After Life Plan

Close-to-nature forest
sustainable management
practices under climate changes

LIFE SySTEMiC - LIFE18ENV/IT/000124

Table of Content

THE LIFE SySTEMiC PROJECT

In 2018 the LIFE Programme, the EU's funding instrument for the environment and climate action, offered the opportunity to present projects that further develop and deepen the topic of forest monitoring by providing all the relevant data they can generate for current or future European forest information systems. In addition, it called for effective and efficient application of tools, methodologies, techniques, technologies and equipment to implement close-to-nature forest management approaches and similar silvicultural alternatives to more intensive forest management and/or management approaches based on planted even-aged and single-species stands. The impact of climate change on forest systems is recognised worldwide and its effects are increasingly visible in European forests. Nowhere is this more evident than in the Mediterranean region, where rising temperatures and the increasing frequency of extreme events such as storms, heatwaves and prolonged droughts pose a significant threat to forest ecosystems. These negative effects of new challenges for Sustainable Forest Management (SFM) required innovative approaches to protect and preserve forests as vital natural resources.
The genetic diversity of forest tree populations has a crucial role in ability of forests to cope with climate change and other threats. Genetic diversity serves as the foundation for the long-term evolutionary processes that enable forests to maintain their adaptive potential in the face of environmental changes.
In this context, the LIFE SySTEMiC project (Close-to-nature foreSt SusTainablE Management under Climate Changes) is providing important information and strategies for more effective conservation of genetic diversity of tree populations in forests.

Objectives
The general aim of the LIFE SySTEMiC project is to use the "tool" of genetic diversity to help our forests in times of climate change. The basic idea is relatively simple: the higher the genetic diversity of trees in forests, the more likely it is that some trees will have genetic characteristics that make them more adaptable to a rapidly changing climate, thereby increasing the resilience of the forest ecosystem.
Based on these premises, the main project objectives have been to:

1. Investigate the relationships between forest management and genetic diversity for eight forest tree species in three European countries (Croatia, Italy, Slovenia) to identify the silvicultural systems that maintain high levels of genetic diversity.

2. Develop an innovative Genetic Biodiversity and Silvicultural model (GenBioSilvi) based on the combination of advanced landscape genomics, applied genetics, and silvicultural models to support SFM.

3. Disseminate the knowledge about the method across Europe and to transfer its use into forestry practice by involving different types of stakeholders.

Forest owners, forest managers, national, regional, and local forest offices, academic and research institutions, forest certification schemes, and all institutions and organisations involved in forest management, protection and biodiversity conservation are the main beneficiaries of the GenBioSilvi tool.

Main results
The most important results are summarised in this chapter. They are categorised by species. However, the detailed results are reported in the project outputs, such as Handbook for sustainable forest management, Guidelines on sustainable forest management for all in project analysed tree species and other deliverables, that are available on the project website (https://www.lifesystemic.eu/).
Forest structure and landscape genomics have been analysed, for each of the eight selected species. Soil biodiversity and the influence of browsing* were studied in Beech and Silver fir stands, respectively. Demonstration cuttings for SFM were done in some Italian sites of Beech, Stone pine and Silver fir. We also tested the GenBioSilvi model for all eight species and performed felling on selected stands to test the influence of forest management measures on genetic diversity of forest stands. As a result of the project, recommendations for forest management** for each of the eight species have been prepared. We present short findings for each forest tree species below.
*Browsing: The impact of ungulate browsing on different species and growth stages of forest trees varies significantly. Young forests, particularly during early growth stages, often face heightened browsing pressure, severely affecting the survival and growth rates of tree saplings. Species such as oak and beech, more resistant to browsing, might withstand this pressure better than fir and pine, which are more susceptible.
Recommendations for forest management: Knowledge of genetic variability from an adaptive perspective can improve forest management decisions and anticipate assisted migration efforts *. This is crucial for preserving Forest Genetic Resources (FGR) and enriching stands with favourable genotypes, ensuring forest resilience and genetic diversity.
***Assisted migration involves humans moving tree species to new areas where the climate and environmental conditions are more suitable for their growth and survival, usually due to climate change affecting their native habitats.

Silver fir - *Abies alba* Mill.

Forest structure, deadwood and tree-related microhabitats
Forest structure diversity was high in the old-growth stand followed by uneven-aged and even-aged stands. The total volume of deadwood ranged between 14 m^3/ha and 426 m^3/ha. The old-growth stand had the largest amount of deadwood (426 m^3/ha). Cavities and epiphytes were the most common forms of microhabitats in all sites, except site Leskova dolina (Slovenia), where the most frequent forms were deformation / growth forms and injuries and wounds.

Landscape Genomics
The results of the Genotype Environment Association (GEA) analyses showed that the basal adaptation genotype of Silver fir could spread in the Central European range. Analysing the pattern of genetic diversity distribution, we observed that Silver fir stands managed according to individual tree selection have a complex and heterogeneous spatial genetic structure.

Browsing
Despite the noticeable effects of ungulate browsing on natural regeneration structure and composition, no significant genetic effects were detected. Genetic diversity did not differ significantly between adult Silver fir trees and their regeneration, whether in fenced or unfenced plots.

GenBioSilvi model
In Silver fir stands, we observed that in unmanaged or old-growth forests biodiversity is preserved and sometimes even increased. In individual tree selection forests biodiversity is conserved by mimicking old-growth conditions and promotion of natural regeneration, thus enhancing genetic diversity and improve climate change adaptation.

Demonstration cuttings for Sustainable Forest Management
In 2021, a thinning from below was carried out in site Faltelli (Italy) to reduce tree density and improve the stability of the stand.
In 2021 the individual tree selection system was applied in site Tre Termini (Italy) to favour the growth of the natural regeneration already present in the stand and to improve forest stand complexity.

Recommendations for Sustainable Forest Management
Knowledge about the influence of forest management on genetic variability of tree species can improve forest management decisions and anticipate assisted migration efforts. For Silver fir stands, the individual tree selection forest management practices are recommended, which are associated with populations having a high probability of adaptation.

Beech - *Fagus sylvatica* L.

Forest structure, deadwood and tree-related microhabitats
Forest structure diversity was high in the old-growth stands, followed by uneven- and even-aged stands. The total volume of deadwood ranged between 5 m^3/ha and 420 m^3/ha. The old-growth stands (sites: Fonte Novello, Italy, and Rajhenavski Rog, Slovenia) had the largest amount of deadwood (329 m^3/ha as an average value). The frequency of the tree-related microhabitats differed a lot between studied sites, but cavities were common in the majority of the sites.

Landscape Genomics
Genetic analyses indicated a high number of specific allelic variants in unmanaged sites and old-growth forests. The creation of gaps in forest cover and the complexity of structure characterizing these stands could be linked to a higher probability of gene recombination between genotypes belonging to different family clusters. These patterns are like those found in old-growth forests and unmanaged populations. Less impactful management types, such as individual tree selection, appear to report a population with a high number of allelic variants associated with bioclimatic indicators. Similar results have been observed in unmanaged stands and old-growth forests.

Soil biodiversity
The short-term effects of individual tree removal included decreased species richness and a lower diversity of ectomycorrhizal fungi on the remaining trees' roots. However, the overall fungal community's richness and diversity were unaffected.

GenBioSilvi model
The results of the GenBioSilvi model indicated that unmanaged and old-growth forests conserved and increased biodiversity. Managed sites with individual tree selection forest management practices showed similar biodiversity levels.

Demonstration cuttings for Sustainable Forest Management
In 2021 the individual tree selection system was applied in sites Baldo's Forest (Italy) and Pian dei Ciliegi (Italy). In Baldo's forest, the growing stock volume per hectare before and after the cut was 363 m^3/ha and 300 m^3/ha, respectively. In Pian dei Ciliegi stand, the growing stock volume per hectare before and after the cut was 341 m^3/ha and 296 m^3/ha, respectively.

Recommendations for Sustainable Forest Management
Project results show that knowledge about the influence of forest management practices on genetic variability of beech can improve forest management decisions and anticipate climate change adaptation efforts such as assisted migration of beech populations within its range.
In beech forest stands less impactful management practices are recommended, such as individual tree selection system, which are associated with populations having a high number of allelic variants in response to bioclimatic indicators. Similar results have been observed in unmanaged stands and old-growth forests.

***Pinus* spp. (Black pine - *Pinus nigra* J.F. Arnold., Stone pine - *Pinus pinea* L., Maritime pine - *Pinus pinaster* Aiton)**

Forest structure, deadwood and tree-related microhabitats
Analysed Stone pine and Black pine stands were managed as even-aged stands. Maritime pine site was managed as irregular shelterwood system.
In the Stone pine stands, the total volume of deadwood ranged between 6 m^3/ha and 20 m^3/ha.
Black pine stands had an average volume of deadwood of 21 m^3/ha. In the Maritime pine site, the amount of deadwood was 42 m^3/ha.
The deadwood was the most common form of tree-related microhabitats in Stone pine. Deadwood, epiphytes and injuries and wounds were common in the Black pine stands. Cavities, injuries and wounds and other forms of microhabitats were almost equally represented in the Maritime pine site.

Landscape Genomics
The global analysis of the Genotype Environment Association (GEA) analyses allowed us to identify possible patterns of adaptation to the bioclimatic conditions that characterize the range of pine populations. The results of the analysis showed the existence of three different clusters for Stone pine, and four clusters for Black pine.

GenBioSilvi model
The results are based on indicators including genetic diversity, forest structure, deadwood, and tree-related microhabitats. All sites exhibited simplified spatial genetic structures. However, we observed high genetic diversity associated with genes involved in responding to abiotic stress.

Demonstration cuttings for Sustainable Forest Management
In 2022, the clear cutting was carried out in the Stone pine site Terminaccio (Italy). Instead, in the Stone pine site Fossacci (Italy) two experimental cuts (uniform shelterwood system and group selection system) were carried out as an alternative to clear-cutting. The uniform shelterwood system was applied to favour both pine regeneration already present in the stand and new renewal growth. The group selection system was carried out to favour the transition from even-aged to uneven-aged structure.

Recommendations for Sustainable Forest Management
For pine species, which have been studied within the project, and which typically show low level of biodiversity (except for Black pine) forest management practices that increase forest stand complexity with a multi-layered vertical structure are recommended. Diversification of silvicultural approaches and promotion of age-diverse stand structure facilitate pollen dispersal, promote genetic diversity, and increase new allelic variants, important for climate change adaptation.

***Quercus* spp. (Pedunculate oak - *Quercus robur* L., Downy oak - *Quercus pubescens* Willd., Holm oak - *Quercus ilex* L.)**

Forest structure, deadwood and tree-related microhabitats
In Pedunculate oak, forest structure diversity was higher in the unmanaged stands than in managed even-aged stands; the unmanaged stands had the largest amount of deadwood, represented by snags, downed dead trees and other lying deadwood pieces. The total amount of deadwood in the Downy oak stand and in the Holm oak stand was 7 m^3/ha and 16 m^3/ha, respectively.
Almost all forms of microhabitats (cavities, injuries and wounds; bark; deadwood; deformation/growth form, epiphytes, nests) were detected in *Quercus* sites.

Landscape Genomics
The results of the Genotype Environment Association (GEA) analyses showed the existence of four different genotypes present in Italy, Croatia and Slovenia. Management applied to oak stands appears to result in a simplified spatial genetic structure compared to that observed in unmanaged sites and old-growth forests.

Oak mildew
As part of the LIFE SySTEMiC project different ways of controlling oak mildew at one of our experimental sites in Krakovo Forest (Slovenia) were tested.

GenBioSilvi model
Based on the results obtained considering biodiversity indicators (genetic diversity, forest structure, deadwood, and tree-related microhabitats), we can assume that there is high genetic diversity in all sites, but we cannot conclude that there is significant genetic diversity between the sites even though they differ in management types.

Recommendations for Sustainable Forest Management
For oak species that showed similar characteristics to those included in our study, we suggest using a type of management that increases forest stand complexity with a multi-layered vertical structure that positively affects on conservation of genetic diversity and increases new allelic variants crucial for climate change adaptation.
The forest restoration system in oak stands needs to be adapted to the increasingly frequent natural disasters, mostly through diversification of the size of the areas for restoration, as this ensures the mosaic structure of future stands and increases their resilience.

Guidelines on management activities in forest conservation areas in climate change for each of the 4 species/genera complexes targeted
Our implementation actions lead to better adapted close-to-nature forest management guidelines, support forestry practices, and policy recommendations. LIFE SySTEMiC not only considered past management practices based on National Forest Inventory data, but also the predictive model, GenBioSilvi, which was developed during the project to assist with future scenarios and the adaptability of forest trees and ecosystems. Silvicultural techniques implemented today in Europe do not consider indicators or guidelines that aim to enhance genetic diversity. Therefore, the data collected concerning genetic, forest structure, and biodiversity were implemented into the developed GenBioSilvi model for sustainable forest management (SFM) and used to provide guidelines which are applicable in the EU for the species considered in the project. LIFE SySTEMiC has contributed to the harmonisation of information from data collected in EU forests present in different European Forest Types across 3 EU countries and subjected to different management, providing specific guidelines for sustainable forest management to help maintain forest ecosystem biodiversity, forest genetic resources and forest productivity over time, maintaining the adaptive potential of forests.
The suggestions reported in the guidelines are useful to maintain forest ecosystem biodiversity in agreement with target priorities of the EU Biodiversity strategy 2030 [COM(2020) 380)], and the Competent Authorities of the Member States.

Replicability and transferability
The multidisciplinary approach in several protected and managed forests in different European Forest Types produced standardised protocols to favour the replicability of the results, organised stakeholder meetings at EU level, and identified the potential transfer sites outside the project countries (Italy, Croatia and Slovenia) during the first stakeholders meeting, securing their interest in the project methods and tools.
LIFE SySTEMiC provided a replicability and transferability exploitation plan, to tangibly use the project results also outside the project regions, to multiply and use them in other contexts.
LIFE SySTEMiC stakeholder Parco Nazionale della Sila (Italy) has replicated the method in a newly established site of Black pine during the project.
LIFE SySTEMiC also signed letters of intent to collaborate in a joint project with the coordinator of the ongoing Horizon Europe project “Sustainable Management models and valUe chains foR small Forests” (SMURF), and with the coordinators of the proposal “Managing Ecosystems to Drive Forests towards Optimum Resilience for Ensuring a Sustainable Tomorrow” (MEDFOREST) submitted under the Interreg NEXT MED programme call, and the proposal “Restore and improve the conservation status of threatened forests by holm oak dieback” (LIFE RECLOAK) submitted to the call 2024 LIFE-2024-SAP-NAT (Topic LIFE-2024-SAP-NAT-NATURE).

Dissemination and communication activities
Several activities were carried out to communicate and disseminate the project results. Part of these activities concerned the creation of the website and other social media, the organisation of workshops and participation in other initiatives (networking), and the use of other communications tools like notice boards, leaflet, roll-up and project gadgets. The target audience was public institutions and private organisations/owners active in environmental monitoring, forest management and policy, as well as the general public interested in environmental protection. Key events and dissemination activities included: press conferences, TV and radio appearances, videos of the sites, social media posts (Facebook, Twitter (now X), Instagram, YouTube), workshops, educational visits, field trips, scientific podcasts, networking with other projects, conferences.
The results of the LIFE SySTEMiC project were presented at the final conferences held in Brussels and in beneficiary countries (Italy, Croatia, Slovenia) to inform organisations specialised in monitoring and nature conservation, as well as public and private institutions involved in nature conservation and forest protection and sustainable forest management (i.e. forest certification schemes).

Socio-economic context of the project
Social impact
Considerable efforts were made to involve a wider audience: presence on traditional media (television and radio) and new media (websites); presence on social media platforms (Facebook, Twitter (now X), Instagram, YouTube) and public events (visits to sites, open days, educational day for students and teachers, field trip for students) were organised by LIFE SySTEMiC.
Questionnaires were submitted (> 700 responses in total) to get people more involved and to determine their knowledge and awareness of sustainable forest management, the protection of biodiversity and the genetic resources of forests. Overall, there was a high level of awareness of global change and Natura 2000, and particular attention to the protection of biodiversity (e.g. releasing old trees, avoiding logging during the breeding season of birds) and the impact of climate change on forests is considered necessary to improve sustainable forest management.

Economic impact
The conservation of Forest Genetic Resources and the increase in Genetic Diversity are of vital importance considering the climate change effects on European forests. We tried to assess the short- and medium-term economic impact of Sustainable Forest Management (SFM) in beech forests (as proposed by the project’s guidelines) by comparing the demonstration cuttings carried out in the site Pian dei Ciliegi (Italy), which aims to shift forest structure from even-aged to uneven-aged, with the “traditional thinning” usually carried out in even-aged stands in the same area. Volume of harvested wood was quite similar (45 m^3/ha in LIFE SySTEMiC interventions, 42 m^3/ha in traditional thinning) as well as the value of the harvested wood (almost all firewood, respectively about 2300 €/ha and 2100 €/ha) while total cost is lower in LIFE SySTEMiC (about 7300 €/ha) than in traditional thinning (about 9200 €/ha). Regarding the long-term economic impact, we evaluated, as an example, the site Baldo’s Forest (Italy). Approximately 30-50 trees are cut down per year (over a total area of 10 ha), generating roughly 1200 €/ha per year. In the LIFE SySTEMiC intervention at the site Baldo’s Forest, the volume of harvested wood was quite high (63 m^3/ha). This type of intervention also provides high-quality timber: the logs are usually sold to the furniture industry for veneer, while branches and smaller materials are sold as firewood.

In the same way, we compared traditional forest management in Stone pine forests (clear-cut and planting) with the LIFE SySTEMiC interventions (uniform shelterwood system and group selection system, both aimed at achieving natural regeneration) in the Parco Regionale San Rossore Migliarino Massaciuccoli (Pisa, Italy). The volume of harvested wood was greater in the clear-cut system (about 65 t/ha) and the uniform shelterwood system (20 t/ha) compared to the group selection system (11 t/ha). Consequently, the total revenue was higher for the clear-cut (5300 €/ha) and uniform shelterwood system (1700 €/ha) compared to the group selection systems (900 €/ha). The cost of cutting was 2900 €/ha for the clear-cut, 1900 €/ha for the uniform shelterwood system, and 1400 €/ha for the group selection system. However, the uniform shelterwood and group selection systems avoid the additional costs of reforestation (about 3600 €/ha), fencing (8400 €/ha), or shelter (4800 €/ha), which are necessary to regenerate and protect Stone pine forest after clear-cutting.

However, it is worth noting that the influence of forest management practices on the total economic value of the forests should consider not only wood supply but also other important ecosystem services that were not considered in our study.

Relevance to environmental policy and legislation of the project
Acquired knowledge and experience will be used as a basis to build up regional legislation or guidelines for the sustainable forest management. Furthermore, those beneficiaries have a specific rule in SFM, and biodiversity monitoring can apply directly the tools developed in the project (MRSM, SFS, UCCAS). LIFE SySTEMiC is facilitating the development of science-based strategies, methods and recommendations also for policy-makers and managers at pan-European scale. Project has actively partecipated in forest policy initiative of eight forest focused LIFE projects in the Mediterranean area who have joined forces to align their outcomes with EU climate and biodiversity targets in the frame of the European Forest Strategy. We have coproduced the position paper "A step forward in EU forest policy: the Mediterranean perspective" and participated on forest policy roundtable in May 2022 in Brussels, to contribute EU policymaking towards sustainability. The finalization of project's outputs will add significantly to the possibilities for the transfer of policy recommendations for EU decision makers through International and National events (IUFRO congress, Brussels workshop, local stakeholder workshops in beneficiary countries) and publications. Implementation of policy measures in each country depends on specific conditions and social capabilities based on existing national/local institutions, policies and laws. In Croatia – support for forestry policies adaptation with the Croatian Ministry of Agriculture, the Forestry sector and national forest company, Croatian Forests Ltd. and particularly to working group for forest management planning, preparation of common management plans for Forest seed objects (FSO), preparation of guidelines for selection of FSO/plus trees in Croatia. In Slovenia, results from project activities have been used to renew national forest regeneration approach and strategies for biodiversity conservation within regional forest management plans for period 2021 – 2030, adaptation of silvicultural and forest reproductive material operative policies and legislation, and for the development of forestry services within EU program Next Generation EU. In Italy, support for implementation of National Forest Strategy (published in 2022) especially on the field of forest genetic resource conservation (Specific action 3 – Genetic resources and plant material, and sub-actions 3.1 Forestry nurseries, genetic resources and plant material; and 3.2 Oriented silvicultural management and assisted migration) – provision of new science-based information and practical experiences to support the decisions of forest policy makers at regional scale (e.g., in Tuscany Region), and used from Stakeholders of the Stakeholder Advisory Board of the project and responsible for forest management in protected areas (Foreste Casentinesi National Park, National Park of Sila, Biogenetic Nature Reserve of "Pian degli Ontani"). The development of guidelines, practical Handbook, and GenBioSilvi model will further facilitate cooperation among foresters, conservationists, hunters and other end-users on implementation of forest genetic resources conservation into SFM.

AFTER LIFE ACTIVITIES

The LIFE SySTEMiC communication strategy
The project LIFE SySTEMiC is focused on the conservation of forests and biodiversity, a topic of particular sensitivity at political and media level in the current European socio-economic context. The principal aim is to develop a tool to be used for Sustainable Forest Management (SFM) facilitating the choice of the best silviculture practice to preserve forest resilience in relation to climate change. This situation involves particular attention in the communication strategy and in the choice of target groups.
The project, characterized by a very specific and specialized objective, primarily targeted a medium-high specialization audience. However, a general communication was developed and addressed to a more general and less specialized public but attentive to the issue, to which the rationale, implication at biodiversity level, of the project was transferred. For this reason, the project organized national events addressed to the public, families, and students.
For the foregoing reasons, the communication strategy, defined from time to time depending on the event programmed communication, has involved the following types:

- communication events of the draft general informative nature (low specialist);
- participation in specialized conferences (high technical-scientific content);
- networking initiatives (medium technical-scientific content).

Generally speaking, communication events have a strong prevalence of specialized content, and the communication strategy will be geared towards developing appropriate content. All communication products are available on the project website (to be available by 31/08/2034).

Target groups of the project
Individuals with expertise in monitoring and conservation: national, regional or local public bodies involved in the monitoring of forest genetic resources, in surveillance and environmental regulation. These entities, as potential users of the final product of the project, have been involved in specialised outreach activities, in networking and through the exposure of project results at national and international events.
Scholars, scientists and researchers: specialist staff from Research and Development or other bodies involved in the study of the environmental issues. Compared to the previous group, this target group has been involved in some project development activities through specialist initiatives.
Students and schools: specific educational initiatives at the level of specialization were defined according to the type of study (high school / university).
General public: this target group includes a general audience which were addressed through specific communication activities envisaged by the project (launching and final workshop, educational visits) and other communication tools such as press conferences and promotional material.

Main events and dissemination tools conducted by LIFE SySTEMiC project

- Launching event of the LIFE SySTEMiC project: oriented toward an attendance with a high technical-scientific background. A press conference aimed at disseminating the project content to media was also done. Some local TV channels and radio have released video and audio services.
- Videos of LIFE SySTEMiC sites illustrating the study areas and explaining the importance of the project.
- Project Website updated and social media tools (Facebook, Twitter (now X), Instagram, YouTube) to continuously disseminate the project activities and results.
- Mid-term workshop: the activities and first preliminary results of the project were presented to an audience of experts in the field sustainable forest management and environmental monitoring. Some local TV channels and radio have released video and audio services.
- Educational visits, workshops and demonstration activities for students, stakeholders and foresters.
- Networking with other LIFE and EU projects for the LIFE 30 years.
- Participation to national and international conferences: SIGA, SISEF, IUFRO.
- EU Stakeholder workshop "T3.2 Can adaptive genomic drive sustainable forest management under climate change?" at the 26th IUFRO World Congress.
- Workshops with local stakeholders in Croatia, Italy and Slovenia to present the final results and the GenBioSilvi model for SFM in climate change.
- Final conference of the LIFE SySTEMiC project: results were presented to organization specialized in monitoring and conservation, public and private entities involved in Nature Conservation and particularly forest conservation and Sustainable Forest Management (i.e. Forest Certification schemes).
- Technical manuals in relation to sustainable forest management in English language, to share protocols that were used in the project for research activities.
- Handbook for sustainable forest management, in English, Croatian, Slovenian, and Italian languages, describing the study areas and reporting the results of the projects has been printed and free distributed.
- Guidelines on Sustainable Forest Management for each of the project species, in English, Croatian, Slovenian, and Italian languages, reporting the main recommendations for a sustainable forest management based in project results, have been printed and free distributed.
- A popular science monograph, Conservation of Forest Genetic Resources with Forest Reproductive Material Management, and 12 related podcasts.
- Handbook communication manual in English, Croatian, Slovenian, and Italian languages, on how to communicate forest topics to various audience.

All the products are free available as PDF in the dissemination section of the website.

Future dissemination events and products
After the conclusion of the project some activities will be continued to disseminate the outputs of the project.

- Institutional communication tools will be used to report relevant activities carried on within the project (Project and Institutional website, internal press, fairs, etc.).
- Dissemination of project communication materials will continue in those relevant fairs or exhibitions where partner's stands will be present.

The following activities/products are planned:

- Publications of 3-5 papers in international journal with IF by the end of 2024 and first half of 2025
- Presentation of the methods at the National and International networks.
- Training workshop on SFM: seminars to students interested in forest-ecosystem biodiversity conservation.
- Participation to national and international conference: SIGA, SISEF, IUFRO meetings.
- Presentation of GenBioSilvi model to various European projects and forest stakeholders / end users with the goal to be used and replicated (e.g. MOSAIC project – Interreg Alpine Space, Ministers, forest operators, forest managers, etc.).

Sources of finance
The cost of these activities is also forecasted in the regular institutional activities of all the Beneficiaries, and it includes personnel cost, travel and subsistence cost, and fee at conferences for a total minimum of 105.000€ in 5 years (about 3000 €/year/beneficiary).

Future conservation/management activities
Beneficiaries are directly involved in the safeguard of the environment and the monitoring. Furthermore, some beneficiaries have a specific technical centre for the open field testing, where the monitoring strategies could be materially applied and will continue to evaluate the method developed in the project
The activities carried out in implementation actions will be continued for at least 5 years after the project and will be carried out according to the different experience of each Beneficiary, and to implement the knowledge of the study areas:

- Monitoring and evaluation the effect of the demonstration cuttings performed during the projects in sites: Baldo's forest (Italy), Pian dei Ciliegi (Italy), Faltelli (Italy), Tre Termini (Italy), Terminaccio (Italy) and Fossacci (Italy).
- Evaluation of browsing in fenced and non-fenced areas established during the projects in sites Pian dei Ciliegi (Italy), Caselle (Italy), Faltelli (Italy), Tre Termini (Italy), Terminaccio (Italy), Fossacci (Italy) and Culatta (Italy).

Sources of finance
All beneficiaries have yearly a budget (ie., "FFO" for Italy) which is not a fixed amount, but in total we can consider 5000€/year (personnel cost included)/Beneficiary, for a minimum of 25000€ in 5 years/Beneficiary. Therefore, a total 175000€ can be considered as minimum for the activities related to the Conservation/management related to implementation Actions B.
A detailed costs of these conservation activities are reported in the technical manual which is available in the project website (www.lifesystemic.eu/).

The consortium will hold meetings at least annually, and as needed, to monitor the progress of the planned After LIFE activities, ensuring the continuation and analysis of the various tasks.

Contributors to the After LIFE Plan
DAGRI-UNIFI: Cristina Vettori (IBBR-CNR), Roberta Ferrante, Cesare Garosi, Francesco Parisi, Patrizia Rossi, Davide Travaglini, Donatella Paffetti
CFRI: Sanja Bogunović, Mladen Ivanković, Anđelina Gavranović Markić, Barbara Škiljan, Zvonimir Vujnović, Miran Lanšćak
D.R.E.A.M.: Guglielmo Londi
MSRM: Francesca Logli, Francesco Annecchini e Barbara Cecconi
SFI: Marko Bajc, Rok Damjanić, Natalija Dovč, Tine Grebenc, Katja Kavčič Sonnenschein, Tijana Martinović, Tanja Mrak, Tina Unuk Nahberger, Boris Rantaša, Nataša Šibanc, Marjana Westergren, Hojka Kraigher
SFS: Andrej Breznikar, Kristina Sever
UCCAS: Fabio Ciabatti, Beatrice Brezzi, Antonella Mugnai, Donatella Bargellini, Fiorenza Bianchi, Lucia Cresci, Lucio Lasagni, Ivana Fantoni, Alberto Tizzi, Fulvio Cherubini, Lorenzo Lupini, Silvano Rossi, and all the forestry workers of the Organization.

Beneficiary's name
Department of Agriculture, Food, Environment and Forestry (DAGRI), University of Florence (UNIFI), Italy (Coordinator)
Croatian Forest Research Institute (CFRI), Croatia
D.R.E.A.M., Italy
Ente Parco Regionale Migliarino San Rossore Massaciuccoli (MSRM), Italy
Slovenian Forestry Institute (SFI), Slovenia
Slovenia Forest Service (SFS), Slovenia
Unione dei Comuni Montani del Casentino (UCCAS), Italy

Project duration
01/09/2019 - 31/08/2024

Total cost and EU contribution
Total project budget: 2,976,245 €
LIFE Funding: 1,635,709 € (55% of total eligible budget)

Project's contact details
Coordinator and scientific responsible of the project
Donatella Paffetti - DAGRI-UNIFI
Via Maragliano, 77
50144 Firenze
Italy
donatella.paffetti@unifi.it

Project Manager
Cristina Vettori - IBBR-CNR
Via Madonna del Piano, 10
50019 Sesto Fiorentino (FI)
Italy
cristina.vettori@cnr.it

Communication Manager
Davide Travaglini - DAGRI-UNIFI
Via San Bonaventura, 13
50145 Firenze
Italy
davide.travaglini@unifi.it

Website
https://www.lifesystemic.eu

The LIFE SySTEMiC - LIFE18ENV/IT/000124 project has received funding from the LIFE program of the European Union.

Graphical plan, pagination Arts & altro Grafica