements:

The project successfully tested a **small-scale insect meal production plant** that can be replicated at farm level with the main objective of **raising awareness among farmers** about this possible protein alternative. This step is necessary to make the business profitable and to promote private investment capable of developing large-scale plants.

An important result was the **dissemination of useful information** on the subject through animation, dissemination and training activities. These initiatives have found a response from various actors in the area, stimulating interest in the **economic and environmental benefits of this activity**.

FERTIBIO

Development of the production process of BIOLOGICAL FERTILIZERS and their application in different production sectors in Tuscan agriculture

Context:

In the **organic farming** sector, there is a growing need for **fertilisers allowed by production regulations**, and in particular for those characterised by the presence of **mycorrhizae, which are** more effective in combating soil fatigue. Faced with a growing demand for registered and tested products, the **need** has emerged **to increase the supply of** this type of fertiliser.

Actions carried out:

- construction of **two prototypes for the production of 'AMF' biofertilisers** and bacteria;
- production of different types of biofertilisers;
- **testing on different field crops** and in a protected environment of the biofertilisers produced.

As envisaged by the Call for Proposals and the 'philosophy' of the PS-GO projects, great emphasis was placed on **training** activities with the involvement of Agricoltura è Vita Etruria Srl, **information and dissemination** actions, and **inter-company exchanges** entrusted to CIA Toscana.

Strengths and weaknesses of PS-GO:

The PS-GO Call for Proposals, by involving different actors engaged in various capacities within the same supply chain, has made it possible to achieve **concrete results anchored to the actual needs of the territories**.

It would be desirable to envisage the **transition from the prototyping phase to the industrialisation phase by** including among the project partners a company producing technical means capable of commercially exploiting, with appropriate product lines, the results resulting from the project.

GO objective

The overall objective is to develop and validate biofertilisers for herbaceous and shrub species to improve soil fertility and reduce the use of mineral fertilisers, while maintaining crop productivity and improving yield quality.

Project partners

- Terre dell'Etruria (Lead Partner)
- Fattoria Le PRATA, Azienda Agricola Ughetta Bertini, Società Agricola del Bambù, Il Rinnovo Agricolo soc. coop. Agr., Azienda Agricola Grappi Luchino, Cooperativa Agricola Spontanea, Azienda Agricola Musu Giuseppe e Francesco s.a.s.
- Confederazione Italiana Agricoltori Toscana
- Scuola Superiore Sant'Anna (SSSA)
- Idea Verde s.r.l.
- Agricoltura è Vita Etruria s.r.l.

Achievements:

At present, the companies do not yet have the products directly tested during the project at their disposal; they are waiting for market availability, which is expected to be guaranteed soon by the partner Idea Verde s.r.l. Many of the partner companies started using **similar products**, not directly tested in the project, but already available on the market, mainly supplied by Terre dell'Etruria. It is worth mentioning that dozens of companies took part in the training cycles, around 50, **a higher number than initially expected**, confirming the **interest in soil fertility issues and the availability on the market of effective products dedicated to organic farming**.

FORECAST

Organised Form of Evolved Network of Castaniculture, Activating Innovative Strategies in Tuscany

Context:

The **chestnut sector** is an excellence of the Italian agri-foodsector and is characterised, as in the case of the Castagna del Monte Amiata IGP, by quality marks that contribute to enhancing the image of our country. **Climate change** has led to a collapse of chestnut cultivation with a **resurgence of diseases** year after year. In the Amiata area, characterised by traditional chestnut cultivation, production collapses have occurred with peaks of up to 90% (2017), combined with an increase in quality defects.

Actions carried out:

The activities carried out can be divided into two distinct phases:

1) numerous and extensive **field trials for the definition of good practices**. Among others, tests of organic fertilisation with manure or manure pellets were carried out;

2) **realisation of the prototype sorter with NIR (Near Infrared Spectroscopy) technology**. The activities described above were complemented by animation, training and knowledge dissemination.

Strengths and weaknesses of PS-GO:

The project has given **new impetus to a sector** prostrated by increasingly frequent plant diseases, helping to give the chestnut growers' association a leading role.

The main elements for improvement concern not so much the partnership aspects in the GO or the technical aspects, but the **administrative and financial management of the projects** (e.g. advance payments, reporting).

GO objective:

In this context, the producers, deemed it necessary to launch the FORECAST project with **two priority objectives**:

- the **reduction of the incidence and formation of rot on the fruit**, whether in the field or in storage;
- increasing the **accuracy and hygiene of the fruit sorting system** by eliminating fruit with defects at the packaging stage (prototype sorter).

Project partners:

- Association for the Enhancement of the Monte Amiata Chestnut PGI (leader);
- 4 farms;
- University of Tuscia;
- CIPA – AT Grosseto;
- Certema S.c.a.r.l.;
- Studio Tecnico Associato AGRICIS.

Achievements:

Thanks to the very practical and operational approach, the activities had an important impact on the project's objectives, and made it possible to **disseminate cultivation techniques**, such as green pruning, monitoring and treatment of the most common diseases, with an overall improvement in the management of the farms involved.

Environmentally friendly product management protocols were introduced.

In order to reduce the risk of product recalls already on the market, an **innovative protocol** was tested to treat the plants in the open field and post-sorted fruit using low-impact methods.

HOPS Tuscany

Development of Tuscan hop cultivation for the production of craft beers made in Tuscany

Context:

Hops are a plant that is widespread in the wild in central and northern Italy but is almost **absent as an agricultural crop**: its development in Tuscany would be an **interesting opportunity** for both farms and local craft breweries. As can easily be guessed, it is a matter of **borrowing what happens in the world of wine** where the influence of vines and **terroir** on quality is well established and where it is possible to **rely on the image of Tuscany**, characterised by environmental diversity and a wealth of spontaneous germplasm. The need to develop a complete chain came from the territory: the idea of a **local hop**, capable of exploiting the image of the territory in which it is born, can be more competitive at international level

Actions carried out:

- ♦ **craft and typical beer** production, characterised by locally produced hops and evaluation of their aromatic and taste properties;
- ♦ enrichment of craft beer with **phytochemicals** with an **antioxidant and flavouring** action for a product linked to the production environment, with health characteristics.
- ♦ creation of **hop plants with the introduction of specific techniques** suited to the Tuscan areas.

Strengths and weaknesses of PS-GO:

Partners emphasise the need for **more training** on administrative and bureaucratic management. This type of instrument, which allows cooperation and research, favours and stimulates innovation and should therefore be protected because it is an **excellent opportunity for farms**.

GO objective:

The project idea was to **introduce and develop**, on the land of the partner farms and subsequently also in other suitable farms in Tuscany, **the cultivation of hops** for the production of **higher quality** cones than imported ones to be used in the craft brewing process.

Originality also lies in the desire to create a **km0 supply chain** where even the water supply is local.

Project partners:

Birrificio Valdarno Superiore srl (leader); Azienda Agricultural Company Laura Peri, La Stecciaia BirrificioAgricolo Bio; D.R.E.Am. Italy (training); Department of Agricultural, Food, Environmental and Forestry Science and Technology (UNIFI).

Achievements:

UNIFI has carried out **hop mapping** to understand the possible existence of **native species** that can be cultivated in Tuscany: **23** have been identified. Two **twin hop groves** have been created (on land with opposite soil characteristics) with rows of a native species and a commercial species, for which a **processing specification and technical sheets for drying and storage** have been written. **Two craft and typical beers** were produced and their aromatic and taste properties were evaluated. In general, the Hops Tuscany project made it possible to demonstrate that it **is possible to grow hops in Tuscany** and that Tuscan ecotypes are very interesting for characterising local beers. Discussions with the CREA gave rise to the **'Permanent Table on Hops'** to reason about improving hop yields and thus their profitability.

KATTIVO

Strategic Plan for the development of a Modification Kit for Sprayers capable of performing Innovative Variable Dose Optimised Technology treatments according to the canopy and reducing the release of pollutants and pesticides

Context:

The most innovative and largest companies in the Tuscan wine sector are adopting '**Precision Farming**' techniques, aimed at **optimising the use of production factors and increasing competitiveness** while contributing to the **environmental sustainability** of wine-growing activities.

In this context, Tenute Ruffino S.r.l. Soc. Agr, have identified the need for

Optimising the distribution of pesticides through the development of equipment that allows less use of active ingredients and water.

Actions carried out:

- development and testing of a **kit** in pilot areas;
- **evaluation of the effectiveness of treatments**;
- analysis of the **problems of applying sprayed products** to vineyard vegetation and verification of the quality of spraying;
- evaluation of **the impact and economic sustainability of innovation** and scenarios of transferability;
- **dissemination and networking** with other EU networks and projects.

Strengths and weaknesses of PS-GO:

The creation and consolidation of relationships have created the **conditions for the continuation of activities aimed at further improvements, and at making Precision Farming techniques more effective and, above all, affordable.**

It would be necessary to network the different PS- GOs more effectively and with greater territorial penetration in order to **turn individual experiences into concrete starting points for other similar initiatives in other territories.**

GO objective:

The objective was not to develop a specific piece of equipment, as this type of machine already exists (recovery machines), but is not very widespread due to the high purchase costs and the difficulties of use in hilly environments, typical of Tuscan vineyards. The research focused on **modifying equipment available on most wine-growing holdings to make it suitable for precision farming, overcoming the problem of the purchase and operating costs of specific equipment.**

Project Partners:

- Tenute Ruffino S.r.l. Soc. Agr. (capofila);
- Soc. Agricola San Felice;
- E.R.A.T.A.;
- CREA – Viticulture Research Unit; University of Florence, DAGRI

Achievements:

The prototype developed by the project is an **innovative system applied to traditional sprayers**, which allows the distribution of the crop protection agent at a variable dose depending on the volume of the canopy to be treated.

Considering the prototype status of the machinery developed by the trial, its use is currently limited to the project's two agricultural partners.

The **added value**, however, has been to **search for technological solutions capable of spreading the technique of variable-rate pest control** even among smaller, less structured companies unable to afford the expense of purchasing recovery machines.

NOMADI APP

New Opportunities in Remote Monitoring in Productive Apiculture

Context:

The practice of **nomadism**, i.e. moving hives in relation to different blooms, is the basis of productive beekeeping. However, this practice entails the **positioning of apiaries at a distance from the farm centre**, with the result that the **beekeeper has less control** over the state of his hives and a reduced ability to provide timely responses. These conditions require a **tool capable of constantly informing the farmer** of apiary conditions, such as family status and production. These data, correlated with climatic trends and information on blooms, allow for rational and efficient management of any beekeeping enterprise, whether it be permanent or, a fortiori, practising nomadism.

Actions carried out:

Thanks to the project, a **monitoring network model** has been created, the nodes of which consist of **stationary or nomadic apiaries**, distributed in the areas of greatest beekeeping interest and managed by the partners. The nomadic apiaries consist of "**computerised hives**", equipped with position and weight sensors, internal temperature and humidity sensors, data-loggers, GSM transmission system. A specific **software** has been prepared for information management **through which all data will be collected, processed and made available on a web interface**.

Strengths and weaknesses of PS-GO:

The NOMADI-APP project has provided numerous **insights for new research** and potential innovations to be introduced in the sector. For the future, it is hoped that it will be possible to introduce a **phase dedicated to research**, because experiments reveal new elements to reflect on and which may even challenge what has been imagined.

GO objective:

The overall objective of the project was to **create a standardised system capable of providing beekeepers with information on the general status of families and production in the areas where they operate**, and to provide a **decision support** tool capable of rationalising interventions, optimising time and costs of apiary management, and improving the **quality of the beekeeper's work** and the health of the hives.

Project partners:

Tuscan Regional Association of Beekeepers - ARPAT (leader);
FCS - Climate and Sustainability Foundation, Department of Agricultural, Food, Environmental and Forestry Science and Technology - UNIFA, Eurobic Toscana Sud;
La Pollinosa Società Semplice Società Agricola, Società Agricola Apicoltura Forasassi di Pietro Maggiorelli e Paolo Piazza S.S., Le Tre Api Società Semplice Agricola, Apicoltura di Pesca di Pesca Paolo.

Achievements:

The implementation of the **monitoring network**, distributed throughout the region and consisting of computerised apiaries equipped with sensors, which collect data from the apiaries themselves, **has given beehive owners the opportunity to rationalise their visits to the apiaries**, thus improving the quality of their work. Thanks to the project, it was possible to create a **model capable of providing useful information on the blooms of nectariferous species**. In this way, the holdings have the possibility to **reduce the costs related to movements** also thanks to a more rational movement of the families in relation to the blooms.

03/11/2022 ore 10:45
Data classifica F.045.040.010.010

03/11/2022 ore 10:45
Data classifica F.045.040.010.010

Context:

The context in which the project is carried out is the territory of the **municipality of Bucine** which is highly **suited for olive growing**. However, the supply chain is characterised by some difficulties such as **low/no profitability**, and **low professionalism**. However, the **area's olive-growing heritage can count on 33 native genotypes** with a high polyphenol content.

The project idea comes from the municipal administration of Bucine, which had the intention of **enhancing the local olive-growing heritage** and recovering the various lands that had been abandoned over the years.

Actions carried out:

The lead partner was mainly in charge of the animation and coordination phases, including several **company visits** where topics such as **pressing** techniques in company mills, **harvesting** and **delivery** to the mill, and practices to be followed in the **post-production of EVO oil** were discussed. The **prototype mill** was designed by UNIFI with innovative plant solutions whose technology is not currently on the market. The CNR in Florence has set up a **collection field of Valdambra native genotypes** where tests are carried out, also related to biotic and abiotic stresses. ANCI carried out **training** activities on various topics such as **marketing strategies, product enhancement and e-commerce**.

Strengths and weaknesses of PS-GO:

PS-GOs can play a key role in promoting **an associative and cooperative culture** and its benefits. This project is a clear example of this, it started off with difficulty due to the initial mistrust of companies and is now expanding its pool more and more.

GO objective:

The overall objective is to **revive the entire olive-growing sector in the area**. The project plans to do this through the **professional development of olive growers**. A key element of the project is the development of an **innovative oil mill** that will enable the companies to use equipment that aims to enhance the genetic characteristics of the local olive-growing heritage. The **training** will also concern the staff that manages the oil mill because processing is identified as a critical issue to be addressed in order to revive the product and enhance the **Olionostrum brand**.

Project partners:

Municipality of Bucine (lead partner);
DAGRI - UNIFI, National Research Council,
ANCI Toscana,
Azienda Agricola Villa a Sesta, Azienda Agricola
Bianconi Sara.

Achievements:

The creation of a **prototype mill** that allows for the production of a **top-quality oil** allows producers a **better market positioning** that aims to generate more income for the companies. Another important milestone achieved thanks to the project was the **definition of a production and processing protocol** that favours the achievement of product standardisation, necessary to use the Olionostrum brand. In addition to the economic benefits achieved, the project also stimulated the **strengthening of social capital** in the area. Considering the producers' initial diffidence in participating in this type of project, there has been a consolidation of a culture of sharing and participation with respect to the area's development processes.

The breadbasket of Sant' Ambrogio

Context:

The project is based not only on the **rediscovery of the relationship with the peri-urban rural reality** but also on the **re-appropriation of urban spaces** by citizens, overcoming the museification process that many historic centres, such as that of Florence, have undergone in recent decades. The intention was also to recreate the **relationship between producer and consumer**, favouring new meeting places and moments and extending the possibilities of use and visibility of the market and surrounding spaces. With a view to setting up a network of small-scale organised distribution with a 'short supply chain', there is a desire to **redefine urban markets by restoring a social value to them**.

Actions carried out:

Specifically, the project proposed to enter into a **cooperation agreement** in which the following 'actions for change' would be implemented:

- Development of a **grid of agricultural products** by farm, type, available quantity, price, period of availability;
- identification of the **forms of delivery of the product to the market**;
- mode of **monitoring of proper brand management**;
- **development of an information exchange system** through the web portal;
- scheduling of **public initiatives**, meetings between operators, training; revitalisation of spaces market spaces through collaboration with companies.

Punti di forza e di debolezza del PS-GO:

Participating in a collective project helps to **grow culturally**, plus PSGOs stimulate **new ideas and lasting bonds**. It is necessary to keep in consideration the average size of the participating companies: **those less structured have difficulties to ensure adequate participation** even in dissemination activities.

GO objectives:

The project intends to intervene both on the organisational models of commerce, by **integrating mixed systems of small-scale organised distribution**, and on the capacity for coordination between the various participants, as well as on the possibility of implementing systems to manage the flow of information to and from the companies. Lastly, the project envisages defining a **"basket" of products to be proposed to market-goers** to whom, during the first phase of the project, a questionnaire on their eating habits was submitted.

Project partners:

- Azienda agricola Le Roncacce (capofila);
- Dipartimento di Storia, Archeologia, Geografia, Arte e Spettacolo/Laboratorio di Geografia Sociale (LaGeS) - UNIFI;
- Fattoria il Cassero, Fattoria il Bello, Lunardi Riccardo;
- Consorzio Esercenti Mercato Sant' Ambrogio;
- Centro Assistenza Imprese Coldiretti Toscana

Achievements:

The participants acquired new skills in both the production and promotion sectors. From an economic point of view, sales did not increase significantly, but the initiative registered its first **results in terms of visibility and recognition**. On the production side, the project was an opportunity to introduce **new products, new processes and new packaging solutions**. One of the main results has been to create a **climate of trust** between the companies, which translates into the opportunity to continue exchanging opinions, 'consulting' and developing ideas together. The companies also took the opportunity to **reconnect with the city**.

PRECISION SHEEP

Precision farming and sheep milk quality

Context:

In recent years, a series of unfavourable circumstances have led to a **general decline in sheep milk production** in Tuscany, also associated with a **decline in its quality**. In this context, the **lack of a structured innovation transfer system** to improve the quantitative and qualitative production of sheep milk has led to a progressive **loss of competitiveness of the farms**. Among the main problems identified, the **lack of appropriate structural modernisation interventions** and the **lack of support figures** for the transfer of agronomic and zootechnical innovation on the farm stand out.

Actions carried out:

The project axes involve two distinct activities that interpenetrate in the technology transfer process.

Training of farmers both **with** conventional tools and through **specific farm support figures**. The latter will have the task of linking scientific partners and companies in the implementation of precision farming and precision feeding strategies and of continuing to assist the post-project sheep companies.

Creation of a decision-support service concretised in software (web or app) aimed at transferring strategies for the adoption of precision-farming and precision-feeding practices **by facilitating dialogue between farmers, technicians and scientific partners**.

Strengths and weaknesses of PS-GO:

The added value of the PSGO lies in the possibility that the actors of the partnership have to compete together in all phases of the project. It might be appropriate to envisage a **"flexible partnership"** because sometimes it is the scientific evidence obtained in the course of the project that stimulates an extension of the partnership.

GO objective:

The main objective of the project was to **increase the competitiveness and environmental sustainability of Tuscan sheep milk farms by innovating agronomic and zootechnical management** through the transfer of **precision farming and precision feeding** practices. Operationally, the system is aimed at integrating the functions of technical figures with specific agro-zootechnical training, with those of a decision-support service designed in the form of an app for smartphones and/or web-app, in order **to allow a more efficient use of resources and optimise ration ingredients**.

Project partners:

Consorzio tutela Pecorino Toscano DOG (leader);
Centro di ricerche agro-ambientali 'Enrico Avanzi' - UNIPI, Scuola Universitaria Superiore Sant'Anna di Pisa, AEDIT s.r.l.;
Caseificio Sociale di Manciano, Caseificio V. D'Orcia, Caseificio di Sorano;
ANCI Toscana.

Achievements:

The need to **transform the simple shepherd into a livestock breeder/entrepreneur**, through proper technical and managerial training, was a need strongly felt in the area, and the GO took up the challenge in the hope of meeting this need. It was observed that an **all-round training** and the provision of **the means to optimise work and animal management** can also triple profits. In fact, an improvement in the animal's fertility from 65% to 95% success rate was recorded, solely due to the **correct feeding** adjusted to the period. The project succeeded in kick-starting a **permanent innovation process in** spite of an initial mistrust on the part of the breeders: the concrete result achieved was the growth of the farms that participated.

SMARTGAS

Intelligent biogas: cultivating with biogas to reduce the carbon footprint and increase the sustainability and resilience to climate change of cultivation systems for quality Tuscan crops

Context:

In Tuscany, many agricultural entrepreneurs have invested in the construction of agricultural biogas plants and to date there are about 40 active plants. After the first strong incentives, which allowed the emergence of an important business sector, the companies **need to increase sustainability** by better exploiting its potential, also in relation to the issue of greater energy self-sufficiency. The input to the project came from the Region, which felt that Confagricoltura represents companies that are particularly sensitive to the issues of diversification of agricultural activities through the **production of energy from renewable sources** with the adoption of cultivation systems that reduce the carbon footprint.

Actions carried out:

Rotation techniques were tested **to evaluate water saving and biomass production. Digestate spreading trials** were also carried out on hillsides to compare the fertilising effects of digestate with those of traditional fertilisation. The **effects on the environment** and the actual contribution to saving water and reducing the carbon footprint were assessed and monitored for each activity. Great emphasis was also placed on dissemination and training activities. In this aspect, the lead partner believes that good results were achieved, also thanks to the involvement of the Italian Biogas and Gasification Consortium (CIB).

Strengths and weaknesses of PS-GO:

The PS-GO system functioned **without any particular problems**, also thanks to a continuous and active dialogue with the regional authority. The most significant critical point concerns the **reporting procedures**, which are rather articulated and complex.

GO objective:

The SMARTGAS project does not aim to increase the number or power of plants, which will follow market logic, but to test and promote innovations in the management of agricultural soils and crops, with the introduction of conservation tillage and digestate utilisation techniques, to achieve agro-environmental (maximising soil carbon storage, improving nutrient use efficiency), agronomic and economic (reducing chemical inputs and crop costs) objectives. The main objective of the research was to gather elements for a correct and sustainable re-use of biogas plant residues (digestate) for fertilising agricultural crops.

Project partners:

Confagricoltura Toscana (leader); Istituto Scienze della Vita – Scuola Superiore Sant'Anna; Consorzio Italiano Biogas (CIB), Sersrl; Ente Regionale di Assistenza Tecnica Agricoltura; Az. Agr. Stassano Alessandro, BIO.GAS.MERSE, Marchesi Ginori Lisini, Querciolo.

Achievements:

Technology transfer was effective thanks to the **relational ties** within the GO. The diffusion of innovation was positively influenced by the phenomenon of **generational change**; the **higher level of education, specific training**, and the new **entrepreneurial skills** of young farmers. This has created favourable conditions for strengthening the **link between companies and research**. In addition to the benefits arising from collaboration with research institutions, experimental activities have verified the clear **improvements in soil fertility**, with positive repercussions on **productivity**, and the **reduction of costs with** respect to traditional farming operations.

AP00667 / AP Prot. 0374245 Data 02/07/2022 ore 09:43 Classifica F.045.046.0110

Enhancing renewal crops in Tuscan environments in anticipation of future climate change

Context:

Due to **increasingly globalised markets**, but also to frequent problems related to **extreme weather events**, agriculture is moving towards a progressive **specialisation of production systems**. This results in **monocultures** rarely alternating with green manures, renovation crops or set-aside. This is also caused by the **lack of profitable renovation crops**. These situations, in turn, lead to a worsening of soil fertility, a strong reduction in SO and field water capacity, and thus a substantial and necessary use of external energy inputs. It is therefore important to develop innovative and 'low input' supply chains based on sustainable agronomic practices and transformation processes.

Actions carried out:

- identification of best **varieties/population** for each cultivation area, best **agronomic practices** for the
- preservation of soil fertility and limited use of water resources; definition of an **agronomic production protocol**;
- Nutraceutical characterisation of grains based on the genotype and its interaction with the cultivation environment;
- third-year evaluation of the best accessions with a view to initiating a breeding programme to select populations adapted to different growing environments and resilient to future climate change.

Strengths and weaknesses of PS-GO:

Thanks to the events that managed to take place in attendance after the acute phase of COVID and the varied **dissemination** activities set up via web channels, the project attracted the **interest of companies outside the partnership**.

There was a need to lighten the bureaucratic burden that tends to make it impossible for small and medium-sized companies to participate.

GO objective:

The general objective of the project is to **identify varieties/populations of maize and millet** adapted to the Tuscan soil and climate environments and to develop **a low-input agronomic management model** that reduces the water input required for these crops and preserves soil fertility. The product obtained will also be characterised by high nutraceutical-organoleptic qualities and a strong territorial link. This combination will allow it to be included in specific **market niches** in the national and international agrifood sector.

Project partners:

- Bio-Agriturismo Il Cerreto (leader);
- ANCI Toscana;
- FCS - Climate and Sustainability Foundation;
- University of Florence - DAGRI, Institute of Sciences of Life Sciences - Scuola Superiore Sant'Anna of Pisa;
- Company Farm Vecchioni Giovanna, Garfagnana Coop Alta Valle del Serchio.

Achievements:

The objectives were multiple:

- provide farmers with **low-input alternative crops** in order to diversify production;
- spread the use of **hardy and climate resilient** varieties;
- refine the techniques and varieties to be used in organic and biodynamic agriculture;

These objectives were achieved differentially by the partners according to their location and local soil and climate conditions. The lead partner was most successful with millet while the Garfagnana cooperative was most successful with maize trials. This experience reinforced the idea of **managing the farm with a model based on crop rotations capable of generating income**.

Integrity and stability of Tuscan wine

Context:

The objective of quality **Tuscan viticulture** is to be able to bring to the consumer a wine of optimal organoleptic **quality, minimising additive or subtractive oenological practices** that can reduce the integrity, varietal expression and territorial typicality in the wine, i.e. the qualitative heritage of the grape. The cellar technician is very often forced to act prudently by applying **practices that eliminate all potentially unstable components to the detriment of product quality** with a negative economic and environmental impact.

Actions carried out:

The project involved conducting a **stability test** aimed at causing an acceleration of wine instabilisation phenomena through different techniques. Wines before and after acceleration treatments were **analysed from a chemical and sensory point of view**. The test was used to study the impact of the different stages of wine production on its stability, in order to identify the **practices that make it possible to arrive at bottling with a wine of high natural stability**. Thanks to these tests, no potentially positive components are removed but the addition of compounds with a possible negative impact on human health (SO₂, casein and albumin) is reduced.

Strengths and weaknesses of PS-GO:

In the future, the **instrument must be protected and re-proposed** in its general conception as the means by which experimentation can continue. This should stimulate the search for solutions that combine both the controls but also the purposes of the research incentive: the primary interest must be to create a **group with unity of purpose** to avoid wasting resources through a **more result-oriented approach**.

GO objective:

The aim of the project is to **improve the quality and image of Tuscan wine** and to obtain a naturally more stable wine: avoiding precipitation and unwanted cloudiness in the bottle; reducing the use of chemical-physical treatments on wine, with less removal of positive compounds and a lower concentration of possible allergens in the finished product; reducing the overall environmental impact of wine, with less consumption of energy resources and water resources for stabilising treatments of the wine and for its protection during transport and distribution.

Project partners:

ISVEA (lead partner);
Antinori, Col d'Orcia, Avignonesi;
(DAGRI - UNIFI);
Coldiretti Toscana Business Assistance Centre
Vinidea.

Achievements:

Tests for determining wine instabilities were developed as a result of the project. In general, the project makes it possible to define **wine production strategies with high natural stability**: the results obtained have made it possible to bring together knowledge and operational indications on winemaking strategies to be undertaken to obtain wines with high natural stability. Thanks to ISVEA and the partnership developed, the project has put in place a team that is an active part of the wine production chain and is capable of identifying any unresolved issues that need to be resolved. **The project has raised awareness and helped an entire zone/production area, which is that of Brunello di Montalcino**: it intervened at a time when entire batches of bottles, destined above all for the foreign market, had stability problems.

*The Tuscan veal calf: innovative breeding strategies***Context:**

The first input that gave rise to a round table discussion on the possibility of launching a project came from a dairy farmer who, in a matter of business efficiency and economic sustainability, was looking for **solutions to valorise the meat of the male calves** he had at his disposal. The project then evolved thanks to the collaboration between the actors involved directly or indirectly, such as ARAT, the University of Florence and the Zooprofilattico Institute.

Actions carried out:

The innovation introduced involves the use of **pure semen material sexed female** on cows with the best gene pool to ensure the birth of only female calves for milk production. In this way, it is possible to **reduce the number of cows destined for internal replacement**, thus being able to fertilise the others with **seminal material from beef bulls** in order to obtain **calves with better characteristics for fattening and slaughter**, which at birth are worth about five times as much as the others. An entire **supply chain was** constructed, from fattening to sale, with the involvement of all project partners.

Training played a central role and was also very successful among the partners and beyond. There were many more participants than there were project companies.

Strengths and weaknesses of PS-GO:

The establishment of a partnership and the way 16.2 was implemented created an **innovative and very effective system of collaboration**. On a general level, it was possible to develop a scientific-technical working model that did not exist before. The only thing that needs to be improved highlighted is to increase the **networking of innovation-related projects at national and European level** through events and conferences organised by the public apparatus.

GO Objectives:

The main objective of the project is to **increase beef production** without increasing the number of herds or beef cows. The partnership used a mechanism that was not entirely innovative but had not yet been applied at regional level in the dairy cattle sector. The objectives were not only at farm level because the project also aimed to close the **chain** by creating a weaning centre, which takes in calves at 10 days after birth and continues to rear them until they are 3–4 months old until they go to the fattening centre. In the process, a further objective was added, to **transmit a culture capable of promoting animal welfare** on farms.

Project partners:

Regional Breeders Association of Tuscany (leader);
Az. Agr. Marchi Bruno Ivo and Remo, Az. Agr. Il Grillo di Bonini Daniele and Marco;
CAF – Centro Ingrasso Pilarciano, DAGRI – University of Florence, Istituto Zooprofilattico Sperimentale del Lazio e della Toscana (IZSL).

Achievements:

At this time, a **rather structured supply chain was** achieved, two more weaning centres were established and some farms started to wean calves in-house, thus increasing the added value when selling the animal. The course held had a strong impact, **changing the culture of the farmers** by introducing the notions of animal welfare and biosecurity. The results went far beyond what was expected also because in the meantime the ClassyFarm survey forms were published and applied. Moreover, the CAF, hearing about these aspects, decided to introduce it also in another cooperation project in which it is involved. In this way the message was directly conveyed to many other farms.