

STONEWALLSFORLIFE project: how to achieve climate change adaptation through both tradition and innovation

Francesco Marchese
Emanuele Raso
Cinque Terre National Park

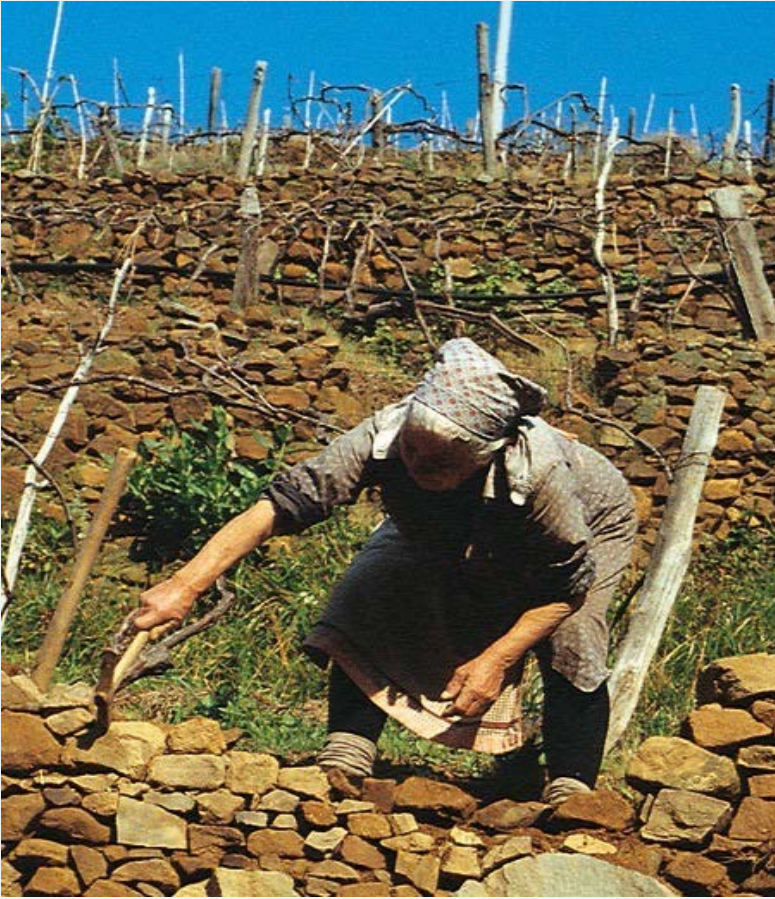
www.parconazionale5terre.it
www.stonewalls4life.eu



The **National Park of Cinque Terre**, born in **1999** and with its **3,868** hectares wide surface, is one of Italy's smallest National Parks and the most populated at the same time, with about **4,000** inhabitants distributed in five hamlets.

In more than 1000 years man changed the natural environment by sectioning the steep slopes of the hills to obtain stretches of land and cultivate them supported by kilometers-long dry-stone walls. This is the real characterizing feature of the Cinque Terre, with an unusual and deeply anthropized landscape: this is why this is the "**Parco dell'Uomo**" (literally Park of Man), a territory that has become a **World Heritage**





Each hectare includes 4.200 m³ and 3.360 m of dry stone walls

Terraces are spread over an area of 2.000 hectares

The whole volume of stones used for dry stone walls building is estimated in 8.400.000 m³

The total length of dry stone walls has been calculated in 6.700 Km

SUSTAINMENT OF AGRICULTURAL PRACTICE

Since 2001, the Cinque Terre National Park has adopted a service card system that enables people to use the services supplied by the Cinque Terre National Park Authority, and that represents a kind of self-financing. The proceeds of the **Cinque Terre Cards** are mainly used to upkeep and **restore the territory** (stones, fences, grafted vines, maintenance of hiking network, monorail) as well as to provide transport services within the territory.

Training activities about drystone walling techniques (local knowledge/technical knowledge)



STONEWALLSFORLIFE project



PROJECT LOCATION: Parco Nazionale delle Cinque Terre (Liguria - Italy); Parc del Garraf (Catalonia - Spain).

Grant Agreement no. LIFE18 CCA/IT/001145

Sub-programme:

CLIMATE CHANGE ADAPTATION

BUDGET INFO:

Total amount: 3,714,493 €

% EC Co-funding: 2,039,748 € (55%)

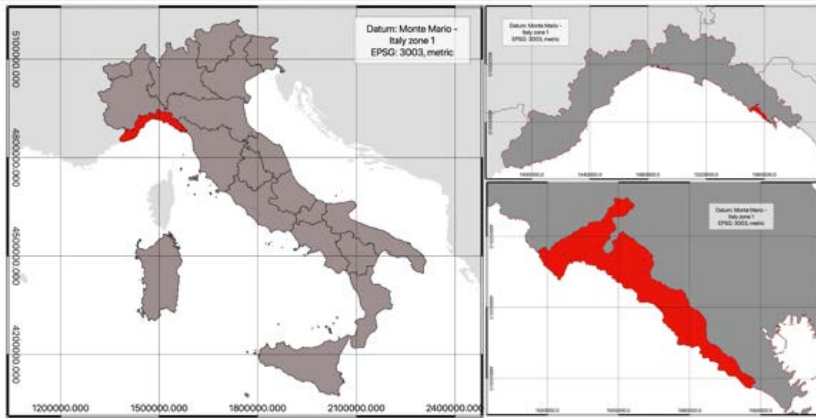
July 2019 – September 2024

www.stonewalls4life.eu



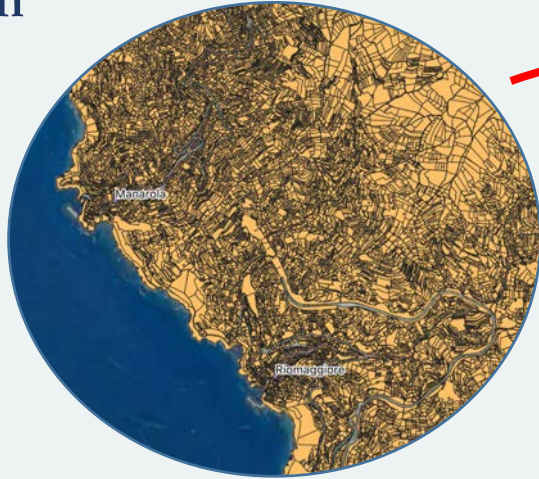
STONEWALLSFORLIFE targets a specific climate problem, the environmentally and socially adverse effects of more extreme weather events caused by climate change. This impact is especially strong on the particularly delicate territories characterized by terraces build with the drystone technique, such as those of the two areas where the project will be implemented: the **Cinque Terre** in Italy and the **Parc del Garraf** in Catalunya.

The project will demonstrate on a specific site (Cinque Terre in Italy) the **climate change adaptation** effectiveness of the approach by restoring abandoned drystone terraces, making them more resilient with innovative techniques, and handing them, through the mediation of a local association, over for productive use with long-term contracts to farmers who commit to their maintenance.



The strategy

Extreme parcelling of the cadastral system



Development of the farms



High frequency of natural phenomena



Risk awareness



Adapting to climate change: history meets the future

Objectives

DEMONSTRATE

long term climate change adaptation effectiveness of drystone walls in Manarola, Cinque Terre National Park

INNOVATE

improve resilience to climate change through sustainable innovative solutions, whose effects will be monitored

TRANSFER KNOWLEDGE

create adaptation strategy for local authorities, create and foster capacity and expertise among local stakeholders: associations, construction workers, agricultural sector

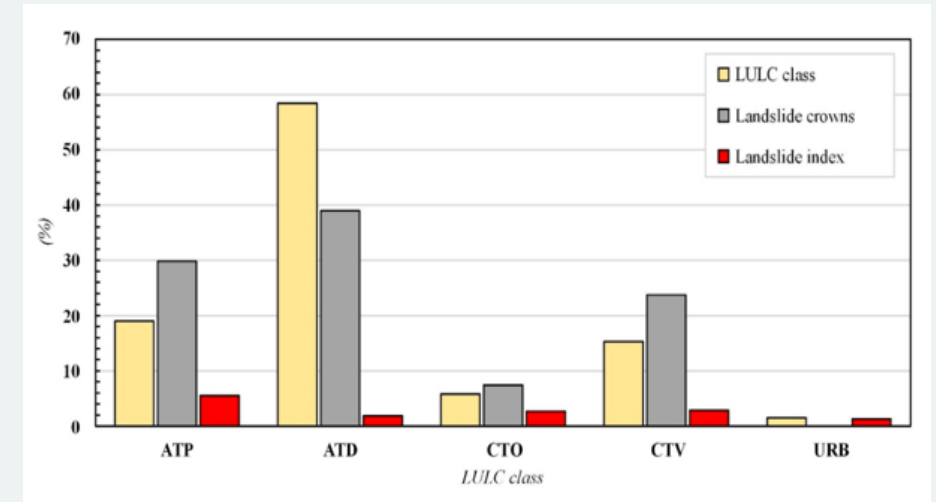
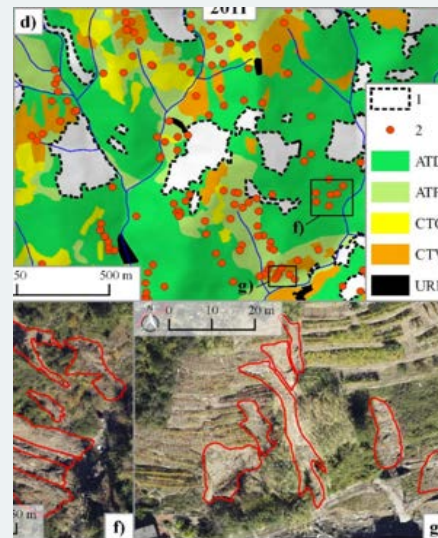
REPLICATE

perform the scientific, technical and social preparatory work for replication interventions in 3 additional sites (40 hectares)

When do dry-stone-walls assolve their function in order to decrease **landslides** and **flash flood** triggering?



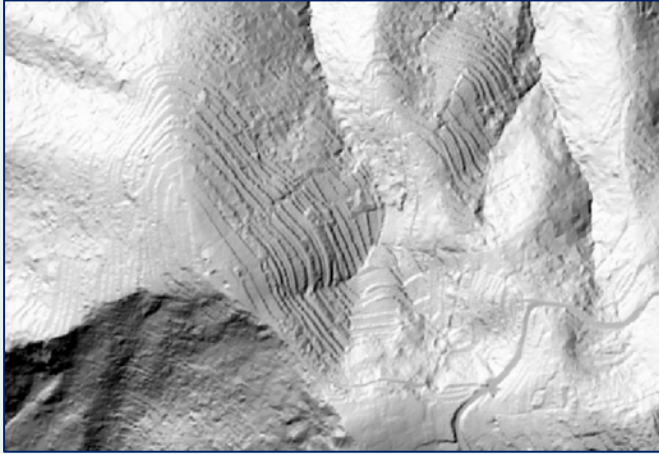
«when the hydraulic conductivity of the wall is greater than that of soil, for any combination of duration and return period, the wall is able to successfully drain the water from its backfill» (Camera et al., 2012)



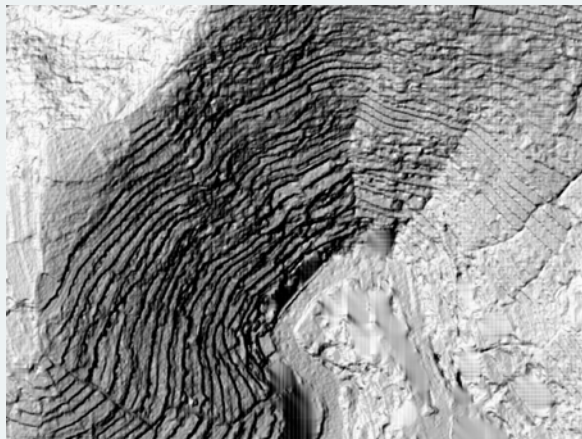
«this research showed that shallow landslides triggered on CT were on average characterized by lower magnitude than those occurred on ATP and ATD. This outcome is consistent with similar studies and testifies the negative consequences induced by the cessation of terrace cultivation and maintenance on slope stability» (Pepe et al., 2019)

Activity carried out (2019 – 2020)

High-detail digital products



DTM 1m x 1m



DTM 20cm x 20cm

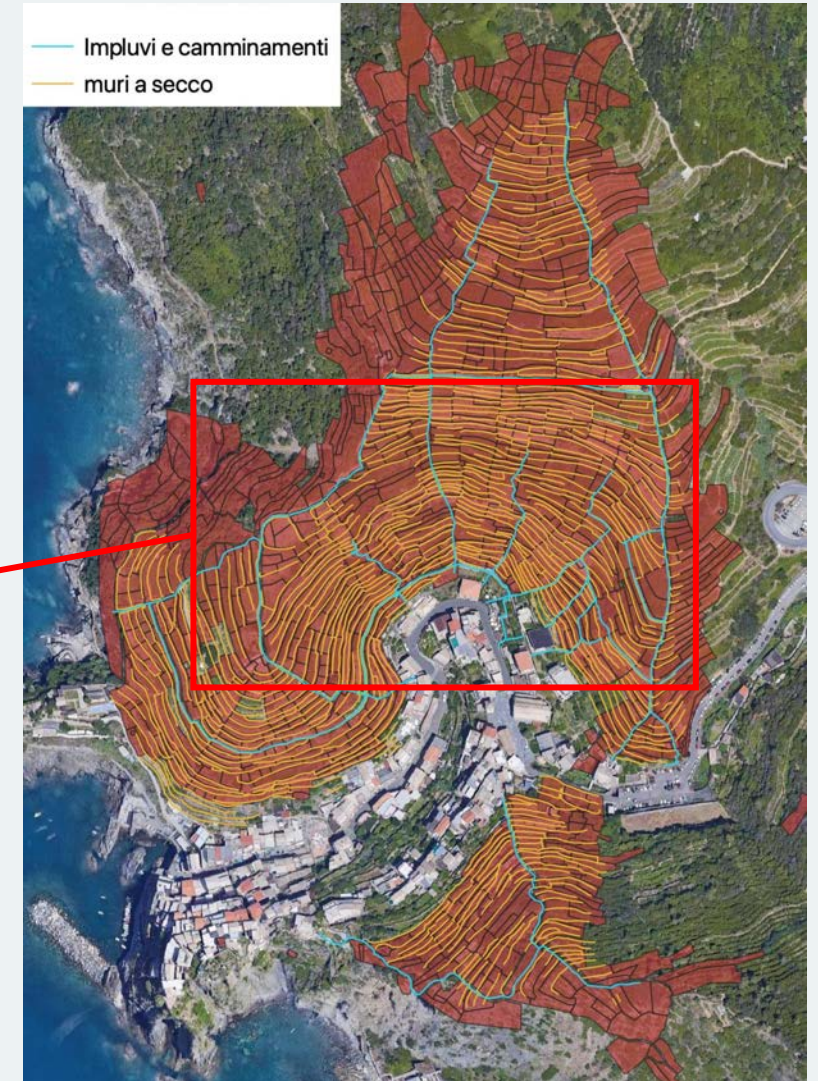


3D models + high res ortophotos (1 pxl
= 5 cm)



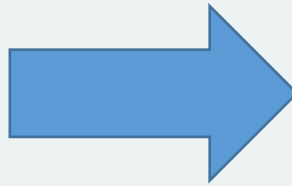
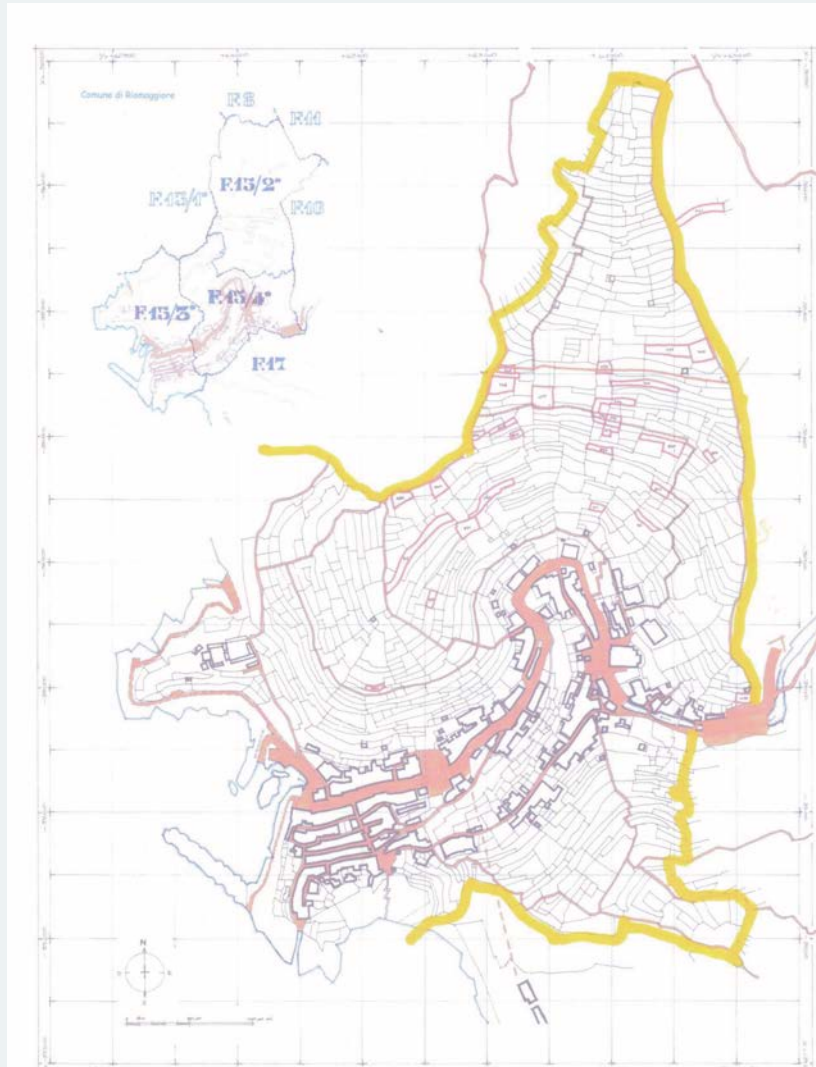
Digitalization of dry stone walls
linear elements (vectors)

Digitalization of main
morphological features

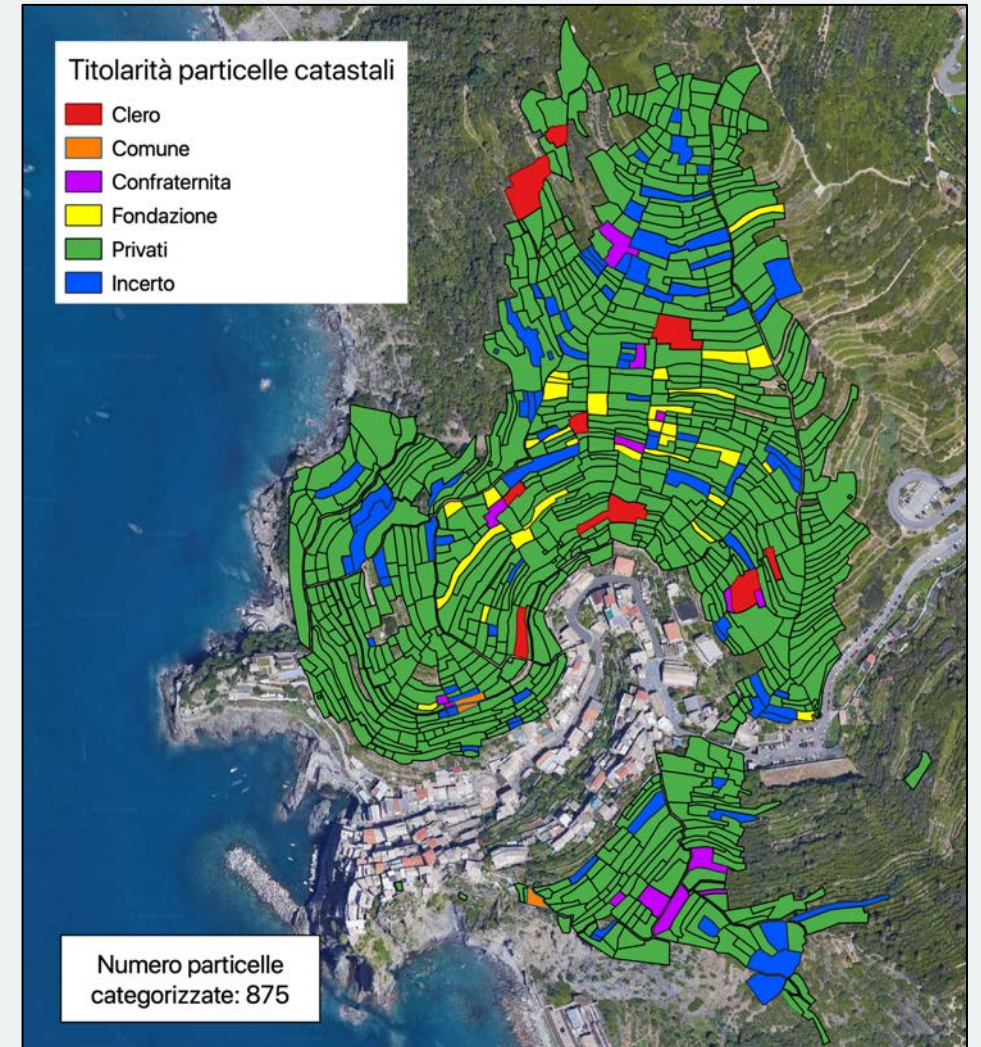


Activity carried out (2019 – 2020)

Ricerca catastale Fondazione (cartaceo)

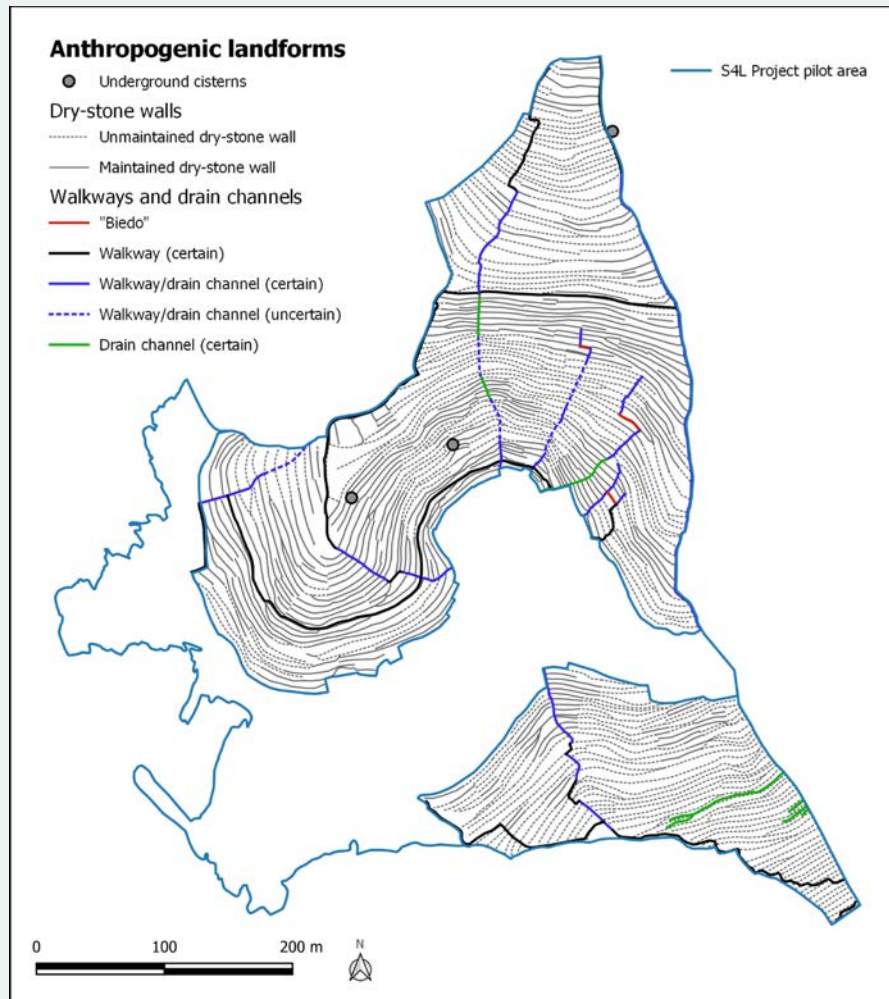


Georeferenziazione particelle



Activity carried out (2019 – 2020)

Anthropogenic landforms and geological survey of the pilot site.



EXPECTED IMPACTS

- Demonstration intervention: **5 hectares** of terraces and **4,000 square meters** of drystone walls recovered for long-term sustainable agricultural use with improved soil surface, preserving a unique habitat. **9.7 hectares** with strongly improved resilience to flooding (intervention area and village), protecting **353 inhabitants** and **5000 daily visitors**.
- Through the replication strategy and studies, up to **40 hectares** of drystone walls terraces will be identified for replication interventions and the preparatory analysis (environmental, technical, social, economic) performed in full.
- **9 innovative techniques** (4 construction, 2 soil consolidation, 3 farming), with potential to increase resilience to climate change, tested and their impact monitored (at least 25 indicators).
- Knowledge exploitation: a **Handbook** on the use of terraces for adaptation, **three Case Studies** for replication, at least **three scientific papers** and a **scientific report** (on water drainage, soil solidification, farming methods), two **Adaptation Plans**, a drystone walls **Course Booklet**.
- Through a targeted communication strategy, **80,000 people** informed plus **2,000 individuals** from selected target groups (farmers, land owners, donors, etc) reached via workshops, meetings, and seminars; at least **12 presentations** at events (Covenant of Mayors, LIFE events, etc).
- Creation of **jobs** during recovery



POLICY IMPLICATIONS

- Strong on **Sustainability** (continuation, replication, transfer)
- **Clear and consistent intervention logic:** the links between root causes, problems, objectives, actions and results are adequately explained and clear.
- **Multipurpose** (not only water, also other Climate Action work areas such as fire risk, resilience of agriculture etc.)
- Many **synergies:** jobs, GAP/CAP, integration of migrants, biodiversity, transnational.



CONTINUATION (REPLICATION, TRANSFER, MARKET UPTAKE)

- A detailed and well thought **replication, transfer and dissemination strategy** will be produced and implemented during and after the project; many supportive stakeholders and organisations have state their willingness to continue to pursue this objective also after the end of the project.
- The replication-interested stakeholders will be able to use the **extensive studies** performed on the **three replication sites** identified
- The **knowledge** (e.g., Handbook) on the use of stonewalls for adaption will be easily employable elsewhere: the division in sub-chapters (techniques, climate issues, financing etc.) will allow its use both as replication model for and to transfer single aspects.
- The **communication material** (website, smart-phone app, etc) will be made available as far possible for continued use after the end of the project.



2021 - 2024

