LIVINGAGRO

Cross Border Living Laboratories for Agroforestry

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LIVINGAGRO: Innovation, *transfer of* ***knowledge*** *and* ***technology*** *for Mediterranean* ***agroforestry***

LIVINGAGRO identifies #innovationneeds of agroforestry economic stakeholders in Italy, Greece, Jordan and Lebanon

Technical activities and main project outcomes, where are we now? An overview about the economic stakeholders baseline study by our Italian partner ATM

The **study carried out by project partner 5** highlights that **economic stakeholders operating in the Mediterranean agroforestry sector** claim in a large part for the **same needs**, **transversally**, from olive to grazed woodlands farmers, attaining the most frequently reported issues to maintenance and/or improvement of soil fertility, reduced use of chemical products and reduction of production costs. Let's deepen the used methodology, purpose and main outcomes of the research.

Within the set of different baseline analysis to be performed in order to identify innovations for the Mediterranean agroforestry sector, ATM Consulting successfully finalized the **study of economic stakeholders for both Living Lab 1** (olive multifunctional systems) **and Living Lab 2** (grazed woodlands) in the four project partner countries, namely Italy, Greece, Lebanon and Jordan. The analysis has been a critical **preliminary step to enable a proper and exhaustive identification and profiling of all relevant stakeholders** to take part or to contribute to the upcoming Living Labs (from now LLs). The categories of stakeholders which were considered are primary producers (farmers in

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general), food processors, intermediaries, distributors, seed and chemicals producers, trade associations and public authorities.

The **purpose of the research** in brief:

- Identify all relevant stakeholders for the two LIVINGAGRO LLs;
- Create a basis for stakeholder involvement within the two LLs;
- Create a basis for communication among relevant stakeholders at various levels;
- Set the scene for the implementation of virtuous circles with positive economic dynamics in the medium to long-term.

Questionnaires and interviews have to this end been the tools that allowed ATM Consulting to establish a communication channel with the stakeholders and gather the relevant data from them by asking targeted questions and holding open discussions on themes addressed by the project.

The main outcomes

Main results on the economic stakeholder analysis for **Living Lab 1** on **olive multifunctional systems**, overview per country:

Italy, Sardinia

Most of the farms indicated the maintenance and / or improvement of soil fertility (29%) and the protection of biodiversity (28%) as the most important aspects for their business. There are two other aspects, the better use of water resources (17%) and protection from soil erosion (14%) which were also considered of some importance. Most of the responses provided by farms focus on innovations regarding the improvement of pruning operations (15%) and working conditions (13%).

Greece, Crete

The most important aspects for the farm that were indicated in the responses were **the maintenance and / or improvement of soil fertility (29%)** and the lower use of chemical products (23.4%). In general, the issues related to the use of plant protection products are particularly felt: in fact, in addition to

their lesser use, the need for rationalization and improvement of phytosanitary treatments appeared to be important (16.1%). Most of the answers given by farms focus on improving the quality of their product (23.8% of the answers). Another very important aspect is linked to the improvement of the phytosanitary aspects of the crop (16.9% of the answers).

Lebanon

As for the aspects that Lebanese farmers indicate as particularly relevant to their business, the **maintenance and / or improvement of soil fertility is indicated in 35%** of the answers. The second most important aspect is the limited use of chemical products (28% of the answers) which is strictly connected to the rationalization and improvement of phytosanitary treatments (13% of the answers). In 24% of cases, answers focus on improving the phytosanitary aspects of the crop, followed by the request for innovation relating to the improvement of pruning operations (18% of the answers) and the improvement of working conditions. (16%).

Jordan

For the Jordanian olive farms that participated in the survey, the aspect deemed most relevant to their activity is the **maintenance and / or improvement of soil fertility**, followed by the protection and best use of water resources and by the less use of chemicals. The prevailing interest mainly concerns economic objectives, aimed at increasing farm income. The farms believe they can achieve these goals through innovations aimed at increasing the production yields of olive trees and, in general, agricultural production and the containment of production costs.

Main results on the economic stakeholder analysis for Living Lab 2 on grazed woodlands, overview per country:

Italy, Sardinia

The most important aspects indicated by the farms point mainly to the **problems connected to the fertility of the soils (37% of the answers)**, of particular relevance is also the safeguarding of biodiversity (23% of the answers), the safeguarding of land from erosion (15%) and aspects related to the best use of water resources (15%). While most of the answers focus on innovations concerning the reduction of production costs (24%), two other important objectives are the development of new products (17%) and the improvement of working conditions (16%).

Greece, Crete

The aspects most often highlighted by the companies were the **maintenance and / or improvement of soil fertility (29%)** and the lesser use of chemical products (29%). Most of the answers given by companies focus on decreasing production costs (27% of the answers). The increase in product quality is indicated in 17% of cases.

Lebanon

As for the aspects that Lebanese farmers indicate as particularly relevant to their business, the **maintenance and / or improvement of soil fertility is indicated in 35% of the answers**. The second most important aspect is the reduced use of chemical products (28% of the answers) which is strictly connected to the rationalization and improvement of phytosanitary treatments (13% of the answers). Most of the answers focus on innovations regarding the reduction of production costs (35%), two other important objectives indicated are: the quantitative increase of production (18%) and the improvement of working conditions (15%).

Jordan

No questionnaires were completed in Jordan. Agroforestry is not a common practice in this country, where natural forests are protected and under the control of the Ministry of Agriculture and the Ministry of Environment in which animal grazing is not allowed: as such Jordan does not have grazed woodlands. Within LIVINGAGRO project, the consortium will in this case work for establishing new forests to introduce the grazed woodlands system or to re-habitat the existed forests and pasture rang lands by introducing new plants suitable for this purpose.

The full report will be available soon on the project website section “Library / Documents”.

#Catalogue of innovations: MAICh to develop it for olive multifunctional systems (Living Lab 1)

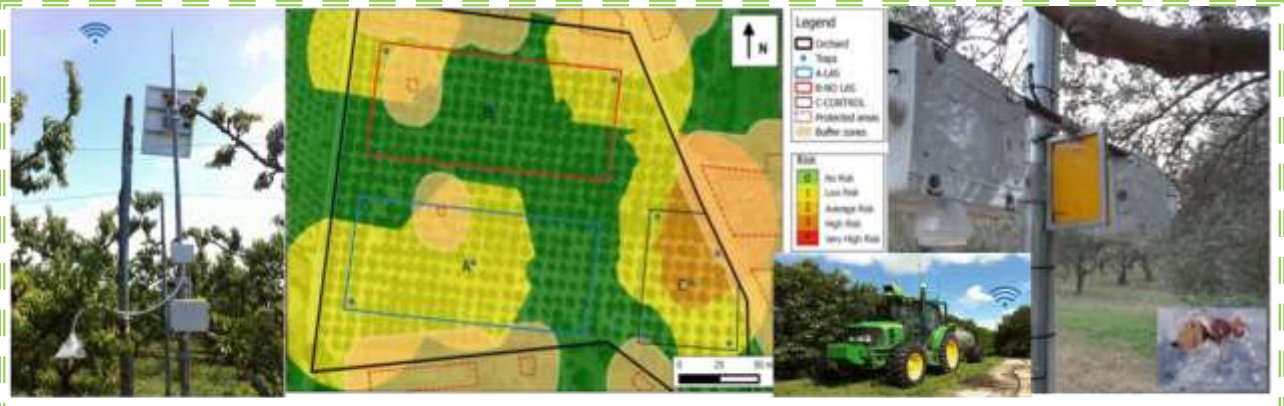
The LIVINGAGRO team at the Mediterranean Agronomic Research Institute of Chania (MAICh) in Crete, Greece, has made **good progress identifying innovations to be presented at B2B events to be organized in Greece, Jordan and Lebanon**, entering their descriptions in the **dedicated B2B catalogue** as soon as they will be selected by the partnership. The MAICh team has been considering the results of surveys from Greece and Lebanon, as well as email interviews with

stakeholders in the Greek olive oil sector and information from Dr. Peter Moubarak at the Lebanese Agricultural Research Institute, then **identifying innovations that respond to stakeholders' needs**.

In addition to identification and **capitalization of innovations** that are ready (or nearly ready) for real-world application developed within **research projects**, the MAICh team has been **reaching out numerous contacts in the olive oil sector and academia to inquire about more innovations**. Work continues on the catalogues and, while there will be considerably more to be done regarding agroforestry and grazed woodlands, the catalogues for olive multifunctional systems should be ready soon.

Innovations identified for Living Lab 1 (olive multifunctional systems) **range from** very practical applied solutions to farmers' day-to-day problems, to pioneering scientific developments. For example, the award-winning Cretan olive oil producer and inventor Eftychis Androulakis recently described two inventions that could be used in many olive mills: **a new washing and drying system that lowers the temperature of harvested olives** by 2 to 3 degrees Celsius, and **an olive depitter/crusher adapted to remove much of the olive peel**, containing no plastic or rubber parts and keeping the temperature stable. Both of these machines are likely to yield higher quality extra virgin olive oil that can bring producers a better price.

Another practical innovation is the **FruitFlyNet-ii automated monitoring and control system against the olive fly and Mediterranean fruit fly**, developed by a team including Professor Theodore Tsiligkiridis at the Agricultural University of Athens. **Part of another ENI CBC Med project, FruitFlyNet-ii is a sustainable, environmentally-friendly pest control system for olive**, citrus and peach orchards that can improve product quality and quantity by integrating the following for the first time: automatic real-time field data acquisition, an innovative e-trap, spraying, e-guidance and traceability.



FruitFlyNet-ii: Commercializing a Location Aware System of environmentally effective e-monitoring and ground spraying control solutions for Olive and Med fruit fly pests based on Living Labs innovations and startups enforcement.

In terms of cutting-edge scientific developments, two innovations from MAICh's own Department of Horticultural Genetics and Biotechnology can help various stakeholders interested in the **authentication of olive cultivars and olive oil**: Dr. Panagiotis Kalaitzis's **DNA-based diagnostic test** to accurately authenticate the varietal origin of olive oil, and Dr. Konstantinos Blazakis's **oliveID**, an **image-based tool to identify olive cultivars** based on a numeric analysis of the size, shape, and structure of olive leaves, fruits, and pits. The next step for oliveID is its implementation as a smartphone application.

#Researchstakeholders for Mediterranean grazed woodlands (Living Lab 2) successfully identified by CNR

In order to find similarities and complementarities among research outcomes coming from LIVINGAGRO countries, an **analysis of the research stakeholders in the field of grazed woodlands** was performed to a) develop a preliminary scenario of available innovations and b) identify potential participants to Living Lab 2, representing the scientific research sector.

The **selection of most relevant research outcomes in the last ten years** was carried out considering **scientific articles published in International Scientific Indexing (ISI) journals and citations for scientific literature collected from bibliographic databases of life science journals and online books** (Web of Science and Scopus database, Google Scholar, etc.). A preliminary list of almost 50 research articles on grazed woodlands (silvopastoral systems) is now available. Around 50 researchers, and their research organizations, universities and companies that have produced scientific papers and that were engaged in technological innovation, were listed. The analysis allowed the identification of innovations tested at an experimental level. **Many of the researchers and related papers identified arise from activities of recently concluded or ongoing projects** such as **AGFORWARD** an **REGENERATE**, which have also been taken in consideration for the development of the LIVINGAGRO Capitalization plan. Furthermore, on the basis of the list of researchers who have developed research and innovations in recent years in the field of agroforestry systems management, the conditions (motivation, interest, personal availability) for a direct participation of

researchers in the development of Living Lab activities were assessed. Moreover, **on January 28th 2021 a webinar on silvopastoral systems was held** on Zoom platform. **About 80 researchers attended** the webinar. The webinar **generated a discussion and highlighted innovations of national silvopastoral systems, with focus on LIVINGAGRO countries**. A first description of the main innovation needs in order to improve the economic efficiency and profitability for farmers (agronomy, zootechnical aspects, marketing, production system, etc.) was proposed and discussed.

Finally, **research stakeholders identified the following emerging innovations**:

1) *INNOVATIVE PRACTICES: LEGUME SOWING*
   - ✓ Mixtures for quality silvo-pasture;
   - ✓ Shade tolerant species;
2) *INNOVATIVE PRACTICES: GRAZING MANAGEMENT*
   - ✓ Virtual fences;
   - ✓ Adaptive grazing management;
   - ✓ GPS collars for animal tracking and precision grazing
3) *POLICY: Branding silvopastoral products*

FROM THE PROJECT PARTNERS – In this edition: news from the Lebanese Agricultural Research Institute (LARI, PP3)

LIVINGAGRO project lately entered in its 4th semester of implementation and preparatory as well as back-office activities do progress despite uncertainties caused by the COVID-19 pandemic. Within this short article we give you a more detailed overview of **what the Lebanese project team is working on in collaboration with the other partners** trying to compensate the delay accumulated partly due to the pandemic situation but also, equally problematic, to the economic crisis affecting Lebanon since several months by now. In the last months LARI's team was engaged with the progress of the tender for subcontracting an information and communication technology (ICT) **company to prepare the project ICT platform**. The platform will serve for data management, access to interactive services linked to the Living Laboratories (LLs) to be established, e-learning tools and will have many other functions ensuring the expected informative flows. Data to be included in the platform will be gathered by all partners involved as output of specific activities and they will be based on a georeferenced database back-end, front-end, and other optional services linked to the database. Moreover, LARI's team worked on the **preparation of a plan referred to the e-learning modules** and contacted several colleagues in the different LARI stations all over Lebanon to collaborate for the preparation of the e-learning modules each one according to his specialization. The modules to be developed will be available through the ICT platform and will benefit from all the

innovations and demonstration materials (i.e.: project deliverables) foreseen by the project. All **information will be combined and organized to achieve the e-learning modules** targeted to Universities, SME's, policy makers, agricultural engineers, technicians, citizens and other relevant stakeholders. A preliminary draft workplan of the field visits was prepared in order to allow researchers to conduct this activity as soon as the COVID-19 situation will improve in Lebanon and in the other partner countries. Within this activity lead by LARI, **a total number of 20 visits will be conducted in Italy, Greece, Lebanon and Jordan**. Researchers, following the signature of specific agreements, will visit farms and different kind of economic operators in order to assess specific needs for innovation, re-orient research towards satisfying firms' needs and assess the possibility of transferring ready-to-use innovations.

In parallel, the team followed the **progress of some field trials which already started in different regions of Lebanon**. The aim of these activities is to **test and develop innovative solutions for agroforestry in the grazed woodlands and olive multifunctional systems sectors** such as, for example, **IOT technologies** for agroforestry; instruments for **detection** of the most suitable **varieties also for intercropping**; **innovative food and non-food products,** adaptation of existing machineries (like tractors), **specific technologies for intercropping**, new **olive varieties ready for patent protection**, **selection of mixtures of resilient and arid resistant forage and grazing species** for multipurpose, **new lines and legume materials** etc.. In Aabde region (North Lebanon), a trial studying the **effect of different cover crops on soil characteristics and olive production** in "Baladi" olive orchards is ongoing. In addition, in Aabra region (South Lebanon) another trial **testing different soil management techniques in olive orchards** is also in progress. Moreover, many other trials such

as testing the intercropping of trees with forages, assessing the behavior of different olive cultivars in different climatic conditions in Lebanon, developing **innovative techniques to increase the green cover in semi-arid regions** and **assessing the use of extracts from olive leaves for preparing new food products** are under preparation. The different activities led by LARI are carried out in collaboration with research stakeholders such as the Lebanese University, Saint Joseph University (USJ), Notre Dame University (NDU), the American University in Beirut (AUB) and FAO; and many relevant economic stakeholders.

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