

Two years running project...

Exploring resilience and sustainability of agroecosystems in the Mediterranean

After two years of the MA4SURE project, we are pleased to share insights into our work on agroecology under climate change conditions across the Mediterranean. Learn more about our work in the Living Labs, field missions to our different study areas and first research results. Get to know stories and faces from our field studies and stakeholder activities in Spain, Egypt, and Italy. We hope you enjoy reading this newsletter!



Enhancing co-creation and local resilience under climate change: The Living Lab approach



"Our Living Labs provide a unique opportunity to test innovative agroecological practices and explore solutions to the most pressing problem of the current food system, climate change," states Dr Joan Marull, MA4SURE project principal researcher. In the first two years of the project, three Living Labs were set up in Egypt, Spain, and Italy in collaboration with local public and private organisations. Their overall objective is to test context-specific innovative agronomic practices and their contribution to local resilience and adaptation to climate change.

The **Egyptian Living Lab SEKEM**: In the case of Egypt, the Sekem farm has always been committed to the diversification of agricultural production. They do so by combining arable and livestock farming, including cereals, fodder crops, fruit trees, olive trees, horticulture, medicinal and aromatic plants, livestock, and beekeeping. Production is biodynamic and the use of organic compost and water-saving techniques are central to the farm's technical system. Building on these foundations, the aim of the Egyptian Living Lab is to enhance the biodynamic integrated agricultural approach through the application of agroforestry systems. To achieve this goal, two experimental plots have been established within the Living Lab to study the effects of different cropping systems, tillage and cover crops on soil fertility by conducting seasonal soil analyses and assessing overall productivity. The aim of these measures is to reduce water consumption by monitoring irrigation and to improve cultivation methods and water storage capacity of the soil. In addition, the circular economy of the cropping system is to be improved by using agricultural waste for mulching and weed control.

Moreover, the Egyptian Living Lab has a specific socio-economic focus that aims to improve farmers' performance by adopting a cropping plan for the crops tested in the field. They not only work to suggest the best agroforestry models that could be replicated by farmers, but also determine the costs to gain insights into the economic benefits of the different practices. To achieve these objectives and ensure acceptance of the practices used, the Egyptian team developed interventions together with local stakeholders by conducting interviews and consultations. Notably, the selection of plants and tree species was assessed together with the stakeholders.

The **Italian Living Lab TERETO** takes a different approach and builds on an efficient cultivation system of annual cereals in combination with legumes, olive trees and hazelnuts. It aims at high drought stress tolerance, for which different tillage methods are tested in addition to agroforestry cropping plans. This agroforestry system aims to ensure soil structure and fertility maintenance by reducing water input and improving water absorption and storage. In addition, an automatic drip irrigation system will be installed and tested to ensure high efficiency and

lower water consumption. These techniques make it possible to reduce external inputs of water and fertilisers, improve the sustainability of the agro-ecosystem and promote a more economically viable cropping system.

To introduce the Living Lab activities to a wider audience and to receive input and feedback from local stakeholders, an Info Day was organised in Tereto in May 2022. The event, attended by students, schoolchildren, local businesses, and farmers, focused on the role and contribution of agroforestry systems to the Sustainable Development Goals. There was an exchange on practices used in the Tereto Living Lab such as land cover, reduced tillage, organic inputs and intercropping and how they can contribute to soil conservation, biodiversity, water retention, nutrient availability, and carbon sequestration.

Last but not least, the **Gramona Living Lab in Spain** aims to support the search for climate change adaptation measures by applying an agroecological approach to viticulture. It focuses on restoring traditional techniques and regional wine varieties, as well as innovative approaches such as agroforestry, which combines vineyards with olive trees and annual rotational crops (cereals and legumes) used as cover crops. In addition, the use of forest litter (chopped pine bark) as a mulch material to retain residual moisture in the soil was tested last year in 2022. Soil sampling in autumn 2022 did not reveal that the parts of the trial plot covered with mulch had a significantly wetter and more compact soil profile than the sections where the soil was uncovered. After two years of continual drought in Spain, this is an important observation that needs to be studied in more detail. The results of the soil analyses will give us further insight into the impact of these practices on soil structure in the coming year. In addition to the test fields, Gramona Farm is integrated into a network of biodynamic farmers who share their knowledge of field practices and who train internally. In this context, the Living Lab not only serves as a test field for innovative practices for the Gramona family farm, but also benefits other farmers in the region who are part of this network, allowing them to share the knowledge and experience gained.



Touching ground: Field visits of Spanish and Egyptian study regions and local stakeholders

To touch ground and get a picture of the realities of local people, throughout the first two years of the project the Spanish and Egyptian Living Labs were visited by Working Package 5 leader Dr. Alia. Expert interviews and many insightful meetings with local stakeholders feed into a baseline socio-economic analysis of the Living Labs field sites and regions, which is a key element of WP 5's research mission on policy and social analysis.



In the first two years of the project, two field visits of the WP 5 team took place in Spain and Egypt. In April 2022, the Barcelona research team hosted Dr Alia Gana in Barcelona for a joint working meeting. Here, Alia Gana presented initial findings from her research mission to Tunisia, while the Barcelona team presented a preliminary SWOT analysis of an agroecological transition in the Spanish research region of Alt Penedès.

The following two days were dedicated to a field trip to the Alt Penedès region, with the aim of visiting different actors in the region and gaining a more holistic perspective on the sectors' activities, challenges, and opportunities.

Together, the team visited the Spanish Living Lab Gramona and discussed different challenges faced by the farm, such as the persistent drought leading to crop failures and difficulties in implementing the agroforestry system with young olive trees that require a high level of water, or the structural and administrative challenges in finding trained staff and hiring migrant workers. This perspective was complemented by that of another winemaker from the region who, like the Gramona farm, belongs to the farmers' collective "Aliançes per la Terra". The collective of biodynamically certified farmers grows quality grapes and sells them to Gramona at a price far above the low market prices for grapes. An interesting initiative that adds value to grape growing through sustainable production techniques, collective organisation and knowledge sharing between farmers.

Following this, the team visited other stakeholders in the region, including a conventional peach farmer and a technical employee of the tourism office in the district of Subirats, who promote the local marketing of the "Pressec d'Ordal" peach, famous in Catalonia. The creation of the "Pressec d'Ordal" brand has opened market opportunities and provides better prices for the produce of local farmers. First attempts of vertical integration into the market through the production of jam in a small processing workshop and local distribution show how important it is to develop innovations not only in farming but also in the downstream sectors (processing, distribution channels, etc.). Such experiences are particularly interesting as in the Alt Penedès, viticulture has become the predominant crop over the last century and today occupies around 80% of the agricultural area. Partly due to the rise of the large cava companies in the region, the old agricultural mosaic of vineyards together with other Mediterranean crops (e.g., wheat, olives, orchards, fruit trees) has been gradually replaced by monocultures of vines as a way of ensuring the productive demands of these companies.

This process has led to several socio-ecological problems, in particular loss of soil fertility and soil erosion, as well as socio-economic pressure on farmers due to low prices for agricultural products. A major challenge is therefore to develop solutions to improve the socio-ecological resilience and adaptive capacity of agri-food systems to climate change and to guarantee generational replacement within the farming sector.

A second visit by the Head of Work Package 5, Alia Gana, took place in Egypt in March 2023, where she visited the Living Lab field site at Sekem Farm and its associated companies, as well as stakeholders from nearby farms, research centres and the wider agricultural sector in the region.

The visit showed that in addition to horizontal integration of agricultural production, Sekem is also committed to vertical integration of its activities, which include processing, packaging, and marketing of products such as medicinal and aromatic plants, herbal teas, olive oil, textiles, cereal products, and honey. The Sekem farm is a production and technical testing ground of great importance for sustainable agriculture beyond the boundaries of the land it directly cultivates. In fact, it plays a leading role in spreading its biodynamic production model through the production contracts it signs with neighbouring farmers. In close cooperation with the Egyptian Bio-Dynamic Association (EBDA), Sekem offers support and benefits to farmers from the region through, for example, the supply of inputs, technical support, and assistance in converting to organic farming, marketing of production at attractive conditions or fixed promotional prices.

The visit enabled the strength of Sekem interventions to be recognised as an important asset for the development of sustainable agricultural practices in Egypt, as their interventions benefit farmers in several ways: Supply and marketing, support for conversion to organic farming and risk mitigation (guaranteed prices), training, technical support and monitoring, profit sharing, support to farmers' organisations. The increase in organic farming also seems to be an adaptation strategy for farmers affected by the agricultural crisis, which manifests primarily in increased production costs and deterioration of water and soil resources. It is also encouraged by the growing demand of affluent consumers for healthy quality products.

Furthermore, the success of the Sekem project is fundamentally linked to its integration into an international network of partners and support in the form of financing, technical assistance, and marketing on European markets. Barriers to the further development of this dynamic are problems related to land leasing (most farms have less than 5 feddan) and regional environmental problems (pollution, water scarcity, rapid urbanisation, etc.).

This year, in June 2023, a third visit to Italy is planned to complete the socio-economic analysis of the different Living Lab regions.





[Read full report of Egypt field mission](#)

“Agroecology is a way of life!”: Insights from local stakeholder engagement activities.

MA4SURE stakeholder engagement is closely linked to local research activities and Living Labs. During the first two years of the project different actions were carried out with local stakeholders within each partner country, all aiming at adapting research to stakeholders' interests and needs.



For MA4SURE, it is important to directly listen to the voices and experiences of stakeholders and to include them in the socio-ecological and socio-political analysis of each region. In the Alt Penedès research area, Catalonia (Spain), stakeholder engagement therefore started with a SWOT analysis based on a review of scientific and grey literature and four interviews with key local

stakeholders to identify the dynamics (strengths, weaknesses, opportunities, and threats) and key actors of the local agri-food sector. This analysis was complemented by a field trip to the Alt Penedès study region in April 2022 with the leader of the Policy Analysis and Social Impacts Work Package (WP5), where four additional local stakeholders were visited and interviewed to establish a baseline socio-ecological analysis. In the following months, a total of 15 semi-structured interviews with local stakeholders (including farmers, policy makers, farmers' associations and cooperatives, local authority staff and members of civil society engaged in rural development) were conducted by the Spanish team over a period of one year. The interviews are currently being systematically analysed to identify the obstacles and opportunities for implementing agroecological solutions in the region. To

contrast the findings from the interviews, we developed a survey that was sent to a wide range of local stakeholders prior to the first participatory stakeholder workshop in Sant Sadurní d'Anoia, Alt Penedès County (Catalonia, Spain). The survey helped us to organise the workshop more effectively and focus it on issues that are important to stakeholders in the region. The participatory stakeholder workshop was held in November 2022. Fifteen (15) people from local agricultural organisations and the public sector attended the workshop. During a lively 2.5-hour world café in small groups, different topics were discussed under the general question of whether Alt Penedès could be a pioneer in the transition to agroecology in Catalonia. The results of the workshop have been summarised by the Spanish team and in a collaborative process with the workshop participants, a decalogue has been developed that summarises 10 strategic elements to promote policies that favour the agroecological transition in the context of climate change in the Alt Penedès region. It serves as another cornerstone to adapt the research work to the needs and requirements of the region and to anchor it politically.

From the outset, Sekem Farm has been very closely involved with local stakeholders, especially farmers, for example by providing them with technical support and assistance. Therefore, Sekem's work in the



MA4SURE project also directly aims at ensuring that research on agroforestry systems directly addresses farmers and that they are instructed and involved in its implementation in their fields. To explore regional needs throughout the process of agroforestry system adoption, the Egyptian team conducted key interviews with local organisations and initiatives embedded in a broad network of stakeholders. Meetings were held with Organic Egypt, Demeter Egypt and El-Mizan Organic Seedling to identify opportunities for collaboration, for example to link the MA4SURE project with associations and farmers working in the organic sector, to jointly develop innovative agroforestry services that associations can offer to their members and to ensure the availability of up-to-date knowledge and effective communication and exchange among farmers. The synergy with the interviewed stakeholders is crucial, as they already have a wide network of stakeholders that the MA4Sure project can access. The outcome of these stakeholder meetings was very multifaceted:

On the one hand, this collaboration served to create synergies and network sharing, and on the other hand, this stakeholder exchange was key to identifying a viable tree selection for the test field in Sekem. Together, they decided on the final list of potential crops that could be grown and the number of trees and species. In addition, they determined effective agricultural practices, such as the use of cover crops and different tillage systems, and the level of tree cover and other soil and water conservation measures. In addition, discussions were held on how Sekem farmers can engage with their neighbours, with extension workers such as Demeter, and with researchers to continue the process of participatory agroforestry development. It was agreed that this would involve scaling up good agroforestry practices, bringing in new knowledge and planting materials, testing new methods and designing agroforestry experiments, and organising farmer-to-farmer exchanges through group meetings and farmer-to-farmer visits. Collaborations have been decided in this regard, although the priority has initially been set

on the implementation of the Living Labs and their functioning. In the coming months and with the first results from the test sites, the stakeholder activities in the context of agroforestry extension will be expanded step by step.



In Italy, an engaging stakeholder event was organised in May 2022, where the Tereto Living Lab prepared a complete information day at the site in Tuscany. The event targeted various stakeholders, including university students, high school students, local businesses

and farmers, who were shown the Living Labs sites and listened to an informative presentation on the role and contribution of agroforestry systems to the Sustainable Development Goals.

Participants were then given more detailed information about the Tereto Living Lab approach. This included an explanation of the objectives of identifying new tree genotypes that are resilient to climate change and of high quality for introduction into agroforestry, as well as the assessment of crop performance and soil properties in an agroforestry system. In order to improve the sustainability of the agroforestry system, there was a lively exchange during the day on the practices used in the Tereto Living Lab such as land cover, reduced tillage, organic inputs and intercropping, and discussions between researchers, practitioners and students on how these can contribute to soil conservation, biodiversity, water retention, nutrient availability and carbon sequestration.

As the next upcoming stakeholder event during the mid-term conference of the project consortium at the end of May, a round table discussion on "New CAP targets and conservation agriculture: the challenges and opportunities from an agronomic perspective" is planned at the Cesa estate, where the Tereto Living Lab is located, and aims to further strengthen the policy dimension of the project.

[Read Decalogue](#)

[Read more about stakeholder workshop in Spain](#)

[Papers, Papers, Papers! Research insights and publications in international journals](#)

Whether microbiological aspects or the analysis of agroecology at the landscape level, the research carried out by the project in its first two years has enabled the MA4SURE team to submit and publish a total of five papers in international journals, with analyses focusing on different scales of the food and farming system.



Towards an agroecological transition in the Mediterranean: A bioeconomic assessment of viticulture farming

[Jaume Gil](#)^a, [Elena Alter](#)^b, [María José La Rota](#)^b, [Enric Tello](#)^c, [Vittorio Galletto](#)^b, [Roc Padró](#)^c, [Teresa Martínez](#)^d, [Soazig Darnay](#)^d, [Joan Marull](#)^b  

The first published article focuses on the farm level and on the bioeconomy assessment of a viticulture farm in the Alt Penedés region. The article was published under the title "Towards an agroecological transition in the Mediterranean: A bioeconomic assessment of viticulture farming in the Mediterranean" in the Journal of Cleaner Production. Our research shows that the Gramona farm system (where the MA4SURE Living Lab is also located) is an interesting best practice example of an advanced stage of agroecological transition in Mediterranean viticulture. The study reveals that Gramona's energy efficiency is higher than that of conventional wineries in the region, while it achieves similar economic returns that are, however, more evenly distributed than those of agro-industrial enterprises in the sector. It also identifies opportunities and barriers for further progress in agroecological conversion to avoid the risk of ecological conventionalisation.

At the landscape level, the paper "Using thermodynamics to understand the links between energy, information, structure and biodiversity in a human-transformed landscape" demonstrates that the main difference between natural ecosystems and agroecosystems is the external energy supplied by farmers. Consequently, it is argued that biodiversity in agricultural landscapes can be explained by an energy-information-structure model. This hypothesis was tested using biodiversity data from butterflies and birds. The results suggest that different agricultural management strategies can be used in combination with conservation at certain optimal points in the relationship between the energy-information structure of agricultural landscapes and its biodiversity.

At the regional level, a socio-ecological integrated analysis (SIA) was applied to assess the multiple functions and services of agricultural landscapes in metropolitan areas under four land use scenarios and two types of agricultural management (organic and conventional). The results suggest that certified organic farming is not sufficient to overcome some unsustainable trends in industrial agriculture, such as low energy efficiency or greenhouse gas emissions. They also show interactions between social metabolism and landscape ecology, as changes in metabolism affect landscape functioning, while changes in land cover have a particular impact on resource use.

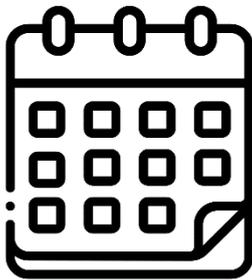
In addition, a study on the impact of organic farming on functional diversity and ecosystem services provision was published in the journal Ecological Indicators ("Organic agriculture increases functional diversity and ecosystem services provision of spontaneous vegetation in Mediterranean vineyards"). The study shows that organic management of vineyards promotes more diverse spontaneous plant communities with varying strategies to cope with different conditions and disturbances. Plant communities in organic farming represent richer, broader and more resilient communities for the provision of pollinator services at the local level. The results highlight the importance of organic farming for maintaining local diversity of companion plants, but also for providing ecosystem services in agricultural landscapes.

Finally, another paper on the "Influence of organic and conventional practices on the subsurface microbiota in vineyards" (Journal of Applied Soil Ecology) was submitted, showing that organic management of vineyards influences microbial diversity in the upper soil layers compared to conventional farming practices. The researchers

identified soil texture and organic carbon at different depths as the most important environmental parameters affecting the microbial community in the subsoil of vineyards. According to the study, organic management resulted in a significant enrichment of a greater number of different genera (21) compared to conventional practices (10 genera), some of which are associated with C and N cycles.

In the final year of the project, we look forward to the collaboration of the whole project team on the publication and the collaboration between the different research groups.

[Check our publications](#)



Upcoming: In-person mid-term conference in Tuscany

We are pleased to announce that between 29 May and 1 June 2023, the mid-term conference of the MA4SURE project will take place in Florence, Tuscany. For these three days, in addition to project meetings and discussions, especially on the integration of the different research lines to further strengthen the interdisciplinary approach of the project, a visit and excursion to the Living Lab Tereto in Tuscany is planned. Stay tuned for updates!



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