**LIFE**
**Climate Change Mitigation**

# Deliverable F.4: After LIFE Plan

**Reporting Period: 16/07/2015 – 30/10/2020**

**LIFE CLIMATREE (LIFE14 CCM/GR/ 000635)**

A novel approach for accounting and monitoring carbon sequestration of tree crops and their potential as carbon sink areas

The **LIFE CLIMATREE** project "A novel approach for accounting and monitoring carbon sequestration of tree crops and their potential as carbon sink areas" (LIFE14 CCM/GR/000635) is co-funded by the EU Environmental Funding Programme **LIFE Climate Change Mitigation**.

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**Participating Beneficiaries:**

University Research Institute
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## 1. Overview of the LIFE CLIMATREE Project

LIFE CLIMATREE aims at evaluating and demonstrating climate change mitigation potentials of tree crops' cultivations. This requires comprehensive and robust investigation of the link between orchards and atmospheric $CO_2$. This link is the target of LIFE CLIMATREE, attempting a holistic approach which takes into account what actually occurs within the farm. The annual change in $CO_2$ related biomass, the $CO_2$ storage in soil as well as the $CO_2$ emissions due to the applied cultivation practices are all systematically evaluated. In this context, the biological cycle of the trees is examined in combination with a Life Cycle Assessment of the currently applied as well as of alternative "green" agricultural practices. The mitigation rich cultivation practices are, then, identified and their $CO_2$ mitigation potentials are demonstrated.

This is an essential contribution to design coupled agricultural – climate policies. Such policies can be facilitated by the carbon farming schemes as defined within the new CAP. Furthermore, voluntary $CO_2$ markets and ecolabeling schemes can be also undertaken to exploit the mitigation potentials of orchards. To support such initiatives, LIFE CLIMATREE assigns economic values to the $CO_2$ sequestration by tree crop farms, considering that it is an essential ecosystem service provided by farmers. Finally, the benefits of sustainable tree cultivation are identified to demonstrate the total contribution of "green" cultivation practices. LIFE CLIMATREE defines the significance of the mitigation potentials of tree cultivation, which can significantly contribute to tackle climate change.

## 2. Goals of the After LIFE plan

During the After LIFE period of the project, a focus on the following priorities will be given:

- Updating and developing of new data regarding carbon sequestration and cultivation practices of tree crops
- Geographic expansion and transfer of LIFE CLIMATREE's methodology to other EU areas
- Incorporation of mitigation objectives within the new agricultural policy
- Stimulation of a $CO_2$ Voluntary market
- Changing farmer's behavior
- Testing of the $CO_2$ Removal Capacity Algorithm – $CO_2$RCA and the $CO_2$RCCT ($CO_2$ Removal Capacity Calculation Tool) e-tool
- Economic evaluation trading-off carbon sequestration with market goods
- Capitalization of LIFE CLIMATREE results in Future Research Prospects
- Updating and maintaining of all project's communication channels (website, facebook, twitter)
- Updating and further developing dissemination material
- Continuing networking and further dissemination actions related to the project results

## 3. Detailed After LIFE activities

### 3.1. Updating and developing of new data regarding carbon sequestration and cultivation practices of tree crops

CLIMATREE created opportunities for, and identified certain gaps inhibiting, the exploitation of mitigation potentials of tree crops. The after-LIFE plan emerges as an inherent component of CLIMATREE seeking the actual exploitation of these mitigation potentials while at the same time envisages actions to deal with the persisting gaps in this direction.

CLIMATREE attempted a stride on developing a comprehensive methodology for evaluating the $CO_2$ balance of tree cultivations. To strengthen this novel methodology, within the after-LIFE period several tasks to create new data concerning $CO_2$ balance under different conditions, including different cultivation methods have been designed. Experiments have also been designed with new cultivations under different practices. These practices are incorporating alternative "green" cultivation practices which were examined within the project. These experiments will be carried out by Prof. Petros Roussos, AUA and will be supported by Hellenic Agricultural Organization (HAO) which provide soil sampling in order to estimate SOC changes in these cultivations. These activities will be financed by own resources of UEHR. The outcome of this task will be the creation of new data under controlled conditions. These data will enrich the novel methodology and support its calibration and validation.

### 3.2. Geographic expansion and transfer of LIFE CLIMATREE's methodology to other EU areas

A major after LIFE activity is the expansion of the geographical area of application of CLIMATREE methodology. In this context, the project has been presented in countries of the Mediterranean zone, mainly Tunisia and Morocco, an initiative that took place at the 2nd Euro-Mediterranean Conference for Environmental Integration (EMCEI-2), in Tunisia (10-13 October 2019) where LIFE CLIMATREE was presented to the countries of the Southern Mediterranean zone. Potential partners have been identified during this conference and afterwards. Unfortunately, the outbreak of the COVID-19 pandemic inhibited the close cooperation with stakeholders from these countries. Just one step towards this direction is the presentation of the final outcomes of LIFE CLIMATREE at the 3rd Euro-Mediterranean conference. Note that these countries present serious potentials, taking into account their large areas of olive cultivations. The expansion effort expenses will be covered by each beneficiary takes part in dissemination and demonstration events.

### 3.3. Incorporation of mitigation objectives within the new agricultural policy

A major challenge in the after-LIFE plan is the incorporation of mitigation objectives within the new agricultural policy. The findings of LIFE CLIMATREE can feed the design of ecolabeling and carbon farming schemes. Such initiatives are obligatory under the umbrella of the new Common Agricultural Policy (CAP) and up-to-date there is a substantial gap in the knowhow to implement these schemes, especially in the Mediterranean area. LIFE CLIMATREE developed methods for evaluating and certifying the $CO_2$ absorption potentials of tree cultivations. These methods can support the application of carbon farming schemes. Towards this objective, LIFE CLIMATREE established a consultation/ communication channel with the Greek Ministry of Agriculture and certain Deliverables of LIFE CLIMATREE have fed the negotiations between Greek Agricultural Authorities, DG-AGRI, European Parliament and Commission. In the after-LIFE period, this consultation process will be intensified and the knowhow of LIFE CLIMATREE will be used for the design of carbon farming schemes. LIFE CLIMATREE will seek the cooperation of all the Mediterranean EU countries towards the development of a common scheme of carbon farming initiatives in order to exploit mitigation potentials. The major findings of LIFE CLIMATREE are going to be presented to a group of the European Parliament, working on the new CAP. In collaboration with Mr. Castro, an Italian member of the European Parliament, the relevant meeting will be organized.

### 3.4. Stimulation of a $CO_2$ Voluntary market

LIFE CLIMATREE's developed methodology has the potential to stimulate private, close to market, initiatives. Voluntary $CO_2$ markets emerge as a prominent initiative with perfect timing under the rationale of the Paris Agreement. LIFE CLIMATREE beneficiaries have established close negotiations with private and public stakeholders in Greece and Italy in order to delineate the comprehensive voluntary market potentials. Private banks, agricultural consultants and insurance companies are among the participants. In this context, potential buyers have been contacted to participate in the design of the voluntary market. The identification of buyers is an essential step towards the development of the voluntary market. The identification of buyers under the constraints imposed by the COVID-19 pandemic caused delay in the realization of the voluntary market. For example a big aviation company in Europe had agreed to act as a buyer however the economic impacts of the pandemic forced this company to withdraw its interest, at least temporarily. Fortunately, potential buyers from other sectors are now negotiating to join this mitigation action. Regardless of the constrains imposed by the pandemic a voluntary market project is designed to be launched by 2022.

### 3.5. Changing farmer's behavior

An essential part of the after-LIFE Plan is the effort to influence the "behavior of farmers" in order to adopt mitigation rich cultivation practices. Changes in behavior can be induced through the provision of knowhow indicating the characteristics and advantages of mitigation rich cultivation methods. Towards this direction, LIFE CLIMATREE is currently designing an education program for farmers and agricultural consultants. The program is being developed in collaboration with the Hellenic Agricultural Organization. The Education Department of HAO will incorporate within its official education program the mitigation rich practices. This program wishes to reach 5,000 farmers and 300 agricultural consultants in Greece. The whole procedure has been substantially supported by Prof. S. Haroutounian who is currently the President of HAO. Similar initiatives are traced in Italy and Spain where CSIC is designing an online virtual program of education.

### 3.6. Further testing of the $CO_2$RCCT ($CO_2$ Removal Capacity Calculation Tool)

The comprehensive communication with farmers will create room for the dissemination of the e-tool and permit its further testing by farmers. The constraints imposed by the pandemic inhibited the testing of the developed e-tool by the farmers to the extend originally foreseen, since this had to take place during the last months of LIFE CLIMATREE when the e-tool was fully operational. Thus, the dissemination of the tool to the farmers and consequently its further testing will be among the After LIFE activities exploiting towards this direction the existing, as well as new, communication channels with farmers. Towards this objective the Hellenic Association of Young Farmers has been already contacted to communicate the tool to its members. Similarly, CSIC and UNIBAS will organize testing in Spain and Italy with farmers groups in Murcia and Basilicata. Especially in Spain, during the next field campaign (2021) the e-tools will be used again by interested growers located within the region of Murcia and Valencia. For almond trees, the experimental farm "Las Dehesillas" located in Cieza will apply the tool in their mature almond orchard. For citrus trees, in Valencia "SAT Baviera" in Torrente (Valencia) will use the tools to assess the citrus trees $CO_2$ sink potential in different orchard types. No additional funds are required for the support of this activity since all project beneficiaries will be available to e-tool users.

### 3.7. Economic evaluation trading-off carbon sequestration with market goods

LIFE CLIMATREE attempted to assign economic value to the $CO_2$ sequestration, being a regulating Ecosystem Service. This value is of significant policy and scientific relevance. In order to reach out policy makers and scientists a paper is going to be published on the *Journal of Sustainable Production and Consumption*. This paper, under the title "Managing tree-crops for climate mitigations. An economic evaluation trading- off carbon sequestration with market goods" has been accepted and is going to be published within 2021. It is worth mentioned that

this paper presents, first time in international literature, estimates of the $CO_2$ sequestration – mitigation from agricultural land.

### 3.8. Capitalization of LIFE CLIMATREE results in Future Research Prospects

The realization of the mitigation potentials depends on the behavior of farmers. In order to investigate further the conditions that may induce farmers to adopt mitigation rich practices LIFE CLIMATREE will participate in a forthcoming proposal under the HORIZON 2020 "Building a low-carbon, climate resilient future: Research and innovation in support of the European Green Deal (H2020-LC-GD-2020)". The NORMS (inNOvative Research & engageMent Strategies to understand and provoke behavioral, cultural and social changes necessary to make Green Deal the new norm) project examines the environmental behavior of several stakeholders with farmers keeping a significant role among them.

Furthermore, LIFE CLIMATREE together with the beneficiaries of LIFE OLIVE4CLIMA project are drafting a LIFE proposal for the LIFE 2021 call concerning the certification and the standards of carbon farming schemes. This new project aims at developing a certification process for the CO2 sequestration and by using this certification to develop an extensive mitigation project in the Mediterranean. Such mitigation action foresees the development of new plantations in abandoned land, the renewal of existing but abandoned tree areas as well as the adoption of mitigation rich cultivation practices as those defined in LIFE CLIMATREE and in OLIVE4CLIMATE.

Finally, an activity within after LIFE is potentially the initiation of the LIFE CARECROPS project, under the condition of its approval, which addresses certain gaps identified by LIFE CLIMATREE. LIFE CARECROPS was submitted by beneficiaries of LIFE MEDINET and LIFE OLIVE4CLIMA projects. This collaboration highlights the active and essential networking among LIFE CLIMA projects in the Mediterranean.

### 3.9. Updating and maintaining of all project's communication channels (website, facebook, twitter)

Given the potential of the Internet and social networking to disseminate environmentally-oriented messages and their high level of penetration in people's everyday lives, it is imperative to maintain and frequently update both the Project's website and its social media accounts. The Project's website and its social media accounts will be kept online for at least five years after the Project ends. Both the website and the social media accounts will be regularly updated. As a result, users will be kept informed about the latest research findings, and generally about any news and progress made after the end of the Project. This activity will be implemented by the Project beneficiaries and will not be dependent on external factors. Apart from the costs incurred for the development and hosting of the website (even after the Project end), the maintenance and updating of the Project's website and social media accounts will be covered by own resources of TERRA NOVA.

### 3.10. Updating and further developing dissemination material

In order to communicate LIFE CLIMATREE findings and to influence policy makers and scientists, a comprehensive paper incorporating all the achievements of the project will be drafted by UEHR. This paper will incorporate agronomic, chemical, computer and economic findings and demonstrate mitigation potentials of tree cultivations. Regarding the behavioral change of farmers towards climate-friendly agricultural practices, a broad campaign with agricultural-oriented mass media will be implemented. The agricultural newspaper "Ypaithros Hora" has already published 5 articles indicating the advantages of mitigation rich practices. A significant milestone in this series will be the incorporation of the Layman's Report in a near future edition of "Ypaithros Hora". A hard copy of the Layman's Report will be also distributed with some newspapers. This is expected to permit a broad dissemination of LIFE CLIMATREE findings with special emphasis on mitigation rich practices.

Furthermore, the outcomes of the project and specifically the $CO_2$ Removal Capacity Algorithm, the $CO_2$ Removal Capacity Calculation Tool, its results and the respective analysis and conclusions will be presented in EFITA 2021 International Conference.

Finally, 3 papers are already being prepared to be published in Elsevier Journals presenting the $CO_2$RCA and $CO_2$RCCT outcomes as well as the importance of the contribution of the fruits' biomass in tackling Climate Change.

### 3.11. Continuing networking and further dissemination actions related to the project results

The enthusiastic feedback by various policy makers and stakeholders to whom the $CO_2$RCA and the $CO_2$RCCT were presented, prove its capability to be used as an important decision-making support tool that will provide to decision makers the necessary data to plan efficient climate change mitigation strategies, enhancing simultaneously the agricultural sector by promoting "greener" cultivation practices. Towards this direction the communication that has already been initiated with the Hellenic Ministries of Environment and Agriculture as well as with EU DG AGRI, DG CLIMA and DG ENV, will be maintained.

Additionally, results of the $CO_2$RCCT will be provided to the Hellenic Association of Young Farmers, as it was requested by them, to assist them formulating arguments to their members for adopting "green" cultivation practices.

## 4. Conclusions

The comprehensive after LIFE plan wishes to contribute to the actual exploitation of mitigation potentials of tree crops. The know-how developed within LIFE CLIMATREE is streamlined to influence the forthcoming CAP, to establish nongovernment mitigation projects and to induce changes in farmers' behavior. Furthermore, the after-LIFE plan addresses the remaining gap in a transparent way with concrete future actions. As a result, the findings of LIFE CLIMATREE are fully exploited in policy making and inspiring future activities. The sustainable of LIFE CLIMATREE's achievement is hence ensured.

Needless to say that all the after LIFE activities will be supported by the maintenance of the LIFE CLIMATREE website as well as by the open access to the e-tools and the model developed within the project.