



# AFTER LIFE PLAN

LIFE REGENERATE (LIFE16 ENV/ES/000276)





After-Life Plan Life Regenerate



## After-Life Plan

**LIFE Regenerate - Revitalizing multifunctional Mediterranean agrosilvopastoral systems using dynamic and profitable operational practices**

**LIFE16 ENV/ES/000276**

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Prepared By	<i>Miguel Escribano, Gerardo Moreno, Paula Gaspar, José Luis Hernández, Ignacio Santa Regina, Begoña Lozano, Giovanna Seddaiu, Antonio Pulina, Sven Kallen, Nuria Borrás, Iván Franco, Juan José Pérez</i>
Contact person	<i>Miguel Escribano Sánchez</i>



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### Project description

The Quercus-based silvopastoral systems of the Mediterranean basin biome, like *dehesas* in Spain, *montados* in Portugal and *meriagos* in Italy, are of great social and economic importance in southern Europe, both for the ecosystem services they provide and for their role in maintaining the rural population in these areas. But these agroecosystems are in rapid decline.

Many anthropogenic and environmental factors challenge the survival and sustainability of these valuable ecosystems. Deficient tree regeneration, soil degradation, increased risk of wildfire, and biodiversity loss caused by the abandonment or intensification of land management reduces the profitability and compromise their persistence. This makes them more susceptible to pests and diseases and less resilient to the effects of climate change, such as prolonged periods of drought or extreme weather events.

As a consequence, it is estimated that these agrosilvopastoral lands have lost up to 20% of their value and continue to lose millions of euros in productivity each year. In addition, it has become increasingly difficult to generate

long-term profitability, due to the current production model's high dependence on external inputs resulting in high operational costs which prevent the sustainability of these systems.

The Life Regenerate Project during 5 years has been developing a wide range of activities with the general purpose of revitalize these silvopastoral systems: *dehesas*, *montados* and *meriagos*. These activities have been designed to improve soil and tree quality, increase biodiversity, apply multi-species rotational grazing practices, promote self-sufficiency in forage production and increase the reuse of biomass waste produced on-farm. In order to raise awareness on these issues, special attention has been paid to disseminating the progress and results of the project.

This project has been developed by a consortium of six partners: Universidad de Extremadura (Uex) (project leader), Consejo Superior de Investigaciones Científicas (CSIC/IRNASA), Fundación Naturaleza y Hombre (FNYH), IDForest-Biotecnología Forestal Aplicada S.L, Università degli studi di Sassari (UNISS) and Volterra Ecosystem S.L.



This project was co-financed by the European Union through the LIFE Programme



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### *The project aimed to:*

**Demonstrate that Mediterranean agrosilvopastoral systems can become self-sufficient and profitable based on resource efficiency principles and incorporating added value products, both at a demonstration and a larger scale.**

The project **specific objectives** were to:

- Combat the loss of natural regeneration and soil degradation in **100 ha of degraded silvopastoral areas** by providing **effective, mosaic landscape management** procedures and **improving soil quality**.
- Recover the practice of **multi-species rotational grazing**, adapted to improve natural capital, and optimize commercial advantages.
- Recycle biomass waste within the farm, **reducing external input of fodder** and creating **alternative sources of incomes**.
- **Replicate** the project's best practices to **5,000 ha in Spain, Italy & Portugal**, proving it is a representative, effective model.
- Integrate **new technologies and monitoring** of project advances
- Influence **policy-making** and **involve external stakeholders** to promote replication and long-term sustainability.

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The consortium foresees various improvements in the current management of these exploitations and believes that the integral approach will lead to a more profitable and sustainable exploitation of *Dehesa* and similar agro-ecological systems. Furthermore, the project will open up a variety of market opportunities for both land owners and project partners. It is expected that the landowners of pilot and replication farms will anchor the integral business model in their long-term strategy and will take advantage of the improved possibilities to commercialize the products that are produced within their farms.

LIFE Regenerate will be an excellent opportunity for the participating landowners to kick-start the transition to a more resilient and

profitable way of farming, forest management and livestock keeping. The commercial project partners will use the project outcomes for improved biomass reutilisation practices, Adaptive Multi Paddock (AMP) grazing and development of new marketable products and services (e.g., by adhering to brands such as land to market).

This document presents the actions that will be continued after the end of the project in order to advance in the work initiated and that can continue to give very revealing results thanks to the continuous monitoring and evaluation process. The partners have own resources that can be allocated to these actions and expect them to be successfully disseminated after the end of the project.



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### 1. Maintenance actions in Pilot Farm

#### 1.1. Pasture and crops

The rainfed pastures established for the implementation of the project in Muñovela experimental site will continue to be maintained and used by rotational grazing AMP. The use of irrigated grassland will be subject to a cost/benefit study to decide whether it is viable to continue using it or to use it for other crops.

UNISS will continue to provide technical advises on the selection of suitable pasture species for the oversowing of wood grasslands in order to improve the herbage quantity and quality and increase the probability of hay production in spring. In particular, in some paddocks that were included in the AMP scheme during the LIFE Regenerate project, an experimental trial will be likely established in

autumn 2022 or in autumn 2023 aiming to compare different mixtures of pasture species and assess their adaptation to shade conditions.

#### 1.2. Soil

The planning undertaken during the implementation of the project will be continued, with Keyline work continuing in autumn 2023 and 2024 in Muñovela. Soil microbial biomass and diversity in grazed vs ungrazed soils will continue to be sampled and analysed by phospholipid fatty acid technique for at least 2 additional years.

UNISS will contact (winter 2022 or spring 2023) some Italian experts of the keyline system who tested in Italy this system in several situations. UNISS will facilitate the interaction between these experts, the farmers who tested this system in order to explore further the possibility to try the keyline application.



#### 1.3. Liming and inoculation

Muñovela's technical staff will maintain regular communications with ID Forest staff, and coordinate to monitor annually the presence and evolution of inoculated material (*Tuber aestivum*, *Pisolithus tinctorius*) and its influence on tree health in collaboration with UEX.

In Elighes Uttiosos in spring 2023 the success of truffle inoculation will be assessed and if will be positive or at least promising, the farmer already decided to proceed with the inoculation of at least other 20 holm oak trees. UNISS will provide all the necessary expertise and the protocol to carry out the inoculation following what learnt during the LIFE Regenerate project.



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### 1.4. Tree regeneration and forest management

UNISS will provide technical support for the identification of more areas in the Elighes Uttiosos farm, especially in the mountain area, where holm oak planting can be effectively carried out and it is not in contrast with the farmer's needs to keep trees away in the more fertile and easily mechanizable areas. This will require the elaboration of maps of suitability, based on the information and data collected during the LIFE Regenerate project and possibly within other future projects, and informal meetings with the farmer and his sons.

The pruning plan established in the Management Plan of the project will continue (maintenance pruning will be done along eight years at the rate of 60 trees per year). Light pruning (olive pruning) will be carried out on the plots which are currently very dense and need to be thinned.

### 1.5. AMP grazing

Cattle and sheep flocks will continue to be managed under an AMP scheme in Muñozela experimental site. Turkey farming will not be continued, as their protection from predators cannot be guaranteed in areas without predator fencing. Cattle will be grouped into a single flock which will be rotated through all plots accessible to livestock.

This will extend the rotational grazing area used during the project from 20.75 ha to 34.92 ha. In addition, at certain seasons of the year, crop plots will also be included where stubble can be used once harvested, adding a further 10 ha, for a total of 44.92 ha.

In Elighes Uttiosos farm, the AMP will continue in the same areas included in the LIFE Regenerate project following the same protocol established and that it was fully incorporated by the farm in his management system. Moreover, the AMP will be started, likely in spring 2023, also in one farm unit that was not included within the actions of the Regenerate project, the Pischina Ruja area. An area of about 5 ha will be initially managed under the AMP system but the size of the AMP area may increase depending on the farmer's needs and future expectations. UNISS will provide all the technical support to expand the AMP area in the Elighes Uttiosos farm, and likely, in case the projects within the PRIN and the PRIMA calls will be successfully funded, also the financial support.

### 1.6. Composting waste from pruning

The pruning waste generated annually will be reused to make compost, which will be used on the farm's crops.

Communication will be maintained with VOLTERRA to assess the transfer of the Kontiki oven to make Biochar with the pruning waste generated in each pruning season.

**Actions Timeframe:** At least 2 years after project 's closure. All data collected will be regularly analysed during this period by partners involved.

**Partners involved in these actions:** Land managers (CSIC-IRNASA, NRD-UNISS) and commercial partners (VOLTERRA, IDFOREST).

**Funding foreseen for these actions:** All these actions will continue to be undertaken in Muñozela, always conditioned by the availability of technical staff in IRNASA from 1-8-2022 to 30-9-2024.



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## 2. Actions to maintain replication of best practices learned

In response to the results during the project and positive feedback from stakeholders, it is expected that replication of best practices and lessons learned from action B1 will continue after the project's closure.

Partners will use their own resources and seek other funds to offer a more competitive technology and support market uptake. We also expect that neighbouring farmers and landowners will become convinced about the added value of the integral approach and start transitioning as well.

UEX is funded with three research projects<sup>1</sup> that will support the adoption of some practices such as rotational grazing, legume-enrichment of pastures and biochar fertilization in a selection of the replication farms.

IRNASA- CSIC technical staff will maintain regular communications and visits with the replicators located in the province of Salamanca, and will follow the evolution of the different replication plans scheduled during the project, providing support and advice. In addition, it will coordinate with the rest of the project partners in charge of maintaining contact with the replicators in the rest of Spain, Portugal and Italy. Likewise, the IRNASA website will continue to provide information on the conclusions obtained at the end of the project, and on the different actions that will be developed during the duration of the Afterlife phase.

The He-Va Grass- Tiller subsoiler acquired by the project will be available for further use on the various replication farms, as well as by others interested in using it for key line design work. Moreover, other national or international projects that are currently developing Key Line actions in Spain and Portugal will be contacted<sup>2</sup>, in order to combine synergies and promote the dissemination and application of this technique.

To this end, a protocol of cession of use will be established between IRNASA and the different interested parties.

UNISS will maintain a strong interaction with all the replication farms involved during the LIFE Regenerate project. Some of the replicators are involved in some other activities that are promoted by UNISS and other institutions such as the School of Pastoralism ([www.scuolanazionalepastorizia.it](http://www.scuolanazionalepastorizia.it)) and the communication campaign "RuralWorlds" funded by the Region Sardinia ([www.reterurale.it/ruralworlds2022](http://www.reterurale.it/ruralworlds2022)), that represent a great opportunity for UNISS to further build trust with these farmers and to create conducive conditions for them to still be inspired by the LIFE Regenerate experiences and outcomes.

UNISS staff is also willing to follow in the next years the evolution of the different replication plans scheduled during the project, providing support and advice. In addition, UNISS will continue to report in its communication

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<sup>1</sup> **ADAP-TGA:** Nuevas tendencias en el manejo adaptativo de la dehesa: Conectando diversidad funcional, producción de pastos y flujos de carbono, PID2019-108313RB-C31, 2020-2023.

**RELIVE:** Back to Future: Reintegrating land and livestock for greenhouse gas mitigation and circularity; EU 2021 Joint Call: CIRCULARITY 2021; 2021-2024;

**RE LIVESTOCK:** RE-LIVESTOCK: Facilitating Innovations for Resilient Livestock Farming Systems; EU Horizon Program; 2022-2026.

<sup>2</sup>For example, EIT FOOD: The Regenerative Agriculture Revolution <https://www.eitfood.eu/projects/regenag-revolution>



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channels any relevant achievement on the different actions that are developed in the replication farms during the duration of the After LIFE phase.

Moreover, UNISS will attempt to explore further the opportunity to apply some actions that were not included in the replication plans because of constraints that might be overcome in the near future such as:

- Water supply and smart water point installation for the AMP implementation (e.g., Alinedu farm)
- Truffle inoculation (e.g., Su Gialdinu and Sa Traia)

The Life Regenerate project will continue working with the farms to demonstrate that with the implementation of the actions promoted from the project, the objectives of promotion and conservation of natural values intrinsic to the habitats, such as soil, waters, forest mass, associated fauna ..., etc., are achieved. The partner FNYH will be involved in line with the following up of the Campanarios farm, owned by FNYH. These farms are located in a large territory of Extremadura, Portugal and CYL, (Monfragüe-Tajo Internacional-Malcata-Vale do Cõa-Duero). The contact among FNYH and the farmers will be constant, the transfer of certain materials and components delivered during the development of the project, such as the electric fences, advice and help for its correct installation or subsequent handling.

In relation to the protection of natural regeneration, FNYH will provide advice for the correct installation (or reinstallation of shelters and protectors already delivered during the project), depending on the type and amount of livestock existing on the farm.

The IDForest team is committed to monitoring the executed inoculations in the replication farms. Therefore, IDForest will verify that the inoculations that have been carried out are progressing adequately. In this way, the IDForest technical staff will be in contact with the replicators, indicating the tasks they have to do, making field visits and providing materials to reinforce the inoculations, if necessary.

Finally, Volterra will keep providing technical support on tree health, especially on planting management and recycling of organic waste (biochar and compost) to interested landowners and stakeholders. These can be made thanks to Volterra's participation in the Life Mycorestore and Life Terra projects. Volterra will also keep track of the usage of biochar and tree plantings made during the project implementation by contacting the replicators involved in these actions.

Regarding the commercialization of products derived from the application of regenerative agriculture techniques, Volterra will help by serving as a bridge between current and future replicators and the most appropriate contacts of external stakeholders thereby helping them to improve their business opportunities.

**Timeframe:** 3 years after project's closure. During this period technical support will be adequately provided to interested stakeholders by partners involved.

**Partners involved:** All project members. Landowners of replication farms will be consulted about their willingness to participate in the Afterlife: the experience in Life Regenerate prove the best incentive to secure a long term continuation of project activities.

**Funding foreseen for these actions:** research projects funding by open calls, own funds from the partners, the public institutions will collaborate with private farms through other national and international initiatives to support the adoption of more practices and surfaces by farmers.





### 3. Actions to maintain the interactive platform

After the conclusion of the project, the application will remain free and available on the project's website for those who are interested. After filling in the form it provides a document that serves as a guide for users to get a general idea of what they could do, what it might cost them and what they could potentially gain from it. It also provides the link to the best practice guidelines to serve as a basis for them to start implementing the most desirable regenerative agriculture practices. For those who need further technical support on their farm, contact details are also provided. Finally, the application also has a video on how to use the application, which has helped to spread it.

To make regenerative agriculture accessible to users and keep engaging interested stakeholders in regenerative agriculture, the consortium commits to keep the Regenerate App running for at least 3 years after the project's closure or more if usage justifies. As the App's maintenance costs are very low, we do not foresee any issues with that. The information provided in the final report will continue to be improved and its use in social networks will continue to be promoted. Technical support will also be an important pillar. For this purpose, the following actions are foreseen to be taken in the next 3 years.

#### 3.1. Improve final report information

It is considered relevant to include in the final report received by the user the access links to the Business Plan and the Transfer Plan. This will help the user to have a more global vision of the market model and will complement the economic information described, also providing certain business recommendations. By also including the link to the White Paper we hope that users will be motivated and feel identified in the transition by reading the case

studies. This information is expected to be updated in the next 6 months, once partners exclude sensitive information from their project's deliverables.

#### 3.2. Dissemination for its usage

The consortium commits to spreading the project app usage by talking to landowners and farmers interested in regenerative agriculture. Additionally, several posts will be done over the next 3 years on the Regenerate social media to keep the app alive and also in Volterra's website and social media channels.

#### 3.3. Technical support

In addition to that, the consortium is also committed to keep following up with any contact that comes through the application to help interested farmers have more detailed information and better implement the suggested activities in their farms.

Users can contact to the details provided in the Regenerate application report (i.e. UNEX contact) and depending on the technique to be treated, the contact of the project beneficiary expert in that technique would be provided. For example, for soil amendments and biochar, Volterra can be contacted.

For inoculation issues IdForest or for keyline or rotational grazing UNEX and IRNASA will provide relevant expertise. It is important to mention the existence of an exclusive section in the Replication/Transfer plan with a long list of relevant stakeholders to scale regenerative agriculture that can be accessed by any interested replicator. This support will be provided for at least three years after project closure.



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**Timeframe:** 3 years after the project's closure

**Partners involved:** All partners

**Funding foreseen for these actions:** partners will use their own resources as the resources needed are very low.

### 4. Future actions related to monitoring of environmental and economic indicators

The land managers for each site, assisted by the scientific partners, will continue applying the methods and techniques used to monitor the impact of the innovative practices on key indicators with a focus on the feasibility of the integral management system. Muñozela's technical staff, assisted by IRNASA scientific staff will continue applying the methods and techniques used to monitor the project's impact on key indicators in Muñozela's demonstration farm.

Uex will continue with the monitoring of economic and environmental indicators in the demonstration farms and practices such as rotational grazing, legume-enrichment of pastures and biochar fertilization in a selection of the replications farms thanks to the incorporation of the abovementioned projects

(ADAP-TGA, RE-LIVE and RE-LIVESTOCK)<sup>3</sup>.

The indicators that will be monitored will be those related to: Land Use and Cover, Forestry, Forage resources, Soil, Biodiversity, Livestock Management, Livestock Production and reproduction, Livestock Health, Other products, Economic Data, Carbon footprint.

The monitoring frequency and its duration will depend on the budget availability of the partners involved, with a target time horizon of 2 to 3 years from the end date of the project.

Additionally, if replicators allow future monitoring data will become available this will be published directly on the project website

**Timeframe:** 2 to 3 years after project 's closure

**Partners involved:** UEX, IRNASA-CSIC, UNISS.

**Funding foreseen for these actions:** partners will use their own resources, projects ADAP-TGA, RE-LIVE and RE-LIVESTOCK and seek for other funds to maintain monitoring activities.

### 5. Actions aimed to continue dissemination and the maintenance of interactive platform

Several dissemination actions are expected to be carried out at regional, national and

European levels following three pillars: Inform, Involve & Monitor.

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### 5.1. Inform

Disseminate the projects' purpose, aims and outputs to reach a broader audience, outside the project boundaries, using the material compiled during the project (Layman's Report, White Paper, Best Practice Guides, Project Website, Socioeconomic Impact Assessment, Business Plan, Replication/Transfer Plan, etc.). These actions will start to take place once partners exclude sensitive information from their project's deliverables.

### 5.2. Involve

Encourage new landowners, farmers, public bodies managing farms and other stakeholders to adopt the Regenerate practices.

### 5.3. Monitor

Beyond the boundaries of the project the Consortium has established a strong network of landowners, NGOs and other stakeholders that are committed to continuing with Regenerate techniques in their areas as well as disseminating and communicating the implemented sustainable management practices. Furthermore, the project results are available online on the project website that can be used for future up-take of these practices.



Dissemination of results will continue beyond the project's lifetime because groups of students

(from degrees, doctoral and master's programmes) and professionals of the agricultural sector visit Muñovela every year. Scientific partners will be keen to further publish results after long-term monitoring at peer review magazines and conferences. Monitoring results will be published on the project website.



- As dissemination partner, Volterra will keep the project's website ([www.regenerate.eu](http://www.regenerate.eu)) and social media active for at least 5 years. Focusing on disseminating those documents and technical materials resulting from the project (Layman's Report, White Paper, Best Practice Guides, Business Plan, Final Report, Project Website, etc.) not only on social media and other websites but also among new landowners and stakeholders from the sector. These documents will also be disseminated through the existing replicator's email list.
- With the objective of generating a large-scale impact, especially from a policy-making point of view, the consortium will disseminate the project's results, lessons learnt and most important deliverables with their own contacts from the main agriculture authorities, unions and operation groups.
- Volterra will also keep promoting the manuals and other relevant project information on its own website as well as social media channels, as had been doing during the project, particularly on Instagram.



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- Inform and involve new landowners and stakeholders about Life Regenerate and encourage them to apply some of its techniques, if appropriate. Some new contacts have already been made, for example with Finca Alía in Cáceres, Extremadura (200+ ha uptake of rotational grazing and in other areas application of keyline and agroforestry).
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  - IDForest will work on disseminating the results of the project. This dissemination will be done through their social networks, through talks at different scientific-technical meetings, with forest owners and with administrations
- IDForest has many contacts in the forestry sector, and for this reason, we want to start using these results to implement the techniques in other farms.
- In addition, this project has shown IDForest that fungi generates an enormous interest in an ecosystem such as the dehesa. For this reason, this project (and its results) can be useful to IDForest as a cover letter to generate new projects based on the techniques used in it.

**Timeframe:** Through the AFTER-LIFE Plan, project partners will disseminate the results of the Regenerate project during at least the following 3 years after project 's closure (the project web site will remain open and regularly updated with relevant news at least 5 years) using their own resources.

**Partners involved:** All partners

**Funding foreseen for these actions:** In response to the results during the project and positive feedback from stakeholders, partners will use their own resources and seek other funds to offer a more competitive technology and support market uptake.

**Total Budget:** 2,209.203€

**EU financial contribution:** 1,306.117€

**Project duration:** 4 years and 10 months (01/09/2017 - 30/06/2022)

**Contact:** [info@regenerate.eu](mailto:info@regenerate.eu)