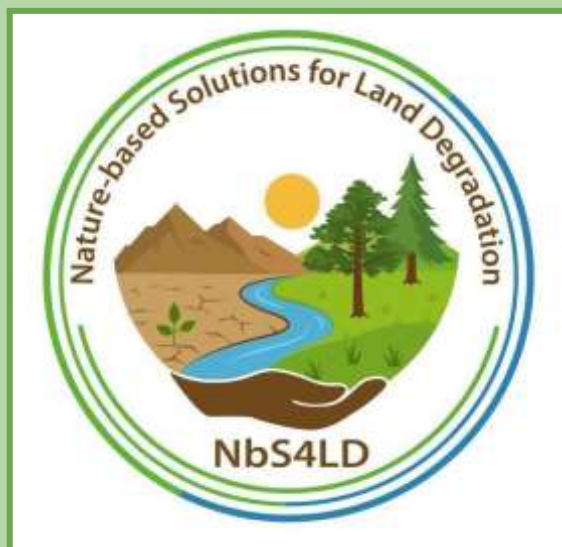




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CASE STUDY

Dry grassland restoration in Alta Murgia, a pilot ecosystem restoration (Italy)



Project full title: Enhancing Technical and Vocational Skills for Implementing Nature-Based Solutions (NbS) to Combat Land Degradation

Project acronym: NbS4LD

Project number: 2025-1-TR01-KA220-VET-000357096

Project activity: WP2 Developing Educational Resources on NbS for Combating Land Degradation

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1. INTRODUCTION

This case study has been analysed by the [European Research Institute Foundation ETS \(ERI\)](#), a partner organisation of the NbS4LD project. ERI is a non-profit organization founded in 2011 in Turin, Italy, dedicated to research, innovation, and sustainable development. ERI works to improve social, economic, and cultural conditions by promoting inclusion, equity, cultural diversity, and respect for the environment. The organization focuses on environmental protection, biodiversity conservation, climate change mitigation, and sustainable management of urban, peri-urban, rural, and natural areas. ERI collaborates with public institutions, businesses, start-ups, and local communities, combining expertise in research, project planning, communication, and implementation. With offices across Italy and a branch in Hungary, ERI has developed significant experience in managing European-funded projects. ERI specializes in environmental education, stakeholder engagement, and scientific communication, supporting communities, authorities, and organizations in developing sustainable solutions. Through research, awareness activities, and innovative approaches, ERI contributes to biodiversity protection, climate resilience, and the transition toward sustainable development.

The NewLife4Drylands pilot project was implemented in Alta Murgia National Park, Apulia, Italy, to restore degraded Mediterranean dry grasslands. The area was affected by soil degradation, reduced vegetation cover, biodiversity loss, intensive agricultural practices, and increasing drought pressure linked to climate change. The intervention site consisted of semi-natural grasslands with shallow, low-fertility soils and reduced ecological resilience.

Between 2021 and 2023, the project applied Nature-Based Solutions including sod cutting, hay transfer, native seed sowing, and biodegradable soil stabilization. These techniques aimed to restore native grassland communities, improve soil structure, reduce erosion, and increase water retention. Monitoring showed improvements in vegetation recovery, habitat quality, biodiversity, and ecosystem services such as erosion control and pollination.

The project was supported by EU LIFE funding and involved research institutions, environmental agencies, the Alta Murgia National Park, and local stakeholders. It improved technical capacity for dryland restoration and created a tested methodology that can be applied in other Mediterranean degraded grassland areas.

The intervention was evaluated as highly effective in ecological restoration, institutional cooperation, innovation, and replication potential. Economic efficiency was considered partial due to the need for continued funding and maintenance. Overall, the project demonstrates how targeted Nature-Based Solutions can restore degraded drylands while supporting conservation and sustainable land management.

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[Before the intervention, the area appears neglected, with overgrown vegetation and scattered debris. The ground shows signs of erosion and uneven surfaces. - Source: Newlife4drylands website]

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[After the intervention, the area shows the effects of ecological restoration. Early regrowth of native grassland vegetation can be observed - Source: Newlife4drylands website]

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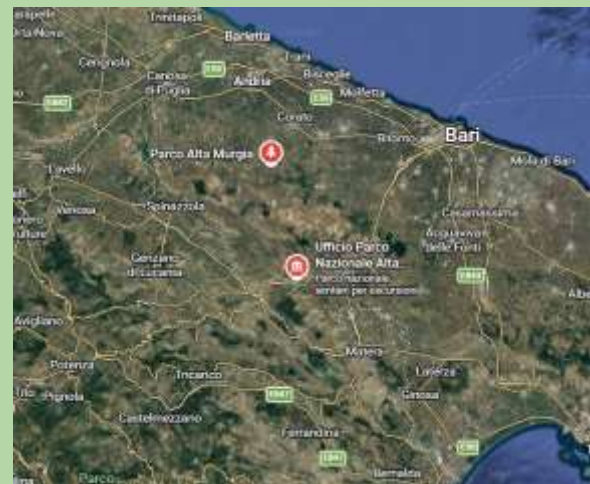


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2. CONTEXT

2.1 LOCATION

Country: Italy. Region: Apulia Region. Province: Bari. Site: Alta Murgia National Park, experimental restoration plots (Masseria Modesti area). Approximate GPS coordinates: Latitude 40.9° N - Longitude 16.3° E.



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2.3 LANDSCAPE TYPE

Grasslands.

2.4 LAND DEGRADATION CHALLENGE

Desertification. Poor land management. Intensive agriculture and irrigation. Climate change.

2.5 BASELINE DATA

Land condition	• Site: the site is located within a semi-natural dry grassland ecosystem in Alta Murgia National Park. Historically used for grazing and partially converted to cropland through stone removal practices. • Soil: shallow, calcareous soils with low organic matter, reduced fertility, and signs of compaction and disturbance. • Vegetation cover: degraded grassland with reduced native species presence, replaced in some areas by sparse or non-characteristic vegetation. • Erosion status: moderate to high soil degradation, with localized erosion, surface crusting, and reduced infiltration capacity due to land disturbance.
Environmental context	• Climate: Mediterranean semi-arid, characterized by hot dry summers and variable rainfall, with increasing frequency of drought events due to climate change. • Hydrology: limited water retention capacity in soils, with irregular rainfall patterns contributing to water stress and reduced ecosystem resilience. • Biodiversity: historically high biodiversity value, but declining due to habitat degradation, loss of native species, and fragmentation. • Ecological pressures: climate change (drought), invasive or encroaching species, habitat fragmentation, and degradation from agricultural intensification.
Socioeconomic context	• Population density: low, with scattered rural settlements typical of protected natural areas. • Livelihoods: predominantly agriculture and livestock grazing, with increasing abandonment or intensification in some areas. • Land management: combination of protected area governance and private land ownership, with varying management practices. • Resource dependency: local communities depend on land for grazing and agriculture, but ecosystem degradation has reduced productivity and ecosystem services.

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Policy and governance	• Institutional framework: The site is governed by a multi-level framework that integrates European, national, and local regulations aimed at biodiversity conservation and sustainable land management. It is located within Alta Murgia National Park and designated as a Natura 2000 site (SCI/SPA), thus falling under the EU Habitats and Birds Directives, as well as the Common Agricultural Policy (CAP). Land management is shared between public authorities and private landowners, with the involvement of the Park Authority, research institutions, and environmental agencies. However, governance is challenged by limited enforcement of sustainable practices, competing land-use interests, and fragmented institutional responsibilities.
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3. INTERVENTION

3.1 TIMEFRAME

2021–2023 (implementation phase), with ongoing monitoring.

3.2 TYPE OF INTERVENTION

Dry grassland restoration techniques including sod cutting, hay transfer, native seed sowing, and soil stabilization using biodegradable materials.

3.3 IMPLEMENTING ORGANISATIONS

The intervention was implemented through collaboration between research institutions, local operators, and public authorities. University-based research teams led the experimental design, monitoring, and evaluation of the Nature-Based Solution, while local land managers and forestry operators, including the Saccà farm, supported site access, logistics, and field implementation. Coordination with Aspromonte National Park and local forestry authorities ensured regulatory compliance and effective site management. The project was funded under national research frameworks, including the Tech4You project.

3.4 FUNDING SOURCES

The EU LIFE funding covers the majority of the project costs, including planning, implementation of restoration techniques, monitoring, and research activities. Additional co-financing is provided by the project partners, including research institutions and park authorities, to support operational costs, local logistics, and knowledge transfer activities.

3.5 IMPLEMENTATION ACTIONS AND MEASURES

In 2021, baseline assessments mapped soil, vegetation, and biodiversity conditions. In 2022,

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restoration techniques (including sod cutting, hay transfer, and sowing of native species) were applied, alongside soil stabilization measures. Throughout 2022–2023, monitoring via field surveys and remote sensing tracked vegetation recovery and ecosystem responses. The final phase (ongoing) is focusing on analyzing results, refining restoration protocols, and developing guidelines for replication in other Mediterranean drylands.

4. IMPACT

4.1 ENVIRONMENTAL IMPACT

☑ Improved soil health or reduced soil erosion. ☑ Increased vegetation cover or habitat restoration. ☑ Improved biodiversity (species richness, abundance, habitat quality). ☑ Reduced land degradation. ☑ Improved ecosystem services (e.g., pollination, flood regulation).

The intervention led to visible improvements in vegetation cover and structure, with the re-establishment of native dry grassland species. Soil stability increased due to reduced erosion and improved ground cover. Early monitoring indicates enhanced biodiversity, including higher species richness and better habitat quality. The restoration reduced land degradation processes and contributed to carbon storage through biomass recovery. Ecosystem services such as pollination and soil regulation also showed improvement, demonstrating the effectiveness of Nature-Based Solutions in dryland restoration.

4.2 COMMUNITY IMPACT

☑ Job creation or new livelihood opportunities. ☑ Strengthened community resilience. ☑ Increased local capacity or skills.

The intervention strengthened community resilience by promoting sustainable land management practices and reducing vulnerability to land degradation. Training and collaboration with local stakeholders improved technical knowledge and capacity, especially regarding ecosystem restoration and monitoring. While direct income effects were limited, the intervention supports long-term economic sustainability through improved ecosystem services and land productivity.

4.3 INSTITUTIONAL IMPACT

☑ New or improved environmental policies. ☑ Strengthened institutional coordination. ☑ Establishment of new management structures or partnerships. ☑ Integration into local or national planning. ☑ Capacity building for institutions or communities.

The intervention strengthened coordination among research institutions, environmental agencies, and park authorities. It contributed to the development of standardized restoration

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approaches that can inform environmental policies and land management strategies. New partnerships were established across national and international organizations. The project also enhanced institutional capacity through knowledge exchange and technical training, supporting integration into broader environmental planning frameworks.

4.4 SUSTAINABILITY OF THE RESULTS

☑ Integration into policies or development plans. ☑ Institutional support or partnerships. ☑ Local technical capacity for maintenance. ☑ Monitoring and adaptive management systems.

The long-term sustainability of the intervention is supported by strong institutional partnerships and alignment with EU environmental policies. The development of a replicable restoration protocol ensures applicability beyond the pilot site. Continuous monitoring systems, including remote sensing, enable adaptive management over time. Local technical capacity has been strengthened, allowing maintenance and scaling of restoration activities. Although long-term funding mechanisms are not fully secured, integration into policy frameworks increases the likelihood of continued support.

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5. CONCLUSION

- **Community relevance:** mostly.
The intervention addressed degradation of Mediterranean dry grasslands that affected ecosystem services and local agro-pastoral activities. Restoration improved landscape resilience, soil fertility, and conditions supporting traditional land uses.
- **Technical effectiveness:** fully
The restoration successfully improved vegetation cover, biodiversity, soil stability, and ecosystem functions through Nature-Based Solutions. Techniques such as sod cutting, hay transfer, native seed introduction, and soil stabilization supported grassland recovery.
- **Economic efficiency:** partially.
The project was largely supported by EU LIFE funding and partner contributions, reducing financial barriers. However, long-term maintenance and continued funding remain challenges.
- **Institutional support:** fully.
Strong cooperation between research institutions, protected area authorities, and environmental organizations supported planning, implementation, monitoring, and integration into wider conservation strategies.
- **Innovation:** fully
The project introduced innovative dryland restoration methods by combining traditional ecological practices with structured Nature-Based Solutions, adaptive monitoring, and replicable restoration protocols.
- **Replication & Scaling Potential:** fully
The tested restoration approaches and monitoring frameworks can be adapted to other Mediterranean dryland ecosystems facing degradation, biodiversity loss, and climate pressures.

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