

Giving LIFE to grasslands – restoring biodiversity and ecosystem services

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BACKGROUND AND INTRODUCTION

- Semi-natural grasslands and their diverse biota are currently most threatened by changes in land-use like afforestation, abandonment of historical lowintensity management practices or **conversion into arable land**.
- Extensive loss and fragmentation of semi-natural grasslands consequently affects the ecosystem functioning and sustainable provision of ecosystem services.
- Our study focused on calcareous semi-natural grasslands in Estonia that have lost an extensive area of their historical spread due to afforestation or shrub encroachment, having profound effect on the local biodiversity and on the supply of ecosystem services.
- LIFE+ Nature project LIFE to alvars was set in motion to halt the continuing decline of calcareous grassland area in Estonia.
- LIFE to Alvars project restored 2500 ha of historical calcareous grasslands to



STUDY SITE



We selected **35 study sites** and within each study site we established three **subsites** according to different stages of alvar grassland degradation (condition classes) – relatively open grassland,



maintain and promote biodiversity and ecosystem functioning.

The European Commission has chosen the Estonian alvar restoration project (LIFE to Alvars) as the best LIFE project in Natura 2000 areas!



In 2018, project Life to alvars was selected as the LIFE project with the best socio-economic impact!

- overgrown grassland (dense shrubs), afforested grassland (Pinus sylvestris plantations). Additionally, we selected relatively open grasslands that were not going to be restored as **control subsites** for all the study sites.
- To analyse the changes in biodiversity and in the potential supply of ecosystem services, we used the information collected during the field studies before and after restoration as indicator values measuring service supply.

RESULTS

VOUR RESULTS suggest that restoration and reinstatement of the low intensity grazing regime had a significant positive impact on the provision of several vital ecosystem functions and services in overgrown and afforested grasslands Fig 1.

Fig 1. Ecosystem service (ES) supply before and after restoration in grassland condition-wise comparison. The ecosystem service indicators used for measuring ES supply had different units and scales, to make all indicators comparable we standardised the values using a scale function in R. After standardisation, all indicator values where unitless and on the scale from 0 to 1. To describe a service, several standardised indicators were averaged to get a relative score of the ecosystem service per subsite in relation to the average of the given service over all subsites. Arrows indicate the significant changes in ES supply after restoration compared to the same condition class before restoration.





specialist plant species emerging from banks or from surrounding relatively intact habitats.

dense

(>75%

cover)

OPEN ALVAR	OVERGROWN AFFORESTED SUBSITE	CONTROL
	Condition 🖶 BEFORE 🖨 AFTER	

Fig 2. Summed biodiversity of all the taxa monitored (vascular plants, bryophytes, lichens, bumblebees, butterflies, spiders, centipedes, millipedes)

TAKE-HOME MESSAGE

Considering that semi-natural grasslands are biodiversity hotspots in Europe and support the provision of wide variety of ecosystem services, the restoration and preservation of remaining grassland fragments is of great importance, and afforestation projects should not be executed on the expense of remaining species-rich grassland communities. Also, further research on the effect of drought on grassland ecosystem services is needed.

