

# Strategy for the European Agrivoltaics community



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## Executive Summary

Agrivoltaic systems can be interpreted as social-ecological systems contributing to the energy transition, therefore they require systemic knowledge and design approaches and fully multi-disciplinarity and trans-disciplinarity. Agri-PV research and implementation is in an early stage, and there is a need to empower the few available knowledge exploitation among the main actors and stakeholders, first of all farmers, at the different levels.

Web platforms and networks mobilize human resources, knowledge and expertise at the different levels: those are similar to arenas where market actors, scientific community, policy actors and local stakeholders can meet and exchange different types of knowledge. Currently platforms and networks appear promising in empowering knowledge exploitation. At this purpose in September 2023 Symbiosyst launched a European network for Agrivoltaic systems development called Cross European Cooperation for Agrivoltaics Development. This deliverable reports on the first outcome of the cooperation after 15 months.

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## 1. INTRODUCTION

Agrivoltaic systems (agri-PV) can be interpreted as social-ecological systems contributing to the energy transition [1, 2, 3, 4]. Agri-PV systems require therefore systemic design approaches and fully multi-disciplinarity and trans-disciplinarity [5, 6]. Agri-PV research and implementation is in an early stage, thus there is a need to empower the few available knowledge exploitation among the main actors and stakeholders, first of all farmers, at the different levels (from local to regional and national [7, 8, 9, 6]).

Web platforms and networks mobilize human resources, knowledge and expertise at the different levels: those are similar to arenas where market actors, scientific community, policy actors and local stakeholders can meet and exchange different types of knowledge [10]. Among the other tools networks and platforms use webinars and in presence events as seminars and workshops [11].

EU member states are currently promoting and funding agri-PV systems, among the others Italy, Germany, France, where national associations for the development of Agri-PV, as the Italian *AIAS* (Italian Association Sustainable Agrivoltaics) or the French *France Agrivoltaisme* have been established.

With regards to Italy, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), launched in 2021 the Task Force Sustainable Agrivoltaics (AgrivoltaicvoSostenibile@ENEA), promoting the concept of sustainable Agri-PV systems: those aiming at synergies not only between energy and food but also within the landscape, ensuring public acceptance [7, 12].

In 2021 ENEA and ETA-Florence, both partners of the Symbiosyst project, started the Italian Network Sustainable Agrivoltaics, whose aim was to give an answer to knowledge demand and sharing on good practices and data within the development of sustainable agri-PV systems. The concept of Sustainable Agrivoltaics had relevant impact on policy making and in June 2022 ENEA and other research institutions and key stakeholders were directly involved in the writing of the Environmental Ministry guidelines on the development of Agri-PV systems. The Italian Network Sustainable Agrivoltaics gained popularity and impact through the organization of a series of training webinars on topics and issues related to the agri-PV systems development in Italy and the organization of a design competition for agri-PV systems in Lombardy region for a farm doing rice fields and nature development [12]. In November, 2022 the Italian Network for

Sustainable Agrivoltaics reached almost 900 subscribers, “including companies, institutions, universities and trade associations, spanning from the agricultural to the energy sector, and including landscape and local decision makers” [12, p. 2].

Symbiosyst project aims to promote innovative agri-PV systems with the ambition to create a symbiosis where PV and agriculture can have a mutually beneficial relationship, with positive ecological and cultural impacts on the landscape. Symbiosyst develops integrated solutions, from design to implementation, that aims at: 1, demonstrating the feasibility of agri-PV; 2, adopting monitoring and controlling systems for PV modules and crop yield; 3, limiting the impact of PV on crop yield; Digitalizing farming tools; 4, improving systems for water supply and mitigation of climate change impact; 5, conducting sustainable agriculture; 6, enlarging and strengthening social acceptance through participatory approach; 7, protecting and enhancing biodiversity; 7, realizing guidelines for Agri-PV systems landscape integration. This broad spectrum of objectives requires fully multi-disciplinarity and trans-disciplinarity and knowledge exchange beyond the project consortium partners at different levels. Among the Symbiosyst project objectives it is relevant to mention here the last three ones, number 5, 6, 7 which are strongly interlinked to this deliverable. Those objectives will be defined at regional level (NUTS 2), for the regions hosting the project demos.

Concluding National networks and associations for agri-PV development are strongly focused on topics and issues which are limited to each member state social-ecological systems and related regulations. International conferences such as EUPVSEC and Agrivoltaics Europe, or working groups as ETIP-PV are at present the only tools for knowledge exchange, yet those are limited in time and scope, while network and related platforms appear in literature as prominent tools to pursue in such knowledge exchange at EU level.

This deliverable shows the first outcomes of the Symbiosyst project network and platform called “Cross European Cooperation for agri-PV development” aiming at creating the first cross European platform and network dedicated to agri-PV for knowledge exchange.

## 2. TOWARDS A EUROPEAN COMMUNITY FOR AGRIVOLTAICS

With reference to the experience of the Italian Network Sustainable Agrivoltaics, the Symbiosyst project launched in September 2023 the Cross European Cooperation for agri-PV development. The network was launched during the European Photovoltaic Conference in Lisbon (EUPVSEC, 18-22 September, 2022). The cooperation is approached in a multi-disciplinarity and trans-disciplinarity knowledge exchange, therefore aiming at the engagement of actors and stakeholders at different levels and at the differentiation of knowledge per regions at least for those topics and issues related to the Symbiosyst project objectives 5-6-7. The network objectives are the following:

- a) search for relevant Agrivoltaic experiences and pilot plants in all EU regions as for example other Agrivoltaic projects funded by Horizon EU (or other programs), stakeholder networks, pilot developers, etc.;
- b) good practices knowledge sharing and spillover effects among difference disciplines;
- c) transfer the knowledge in new agri-PV experiences;

- d) setting an EU community on agri-PV based on the differentiation of regional knowledge;
- e) make EU regions emerge as main actors in the regulation and planning of agri-PV systems.

The methodological framework is reported in the image below (figure 1). The framework foresees a call for agri-PV experiences, started in Lisbon in September 2023, the call is continuous and lasting as long as the project. Interested actors and stakeholders that want to share agri-PV experiences subscribe to the cooperation by following a QR code giving access to a questionnaire. In the questionnaire subscribers are asked to give their generalities, including the name of the institution, firm, enterprise, association etc., specify the field of competence or background (energy, agriculture, landscape planning and design) and to mention one or more critical topics/issues in Agrivoltaics development. The mentioned topics/issues are at the base of the knowledge exchange: training webinars for the project partners and the cooperation subscribers are regularly organized on agri-PV topics/issues inspired by the knowledge demand requests. Further at regional level subscribing actors and stakeholders, are involved in the Symbiosyst project demos field visit and workshops in South Tyrol, IT, Catalunya, E, Calabria, IT and South Holland, NL (Tasks 6.4 and 8.4 in WP6).

Since its launch the cooperation is considered as a tool for Symbiosyst dissemination and communication in a mutual relationship. The Symbiosyst project final event is intended as the first gathering of the cooperation subscribers, this is set in Bruxelles, Belgium, in November 2026. Among the other project WPs and tasks outcomes, a strong focus is on the differences in between the involved EU regions (NUTS2 regions) in the planning and regulating of agri-PV systems and in the role of different actors and stakeholders.

## The cross EU cooperation framework through Regions

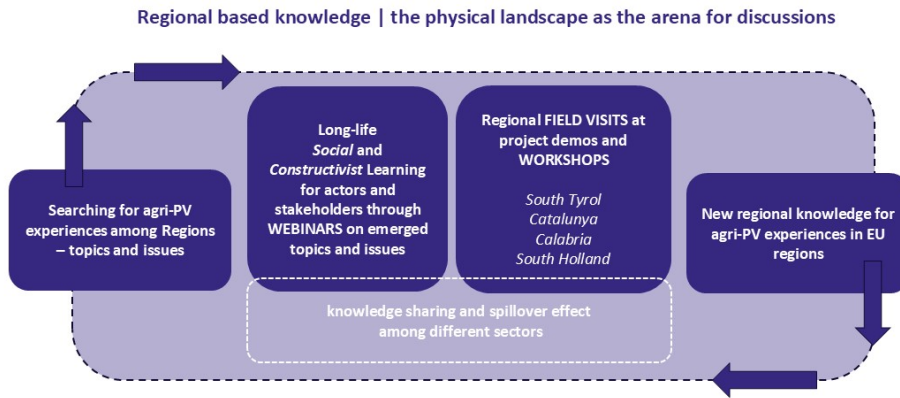


Figure 2.1. The framework of the cross European Cooperation for agri-PV systems.

### 3. FIRST OUTCOMES

In December 2024 the cooperation reached the number of 81 subscribers. The image below (Figure 2.2) shows the provenience of subscriber actors and stakeholders distinguished per NUTS 2 EU regions, extra EU and International. This distinction was based on the address of firm/institution/enterprise headquarter and main acting areas. Those considered international are actors whose headquarters are set in different countries around the world. The highest demand of knowledge comes from Italian regions, Apulia on top, 14 subscribers, on total 57, then from Spanish regions, Murcia on top, 12 subscribers on total 57.



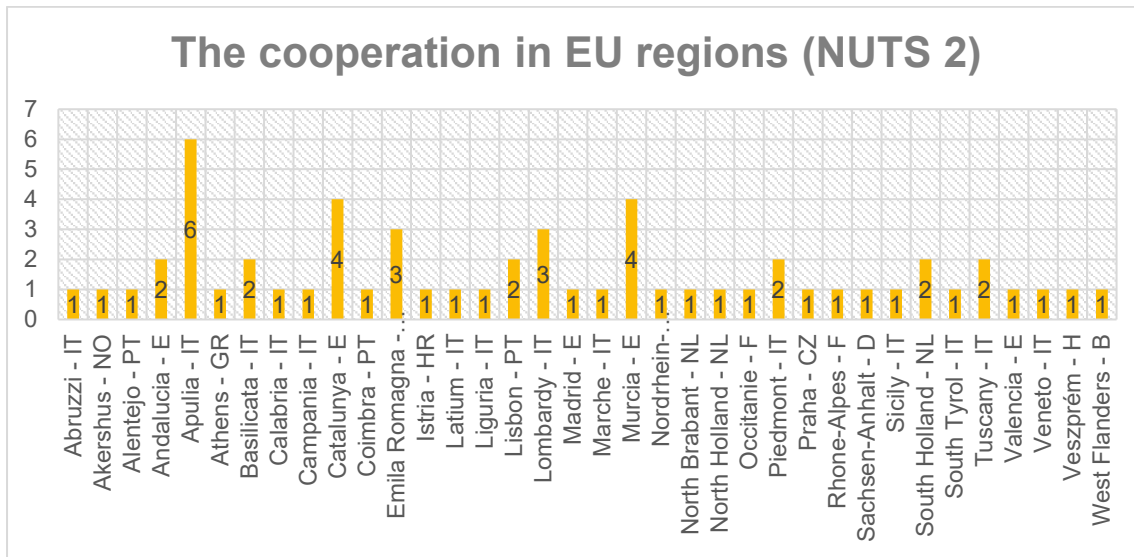


Figure 2.2. Number of subscribers from EU regions.

Ten subscribers are part of multinational companies, while extra-EU countries, Algeria, Cameroon, Mozambique and Zimbabwe are represented from one subscriber, while India and United Kingdom by two subscribers, and Turkey by three subscribers. The image below (figure 2.3) reports on the distribution the field of competence/background (energy, agriculture, landscape planning and design). The majority of subscribers comes from the energy field of competence.

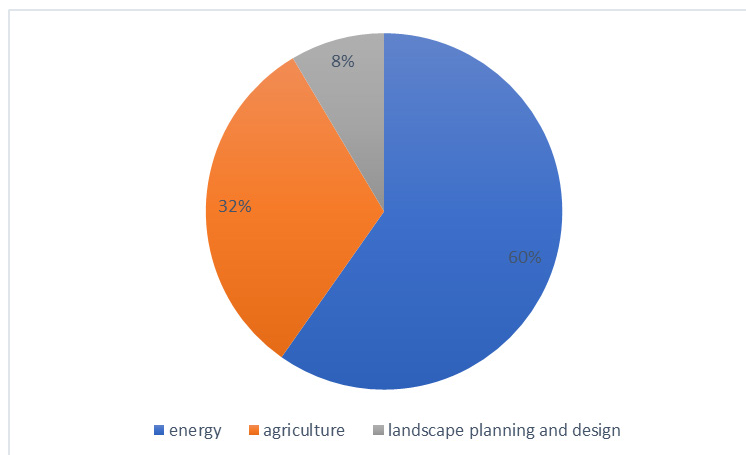


Figure 2.3. The distribution of field of competence among the total of 81 subscribers.

The image below (Figure 2.4) reports on the combination of subscriber target group (see D 8.1) per field of competence.

In the agriculture, energy and landscape planning and design fields of competence there is higher demand of knowledge among the market actors than in the scientific community.

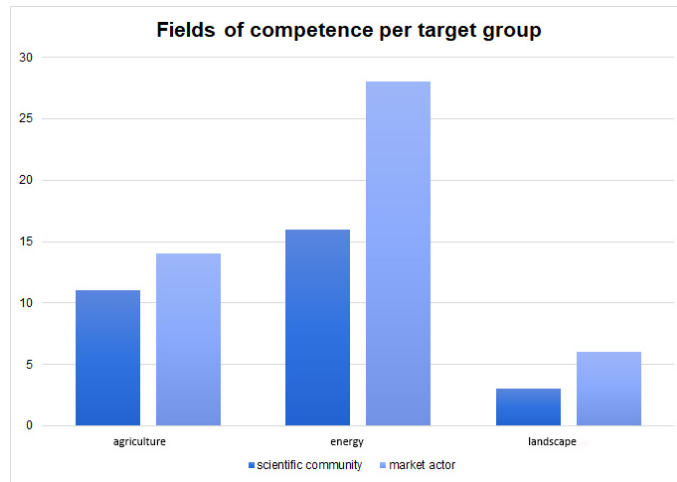


Figure 2.4. The combination of subscriber target group per field of competence

The table below (2.1) reports the main knowledge demand emerged among subscribers from different target groups and field of competence and an indication of dedicated webinars.

**Table 2.1:** The knowledge demand emerged after 15 months of cooperation

Knowledge demand	Main target group/field of competence	Dedicated webinar at M24	Explanations
Sharing data	Scientific community/Energy and agriculture	One webinar done	Researchers active in agri-PV research and looking for data from different applications in crops and landscapes
EU policy and regulations	Scientific community/Agriculture	To be set	Researchers investigating the way to integrate agri-PV in agriculture policies and regulations at regional level
Landscape integration of Agri-PV and Biodiversity, Rural Development	Scientific community/Landscape planning and design	Two webinars done	Researchers or landscape architecture firms investigating the relationship in between agri-PV and regenerative farming and nature development and the way agri-PV cans support landscape

			restoration and rural development
Effects of Agri-PV on crops	Market actors and scientific community/Agriculture	To be set	Market actors looking for demonstrators that can provide data on the effect of agri-PV systems on different crops. A special attention is to Mediterranean crops that agriculture market actors think agri-PV could protect from climate change phenomena
Modelling and optimization of Agri-PV	Scientific community/Energy	To be set	Researchers interested in modeling approaches for agri-PV systems
Design of the layout and mounting structures	Market actor/energy	To be set	Market actors as industries active in the construction of mounting structures for agri-PV and interested in new input and date to enhance structures and layouts
Monitoring	Scientific community/energy	One webinar done	Researchers developing methodologies for monitoring agri-PV systems and creating lists of KPIs.

At present subscribers from the different target groups are invited to join Symbiosyst training webinars. Webinars are gaining popularity, reaching the minimum average number of 200 subscribers each time.

### 3.1. REFERENCE MATERIAL

This Deliverable has taken some data from the document named Dissemination & Communication plan, deliverable 8.1.

### 3.2. RELATION WITH OTHER ACTIVITIES IN THE PROJECT

Table 3.1 depicts the main links of this deliverable to other activities (work packages, tasks, deliverables, etc.) within Symbiosyst project.

**Table 3.1** Relation between current deliverable and other activities in the project

Project activity	Relation with current and future deliverable
WP6 tasks 6.4 and 6.5	D6.1, D6.2, D6.3, D6.4, D6.5

## 4. DISCUSSIONS AND FUTURE EFFORTS

After 15 months of cooperation two main issues emerged. The first issue is related to the lack of multi-disciplinarity and trans.-disciplinarity. The knowledge demand is still very sectorial. Apart from few subscribers from the landscape filed of competence that tend to approach agri-PV systems as social-ecological systems and through systemic knowledge, subscribers, both market actors and scientific community, from energy and agriculture fields are more focused on their discipline and specific topics and issues. The Symbiosyst project is currently operating in each webinar moderation a huge effort in providing a multi- and trans-disciplinary perspective in agri-PV systems development.

Symbiosyst project should safeguard more space and visibility to the Cross EU Cooperation in the future, and promoting it as a network ensuring knowledge exchange. Further the Cooperation should better stress the need for multi- and trans-disciplinarity, which means including regional and local stakeholders in knowledge exchange activities. At this purpose in the near future the close collaboration with the WP6, in the organization of regional workshops in the project demo sites in South-Tyrol, IT, in Catalunya, E, in Calabria, IT and South Holland, NL, can be the proper occasion to join the forces with tasks 6.4 and 6.5 and safeguard multi- and trans-disciplinarity in physical events beside the organization of webinars. On the other hand, webinar should better promote the subscription to the Cross EU Cooperation.

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