



*Life*

**DESERT-ADAPT**

# Preparing desertification areas for increased climate change

## LAYMAN'S REPORT

Restore Nature, Change to Adapt



LIFE16 CCA/IT/000011

This project has received funding from the LIFE programme of the European Union

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# Desert-Adapt LIFE project at a glance

## DETAILS OF THE PROJECT

**Number:** LIFE16 CCA/IT/000011

**Location:** Italy, Spain, Portugal

**Budget:** 4,075 M euro

**% EC co-funding:** 2,439 M euro

**Duration:** 01/09/2017 - 01/09/2023

**Partners:** 19 (9 technical, 10 landowners)

## THE LIFE PROGRAMME

The LIFE Programme is the EU's funding instrument for the environment and climate action.

### **Climate Change Mitigation and Adaptation sub-programme**

Contributes to the shift towards a sustainable, energy-efficient, renewable energy-based, climate-neutral and resilient economy, thereby contributing to sustainable development.

## PROJECT PARTNERS

### **Coordinating beneficiary**

Università degli studi della campania Luigi Vanvitelli (IT)

### **Associate partners**

Forestry Service Group BV (NL)

Associação de Defesa do Património de Mértola (PT)

Universidad de Extremadura (SP)

Università degli Studi di Palermo (IT)

Faculdade de Ciências da Universidade de Lisboa (PT)

TerraSIG Lda. (PT)

Nova Faculdade de Ciências Sociais e Humanas Universidade Nova de Lisboa

Município de Serpa (PT)

L1 Lamp. Municipality of Lampedusa e Linosa (IT)

L2-L11 A&T. Ambiente & Territorio Srls (IT)

L3 SAFT. Società Agricola Franco Turco (IT)

L4 CSL. Consorzio Siciliano LEGALLINEFELICI (IT)

L5 Hoyos. Ayuntamiento de Hoyos (SP)

L6 VdFres. Ayuntamiento de Valverde del Fresno (SP)

L7 Gam. Viveros Forestalis La Dehesa SL (SP)

L8 Cab Gor. Freguesia de CABEÇA GORDA (PT)

L9 Madeira. Sociedade Agrícola Vargas Madeira, Lda (PT)

L10. Sobreira. Sociedade Agrícola da Sobreira, Lda (PT)



# Desertification risk and climate change

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“The Mediterranean is the most susceptible region in Europe to soil degradation and desertification”

“Due to human-created pressures and global warming, many areas in Europe's Mediterranean region are reaching critical limits for their ability to provide ecosystem services”

“In EU 33% of soils are degraded and 90% might be by 2050

The cost of soil degradation for the sole EU is in the order of billions of euro per year”

In a scenario of increasing climatic pressure **ADAPTATION** and **SUSTAINABLE** land managements are the only answers to allow productive system to recover ecosystem services functional to ecosystem health, productivity and resilience to the progressively increasing climate stress.



# Desert-Adapt LIFE mission

*of public and private landowners*



Contribute to the fight against Climate Change and Land Degradation



Embrace the responsibility to protect the land by using adaptive strategies to ensure a safer planet for present and future generations

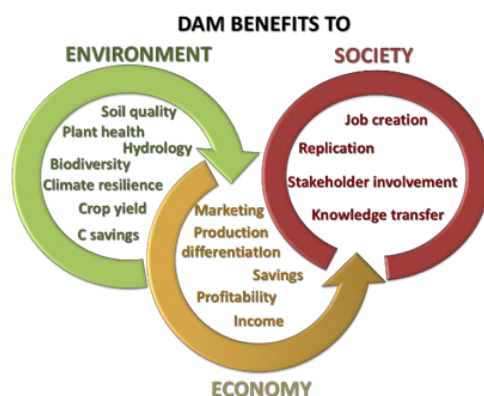


Seek long-term land sustainability, economic self-sufficiency and social balance valorising nature-based solutions and natural capital

## Desert-Adapt LIFE goal

Desert-adapt aims to demonstrate adaptive strategies of land management specifically designed to counter aridification and land desertification in Mediterranean areas under desertification risk.

The land management model we define “**Desertification Adaptation Model**” (DAM)” is an integrated ecosystem approach which combines targets and measures of environmental sustainability and climate change adaptation with actions aimed to improve socio-economic conditions.



## Desert-Adapt LIFE specific objectives

**Objective one:** to test the positive effects of 9 DAM case studies representative of three regional areas of Mediterranean EU at desertification risk.

**Objective two:** promoting DAM system among a variety of stakeholders seeking socioeconomic opportunities from climate resilient and profitable land use.



# The Desertification Adaptation Model DAM

To create a good adaptive land management plan, land managers need to define the management goals, i.e. the economic, ecological and social problems of concerns that need to be addressed and solved on the short, medium, long term, in their land

## The pillars of adaptive land management strategy

### The environmental pillar: protect and enhance ecosystem quality and services

- Protect and support plants and trees in your land
- Increase plant biomass and cover
- Increase soil organic matter
- Reduce soil erosion and loss
- Stimulate biodiversity at all levels
- Reduce fire risk
- Protect quality and quantity of water bodies

### The economic pillar: seek long-term self-sustainable economic investments

- Differentiate income sources including bioproducts and ecoservices which valorise your local natural capital
- Prefer local varieties and breeds which are adapted to local climatic conditions and soils
- Focalize the attention on management options that save money whilst increasing land quality
- Avoid agronomic species that are not climate adapted
- Focus on investments which have long term positive effect on your land

### The social pillar: be inclusive for the local population

- Contribute to raise awareness and become a testimonial of sustainability with your personal experience
- Make your natural capital a shared good and responsibility

Landowners create a DAM plan as a balanced mosaic of functions aimed at responding to the needs of the three pillars

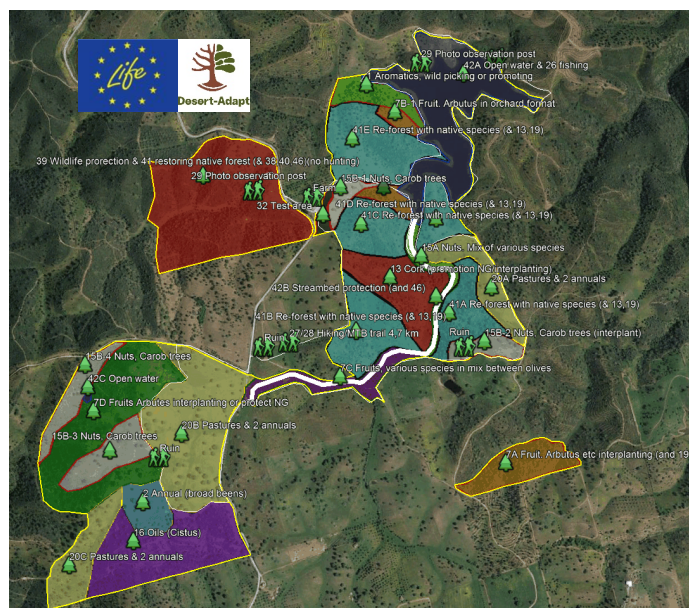
- ECONOMIC
- ENVIRONMENTAL
- SOCIAL

Making preferential use of ADAPTED SPECIES

Applying ADAPTATION MEASURES

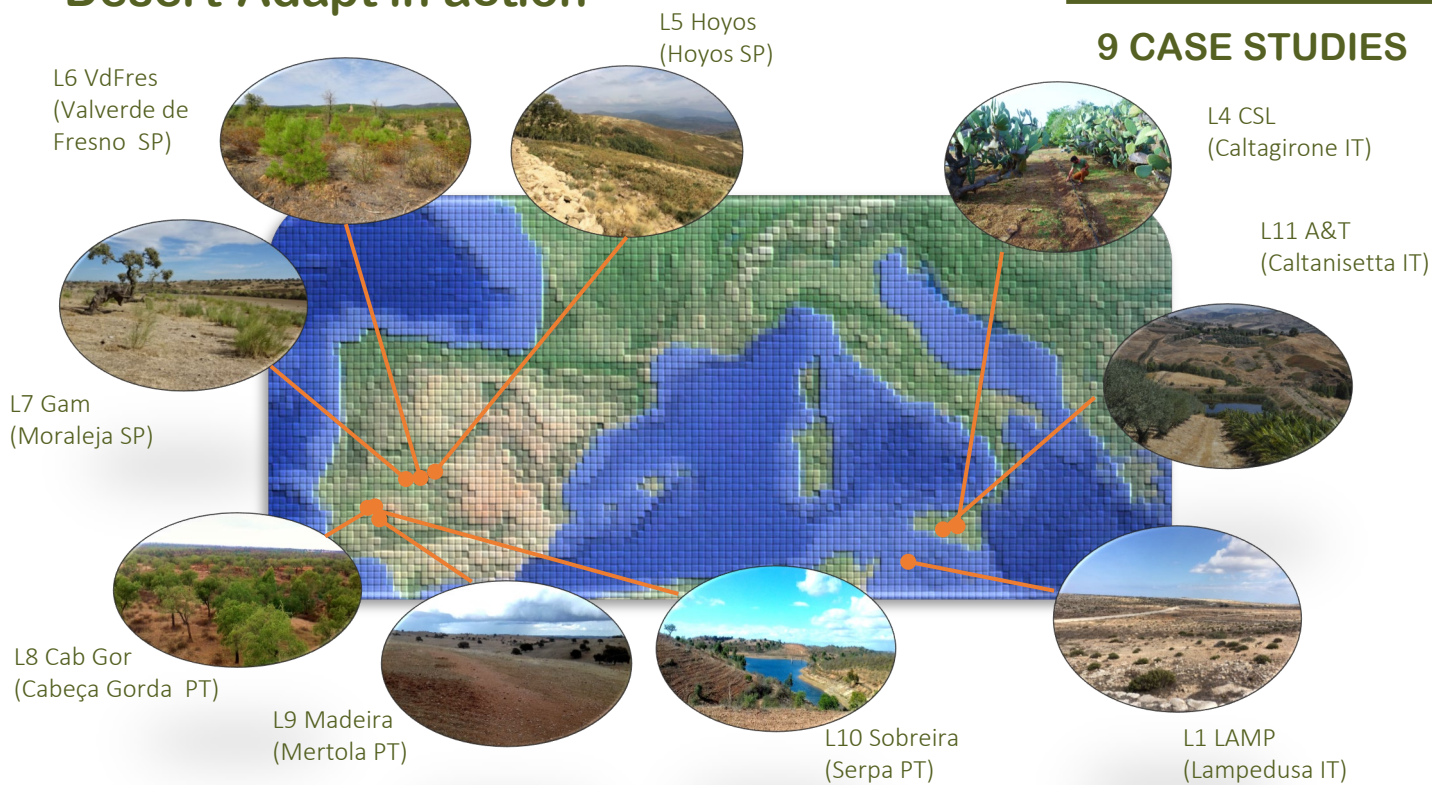
Using NATURE-BASED SOLUTIONS

Considering in the COST/BENEFIT analysis the costs and extra value of increased ecosystem services



# Desert-Adapt in action

## 9 CASE STUDIES



## 9 Desertification Adaptation Models created

The 9 landowners, 4 municipalities and 5 private farming companies have co-created together with the technical staff 9 DAM plans covering a total of 1016,18 hectares



# Desert-Adapt in action

## DAM implementation in the field

### Land functions (51)

Economic (37)

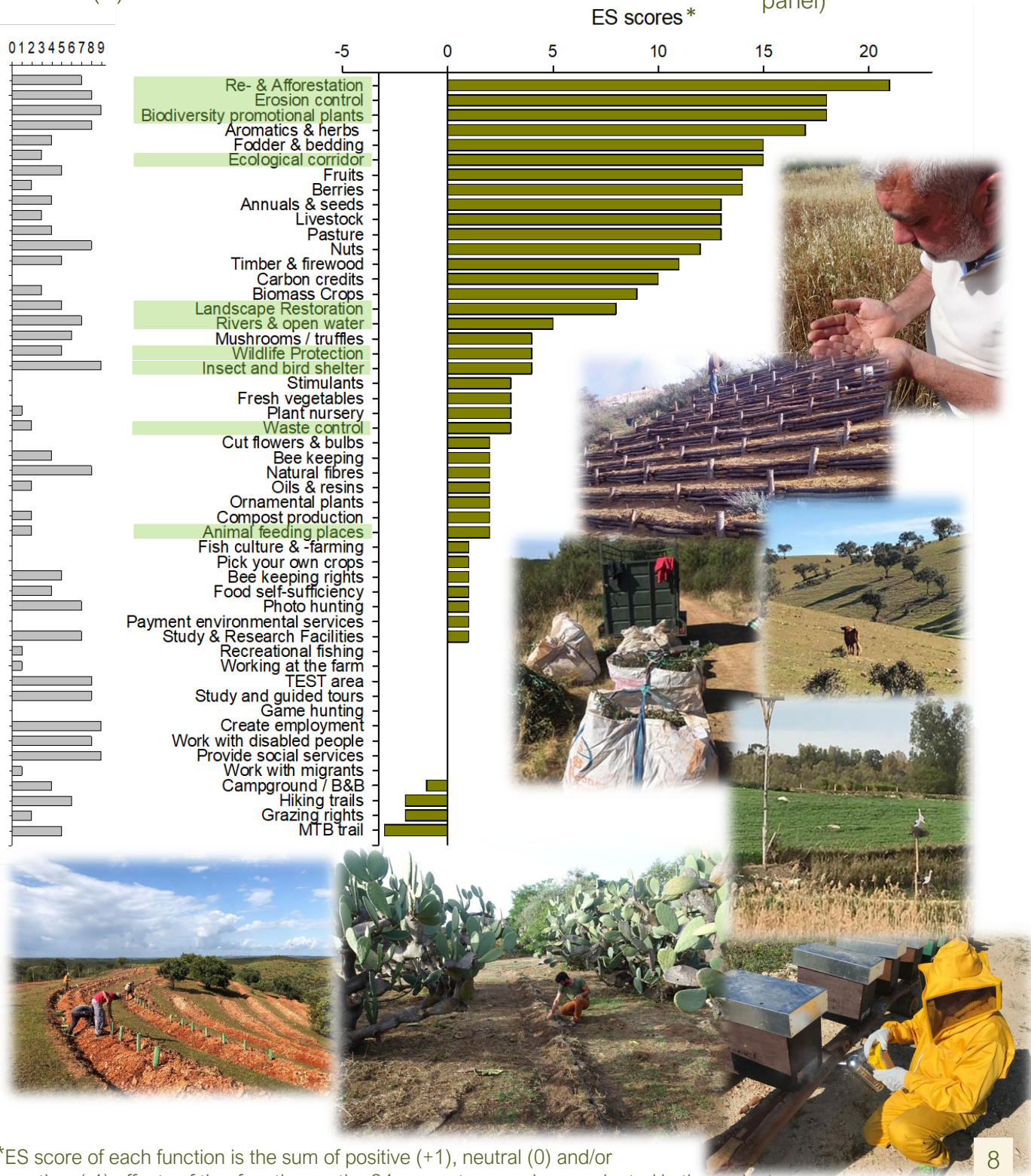
Ecological (11)

Social (3)

### Functions

Ecosystem Service score

In grey scale n° of landowners (out of 9) who chose the specific function on the right panel)



\*ES score of each function is the sum of positive (+1), neutral (0) and/or negative (-1) effects of the function on the 24 ecosystem services evaluated in the project

# Desert-Adapt in action

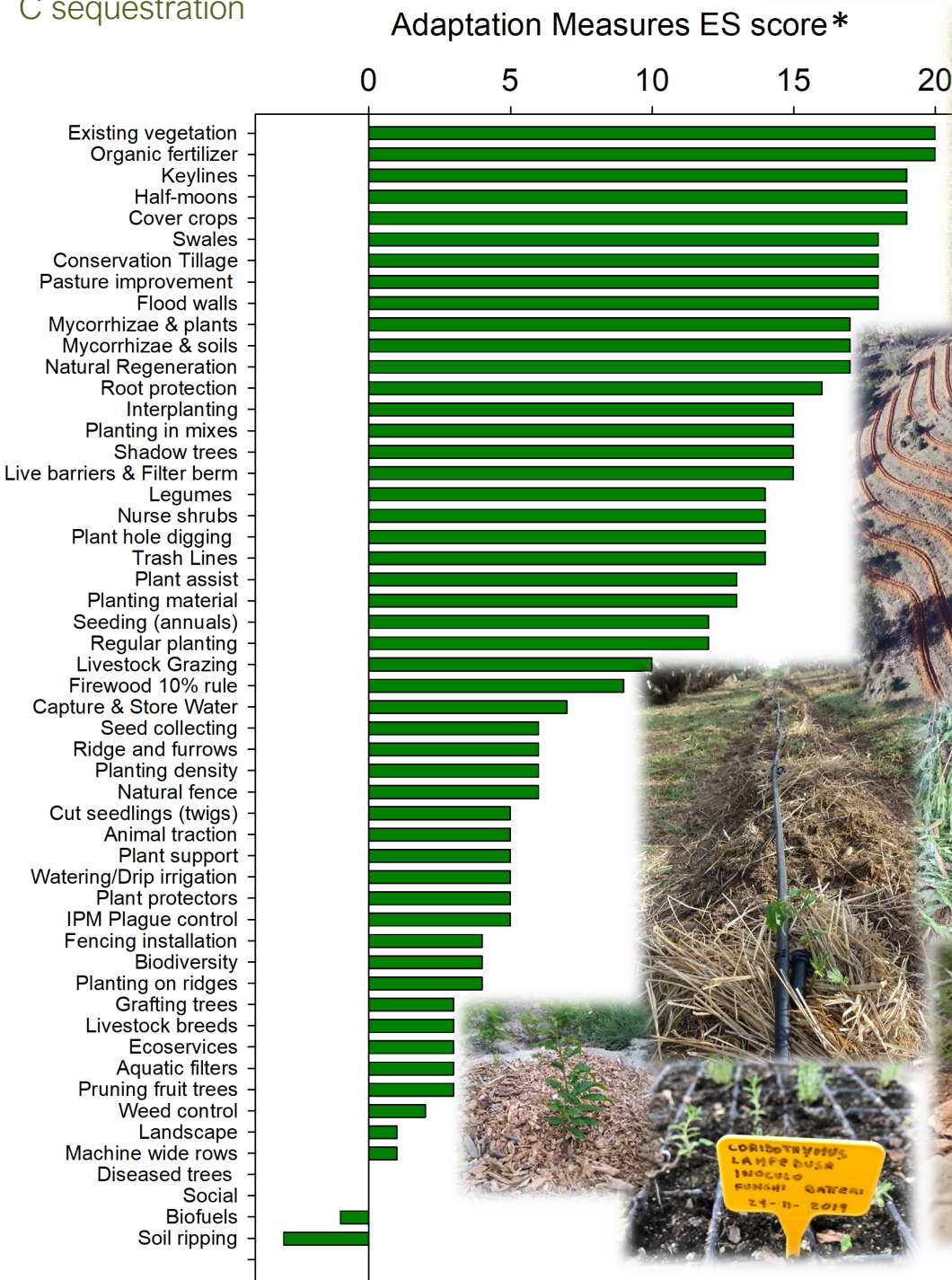
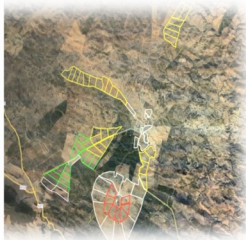
DAM implementation in the field

## 53 Adaptation measures implemented related to

- Soil management
- Plant management
- Landscape
- Hydrology
- Livestock
- C sequestration

## Adaptation measures

Ecosystem Service score



\*ES score of each measure is the sum of positive (+1), neutral (0) and/or negative (-1) effects of the measure on the 24 ecosystem services evaluated in the project

# Desert-Adapt SCIENCE in action

In order to validate the effectiveness of the adopted measures on the amelioration of ecosystem services and cost/benefit analyses, Desert-Adapt identified characterized and monitored:

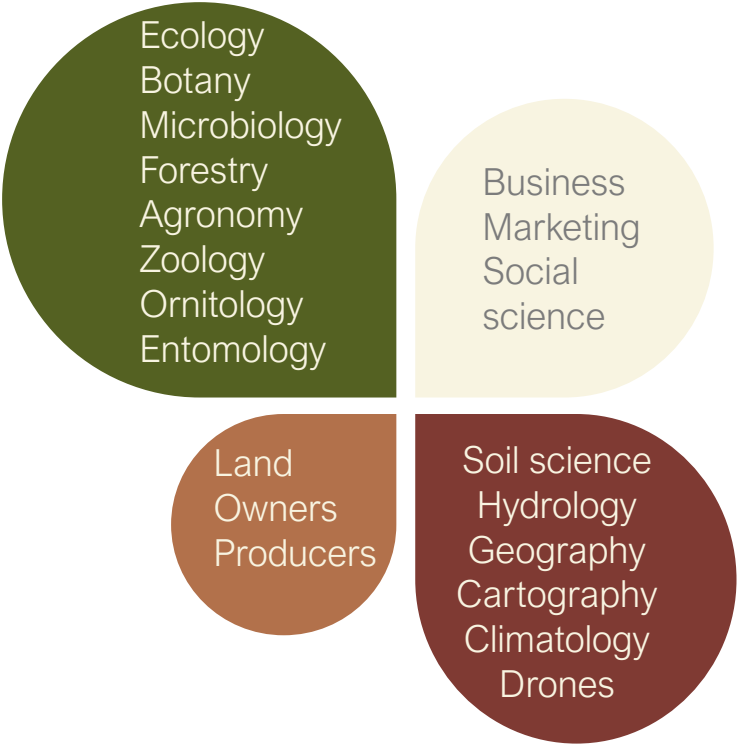
- 24 key project indicators (KPI) for the environmental amelioration of ecosystem services and natural capital
- 7 KPI for economic performance and replicability

## BASELINE CHARACTERIZATION CAMPAIGN IN 2018

## CONTINUOUS MONITORING AND CAMPAIGNS IN 2022-23



8 technical partner teams, more than 30 experts, to evaluate project KPIs in 16 areas of impact



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# Desert-Adapt in number

## RESULTS

### LAND AND ENVIRONMENT



1016,18 ha covered by DAMs  
Planted 93.391 trees, shrubs and plants in 132 species



C sequestered in the vegetation: 0,26 Tons C/ha/yr in newly planted trees and 3,8 Tons C/ha/yr in the pre-existing vegetation



Around and 180 Ton CO<sub>2</sub> sequestered in total on average per year with newly planted trees



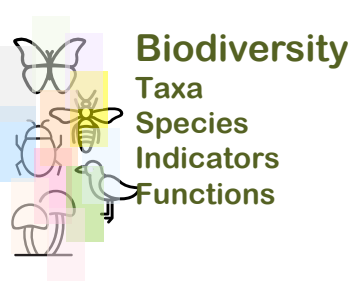
Reduction of 1 ESA class (Environmentally Sensitive Area to desertification) over areas of intervention



2-3% increase of soil water retention capacity  
34-66% avoided soil run-off by improved land use  
3 folds reduction of plant mortality rates by use of plant growing aids



52-67% increase of soil C, 53-77% of soil N under adaptation measures  
49-59 % increase of aggregate stability under adaptation measures  
36-47% increase of nutrient retention (CEC) under adaptation measures



6-18 % increase (frequency -intensity) of mycorrhizal root colonization  
Indicator species: +30% more bird species; +29% soil fauna taxa; + 15% QBS, no variations of butterfly Shannon index and 2% variation for Bees shannon index, while no increase in taxa.  
>30% in soil microbial biodiversity, biomass and functionality



# Desert-Adapt in number

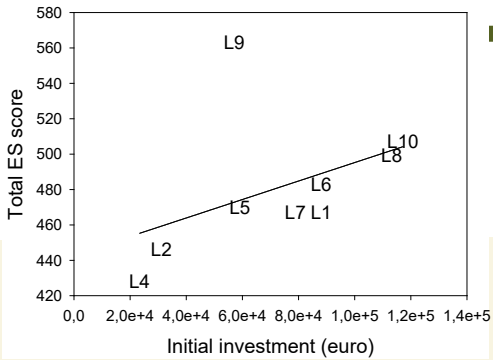
## RESULTS

### Generated project indicators

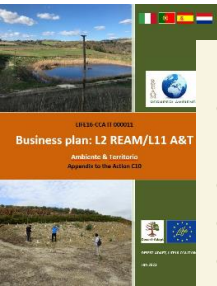
6 partners with positive balance have  
Internal Return Rate up to 22% increase  
Potential revenues (in 12 yrs) up to 209 €/ha

Cost/benefit analysis of initial investment (€ ) for chosen functions and measures vs. estimated score of ecosystem services (ES score) reported for each partner.

### Socio-economic outputs



### 9 Business plans (1 for landowner) integrating



- Economic model of the DAM
- Cost & income for each of the 120 functions
  - Final balance of complete DAM
  - Internal Rate of Return (IRR)
  - Capital employed & initial investment
  - Payback year



### Commercial Plans

for 11 products, extra to the business as usual production, from economic functions introduced in the DAMs



# Desert-Adapt in number

## RESULTS

### REPLICATION

Dissemination by **REPLICATION** of **good practices** for the fight against climate change, land degradation and desertification risk is a strategic objective of the Desert-Adapt project.


The project has created a tool kit to support stakeholders in creating their own sustainable land management plan (DAM Model). Our partners (landowners have open their farms to share their knowledge and experience with new friends in a beneficial reciprocal flow of knowledge. The final aim is to create **RESILIENT COMMUNITIES** based on sustainable and adaptive common goals and strategies.

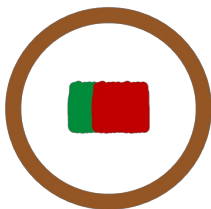
**WHO CAN BE A REPLICATOR?** public bodies, companies, organizations, citizens, who manage portions of the land and who care for the sustainability of their land and share our vision, as reported in the [Desert Adapt MANIFESTO](#).

*The tool kit can be downloaded from to the project webpage*

## DESERT-ADAPT REPLICATORS

*involved during the project*

	N° of replicators	 14	 36	 35
	Hectares of replication	87.8	5.669.7	4793.8



Click to explore our replicators or go to the project website [www.desert-adapt.it](http://www.desert-adapt.it)

# Desert-Adapt in number

## Dissemination Communication & networking

## OUTREACH

**>450,000** Cumulated impressions on social media and web page

**63** News and interviews on media, TV, radio **>100,000 views**

**17** Informative videos  
**17** DRONE flight video } **>37,000 views**

**1** Replication toolkit

**9** Stakeholder meetings **81 attendees**

**45** Open days and outreach events with farmers and policy makers including final conference **3718 involved**

**33** Networking activities with LIFE and other projects and stakeholders

**1113** Students involved in activities

**27** Presentation to national and international congresses **>4000 involved**

**4** ISI scientific publications of project results

**15** Open training courses **365 attendees**



# Desert-Adapt long-term environmental benefits

## Contribution to EU and international environmental objectives

Desert-Adapt sites are expected to increase, over the 11.000 ha of partners and replicators, C sequestration, to reduce soil erosion and to increase ecosystems services, contributing to the EU targets of climate neutrality 2050, to the EU biodiversity strategy, to SDGs 2030 targets and to the nature restoration law. The actions are also in line with the expected engagement of farmers to the Farm to Fork strategy objectives of sustainability of the food system.

## Increased climate resilience

The proposed adaptive management strategies provide a clear roadmap for landowners to increase their resilience to the increasing climate change, reducing desertification risk as well as economic and social risks.

## Best Practice lessons and Spin-off effect

The demonstration value of the proposed best practices is expected to spin off in the coming years more actions from the partners (more intensive and extensive engagement) which can spill over to neighbours and connected stakeholders.

# Policy implications and recommendations

<b>Adaptation</b> <b>Climatic extremes beyond expectation</b> Need to increase adaptation measures adoption&strategies/fire management plans/water collection <b>Lack of awareness and knowledge</b> More dissemination/communication & education measures needed on the topic <b>Lack of technical dedicated staff for sustainable management planning</b> Need for consortia with centralized offices providing sustainability services with skilled technical personnel
<b>Economic sustainability</b> <b>Costs of measures not covered by subsidies</b> Need to identify more relevant adaptation measures to be financed at local/regional level More diffused support to farmers for access to and implementation of financed measures <b>Strong competition for manpower and water on smaller farmers from big agro-companies</b> Consortia forms and dedicated infrastructures are needed
<b>Policy gaps</b> <b>Lack of a supporting sustainability network for farmers/municipalities</b> Initiative to support the creation of networks <b>Complex bureaucracy for plans in public areas</b> Support/ simplification <b>Conflicts with other EU frameworks (PAC, Natura 2000)</b> Disentangle real “ecological/adaptation” priorities and synergies in the most climate exposed areas, adaptation and socio-economic sustainability in tandem with environment sustainability



**Desert-Adapt**

Restore Nature, Change to Adapt



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**[www.desert-adapt.it](http://www.desert-adapt.it)**



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**LIFE16 CCA/IT/000011**  
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