Deliverable C4.1 “After LIFE Plan”

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1. Project Data

Project locations	Greece, Italy, Spain
NATURA 2000 Sites	Asterousia (GR4310013), Nestos (GR1150010), Alta Murgia (IT9120007), Palo Laziale (IT6030022), El Bruc (ES5110012), Tifaracás (ES7010039)
Project start date	01/01/2021
Project end date	30/06/2024
Project duration	42 months
Total budget	840,748,00 €
EU contribution	490,073.00 €
Eligible costs	58,29 %
Coordinating beneficiary	Consiglio Nazionale delle Ricerche – Istituto sull'Inquinamento Atmosferico (CNR-IIA), Italy
Associated beneficiaries	Consiglio Nazionale delle Ricerche – Istituto di Bioeconomia (CNR-IBE), Italy Centro de Investigación Ecológica y Aplicaciones Forestales (CREAF), Spain Hellenic Society for the Protection of Nature (HSPN), Greece Istituto superiore per la protezione e la ricerca ambientale (ISPRA), Italy Università degli Studi "La Sapienza" (SAPIENZA), Italy University of Crete (UoC), Greece
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2. Overview of the project

2.1 Objectives and methodology

The NewLife4Drylands (NL4Dl) project aimed to monitor the application, scalability, and replicability of Nature-Based Solutions (NBS) for the restoration of drylands by using satellite-based indicators. To achieve that, NewLife4Drylands fixed a couple of objectives:

- to provide a methodological and applicable approach in form of a model for monitoring of degraded areas based on remote sensing indicators, and
- to provide a Protocol for NBS application for drylands restoration.

NewLife4Drylands developed and implemented a methodology based on three major steps. The first step was finalized to the **understanding of degradation phenomena**, which is of paramount importance especially when working at a local scale. The second step was the core of the project and consisted in the **identification of a set of indicators and indices** that are computable from remote-sensing sources and that are relevant for studying and monitoring land degradation processes. The third step consisted in the major outcome of the project, which is the **definition of a procedure for restoration planning based on a remote-sensing enhanced monitoring model** that can be adopted for NBS design and assessment by local authorities.

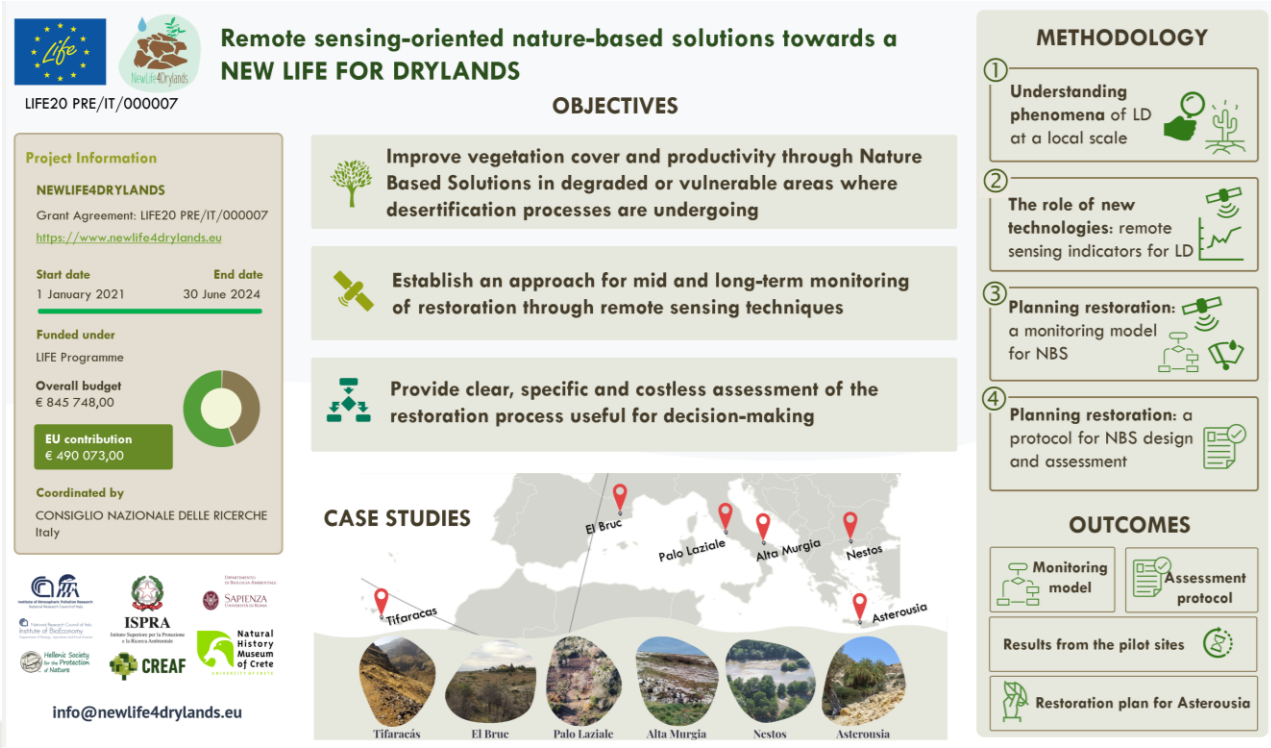

Figure 1 Summary of the NewLife4Drylands project (objectives, methodology, case studies and outcomes

2.2 Case studies and pilot sites

The NewLife4Drylands project developed and implemented its methodology based on six (6) case study areas: two are located in Spain (Tifaracás and El Bruc), two in Italy (Palo Laziale and Alta Murgia) and two in Greece (Nestos and Asterousia). The case study areas are characterized by different degradation status and processes providing a good set of pilot sites for the definition of a procedure for restoration planning that can be generalized at least to the Mediterranean region. The six case study areas are also characterized by a different status of past restoration actions. In four case study areas (Tifaracás, El Bruc, Palo Laziale and Nestos river delta) some restoration actions have been implemented in the recent years, mostly in the context of other LIFE projects (LIFE Primed, LIFE TheGreenLink). In the Alta Murgia area, no restoration action was carried out in the past, but some actions were planned and implemented in parallel with NewLife4Drylands. Finally, in the Asterousia Mountains area, no restoration action was carried out in the past, nor planned yet. This heterogeneity provided opportunities for the application of the NewLife4Drylands methodology to different phases, from the design of potential NBSs (as for Asterousia) to the assessment of the effectiveness of the past or on-going implemented NBSs (like in the other five case study areas).

Figure 2 The six case studies of NewLife4Drylands

2.3 Project structure

The NewLife4Drylands project was structured on a set of Technical (A), Networking (B), and Management (C) Activities:

Action	Title
	Technical Activities
A1	Setting the frame for desertification and NBSs
A2	Remote sensing indicators of desertification
A3	Monitoring model
A4	Monitoring restoration cases based on NBS
A5	Definition of protocol and best practices
	Networking Activities
B1	Dissemination of the project to different stakeholders
B2	Organisation of events for the local community
B3	Networking with other LIFE and/or non-LIFE projects
B4	Material for communication activities
B5	Website
	Management Activities
C1	Project management
C2	Indicator analysis
C3	Socio-economic impact in local community
C4	After LIFE Plan
C5	External Audit

3. Assessment of the situation at the end of the project

3.1 Project outcomes

The NewLife4Drylands project released four (4) major concrete outcomes:

- **A Web tool to explore a Monitoring Model that captures the domain knowledge** linking external pressures, degradation processes, potential NBSs to be implemented, and remote-sensing indicators for the NBSs design and effectiveness assessment.
- **A Protocol to be adopted by decision-makers** to introduce remote sensing techniques in their process for the design and effective- assessment of NBSs to combat land degradation. The Protocol is available as a full document and as a summary report for policy-makers.
- **The results of the application of the Monitoring Model to five (5) case study areas** with restoration actions carried out in the past or still on-going (Tifaracás, El Bruc, Palo Laziale, Alta Murgia, and Nestos river delta).
- **A Restoration Plan for the Asterousia Mountains area** that has been proposed to local authorities in Crete for potential adoption.

NewLife4Drylands also established a solid stakeholder network through a liaison with other LIFE and non-LIFE projects and initiatives.

Figure 3 Major projects and initiatives in the NewLife4Drylands network

3.2 Analysis of results

The results of the NewLife4Drylands project on the use of remote sensing techniques to combat land degradation can be summarized as follows:

Strengths	Weaknesses
Remote sensing is a cost-effective technology that can support local authorities to design NBSs and monitor their effectiveness to combat land degradation. Remote sensing provides large scale spatial coverage enabling local to global monitoring and intercomparison. Remote sensing offers the possibility of carrying out investigations backwards in time for long/short term monitoring. Remote sensing enables the observation of remote areas that could not be accessible otherwise highlighting properties that cannot be detected by human eye. Scientific and technical literature describes several reliable indicators and indices useful for land degradation that can be computed from remote sensing data.	Existing open and free satellite data (e.g., from Sentinel, Landsat) are not sufficient for monitoring small areas (less than about 50 ha) due to their limited spatial resolution (10-30 m). There is the need for open and free Very High Resolution data that are often necessary for monitoring small areas. Validation of remote sensing products requires ground truth through in-situ data. Deriving reliable values of some indicators/indices from remote sensing requires further research (e.g., Soil Organic Carbon). The selection of a relevant subset of indicators/indices depends on the local conditions (degradation drivers and on-going processes) requiring a specific expertise.
Opportunities	**Threats**
Many satellite-based sensors are available, often with open and free access policy. Innovative digital technologies (cloud, machine learning, etc.) support big data sharing and processing. There are many initiatives on knowledge generation from remote-sensing data at national, European and global level (GEO/EuroGEO). There is a growing interest in monitoring soil and land by policymakers (e.g., Soil Monitoring Law and Nature Restoration Law in Europe)	The application of remote sensing techniques to decision-making requires Earth Observation expertise and digital proficiencies that local authorities may not have internally. The large number of potential sources of remote sensing data and products can easily become a barrier. The selection and prioritization of information sources requires a specific expertise.

4. After-LIFE objectives

The objectives of the After-LIFE activities of NewLife4Drylands project can be summarized as follows:

- Continued support of its main outcomes:
  - Web tool for the monitoring model.
  - Protocol for decision-makers and summary report.
  - Monitoring of restoration activities started in Alta Murgia site.
  - Restoration plan for Asterousia Mountains region.

- Knowledge transfer to other projects and initiatives:
  - Application of the NewLife4Drylands methodology and results to other geographic areas (in the Mediterranean region) and domains (e.g., for soil monitoring) with a particular reference to MONALISA (HORIZON-MISS-2023-SOIL-Q1)

- Continuation of communication and dissemination actions:
  - Maintenance and update of the project web site and social media.
  - Targeted dissemination to selected stakeholder categories:
    - Science & Technology community.
    - Decision-makers.
    - Policymakers.

5. After-LIFE methodology

Beneficiaries of the NewLife4Drylands project commits to continue supporting the major outcomes of the project (e.g., ISPRA for the Web tool for the monitoring model and the Protocol; HSPN and UoC for pursuing the implementation of the Asterousia Mountains Restoration Plan; CNR-IIA for monitoring restoration activities started in Alta Murgia).

Knowledge transfer activities will exploit the stakeholder network built during the NewLife4Drylands project. Following the discussions started in NewLife4Drylands networking meetings, GEO events and NewLife4Drylands Final Conference, the NewLife4Drylands methodology for land degradation monitoring and assessment will be proposed as a contribution to the GEO LDN and to be included in the LDN Toolbox. Following meetings with Mr. Mirco Barbero (ENV.D1 Land use & Management Unit of DG ENV), NewLife4Drylands will explore the possibility to transfer the NewLife4Drylands knowledge and methodology to support the Soil Monitoring Law.

The NewLife4Drylands beneficiaries will continue to communicate, disseminate and exploit the project outcomes and results to their own networks including the Science & Technology community for research organizations, to decision-makers and policymakers for organizations that support local, national and regional authorities on land and soil policies.

The NewLife4Drylands beneficiaries commit to purse the After-LIFE objectives with their own budget. However, the positive evaluation of the HORIZON MONALISA project funded as response to the call on "*Research and Innovation and other actions to support the implementation of mission A Soil Deal for Europe*" (HORIZON-MISS-2023-SOIL-Q1) can provide economic support to some of the After-LIFE planned actions of NewLife4Drylands project. MONALISA includes all the NewLife4Drylands beneficiaries as partners - with the only exception of CNR-IBE - and its focus on innovative solutions to combat desertification with six case study areas partially coincident with the NewLife4Drylands ones provides an excellent opportunity for knowledge transfer and continuation of supporting NewLife4Drylands results.

6. After-LIFE planned actions

The following table details the After-LIFE activities planned to achieve the objectives established in the previous sections. Each activity refers to one NewLife4Drylands technical, communication or management action and has one or more responsible beneficiaries, a planned timespan, an estimated budget and the identified funding sources.

Action	Resp.	Timespan	Budget	Funding sources
A2 Remote sensing indicators of desertification				
Annual updating of SDG 15.3.1 indicator and computation of new LD indicators in Alta Murgia and Asterousia sites.	CNR-IIA, CREAF	2024-2029	5,000 EUR	CNR-IIA and CREAF own budget, MONALISA
A3 Monitoring model				
Maintenance, operation and upgrade of the NL4D Webtool for the Monitoring Model	ISPRA	2024-2028	5,000 EUR	ISPRA own budget, MONALISA
A4 Monitoring restoration cases based on NBS				
Implementation and monitoring of restoration actions in Mt. Asterousia site	UoC, HSPN	2024-2028	10,000 EUR	UoC own budget (personnel costs of UoC) , MONALISA
Maintainance and annual monitoring of restoration actions started in Alta Murgia site	CNR-IIA	2024-2028	8,000 EUR	CNR-IIA own budget, MONALISA
Maintenance of Tifaracás restoration actions	CREAF	2024-2029	10,000 EUR	Gobierno de Canarias own budget
Maintenance of El Bruc restoration actions	CREAF	2024-2029	3,500 EUR	Landowners own budget
A5 Definition of protocol and best practices				

Translation of the Summary Report in Catalan, Greek, Italian and Spanish	CREAF, ISPRA, HSPN, UoC	2024	1,000 EUR	CREAF, ISPRA, HSPN, UoC (Personnel involved) own budget
B1 Dissemination of the project to different stakeholders				
Promotion of the use of webtool in the context of land degradation assessment at local scale	ISPRA	2024-2028	5,000 EUR	ISPRA own budget, MONALISA
Promotion of the application of Protocol by Protected areas and decision makers	ISPRA	2024-2029	5,000 EUR	ISPRA own budget
Inclusion of project outputs in training interventions and dissemination events	ISPRA	2024-2028	5,000 EUR	ISPRA own budget, MONALISA
Further promotion of project results (distribution of project's material, participation in local events, festivals, workshops etc.)	UoC	2024-2029	10,000 EUR	UoC own budget (Personnel costs & Travel costs)
Promotion of the use of webtool and Protocol at local and national scale	UoC	2024-2029	2,000 EUR	UoC own budget (Personnel costs & Travel costs), MONALISA
Promotion of the use of webtool and Protocol at local and national scale	CREAF	2024-2028	5,000 EUR	CREAF own budget, MONALISA
Inclusion of project outputs in training interventions and dissemination events	CREAF	2024-2028	5,000 EUR	CREAF own budget, MONALISA
Dissemination events	HSPN	2024-2029	3,000 EUR	HSPN own budget, MONALISA
Presentation of the results of the project to stakeholders in Nestos area	HSPN	2024-2025	500 EUR	HSPN own budget

Distribution of the project's leaflets to exhibitions	HSPN	2024-2029	1000 EUR	HSPN own budget
B2 Organisation of events for the local community				
Organization of study visit for local community in Nestos	HSPN	2024-2025	1000 EUR	HSPN own budget, LIFE PRIMED
Organization of study visit for local community in Asterousia	HSPN	2024-2029	2000 EUR	HSPN own budget, MONALISA
Organization of event in Nestos (November 2024)	HSPN, UoC, SAPIENZA	2024	2000 EUR	HSPN own budget, LIFE PRIMED
B3 Networking with other LIFE and/or non-LIFE projects				
Contribution to the EuroGEO Action Group on Land Cover / Land Intelligence	ISPRA, CREAF, CNR-IIA, CNR-IBE	2024-2026	3,000 EUR	CNR-IIA own budget
Contribution to GEO LDN and LDN toolbox	ISPRA, CNR-IIA, CNR-IBE	2024-2029	6,000 EUR	CNR-IIA own budget, MONALISA
Knowledge transfer to HORIZON MONALISA	CNR-IIA, CREAF, HSPN, ISPRA, SAPIENZA, UoC	2024-2028	12,000 EUR	MONALISA
Transfer of the results to other NGOs of Greece	HSPN	2024-2028	500 EUR	HSPN own budget, MONALISA
Presentation of the project's results in other LIFE projects	HSPN	2024-2029	1000 EUR	HSPN own budget, MONALISA
Contacts with other LIFE projects	HSPN	2024-2029	500 EUR	HSPN own budget
B4 Material for communication activities				
Leaflets	HSPN	2024-2028	1000 EUR	HSPN own budget

Environmental Education Programme for teachers	HSPN	2024-2028	500 EUR	HSPN own budget
B5 Website				
Maintenance, operation and updates of the NL4D web site	CNR-IIA	2024-2029	5,000 EUR	CNR-IIA own budget