



TERRASAFE

Cultivating resilience, restoring the earth.

Innovations for empowering communities in Europe and North Africa to combat desertification



www.terrasafe.eu

Cover photo: Bouajila Essifi



Co-funded by
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NEWSLETTER

#04
JUNE
2026



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Newsletter #04

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Editorial

Sofia Corticeiro,
TERRASAFE Coordinator



Exciting times for TERRASAFE

The last six months have been an exciting time for TERRASAFE.

All of our pilot areas have started or completed their innovation implementations, and we have high expectations of results that might contribute to a turning point for healthy soils in Europe and North Africa, the regions where we work.

On pages 7-10 of this newsletter, we showcase the work of some of our pilot areas and explain in more detail what implementation involves.

We also had our annual meet up in Djerba, Tunisia where we got to look at the Tunisian testing area in Oum Somaa, along with field trips to Chott el Jerid, Tunisia's largest salt flat, the El Berrada cooling system, and finally meeting members of a Berber community in Matmata.



We're delighted that TERRASAFE has been very active on the ideas front, writing blogs outlining our ideas on desertification and sharing some of our initial surveys with pilot area communities.

One important moment for TERRASAFE is helping to launch the AgriTechHub cluster, a collective project to share ideas on soil innovation. On page 15, we share some of our partners' activities.

Together, these activities have moved TERRASAFE from planning to practical implementation, laying the foundations for evaluating which innovations can effectively support healthier soils and greater resilience to desertification.

The next six months promises to be very interesting, with initial results starting to emerge from our pilot areas and some important landmark deliverables to be published and shared.

We hope you sign up to our newsletter to get news about this and also follow us on your favourite social media platform. Let's hope that this is just the beginning for our project to reverse desertification.

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About TERRASAFE



TERRASAFE is a major five-year project (running 2024-2029) investigating innovations for preventing and reversing desertification.

Our goal is to empower communities to tackle the growing threat of desertification, particularly accelerated by climate change.

We work closely with community members, including farmers, foresters, community groups and local authorities, in five vulnerable regions of Europe and north Africa. Each of these pilot areas faces its own unique challenges, and we have selected innovations to test that are best suited to these unique challenges.

We will promote the wider adoption of TERRASAFE-certified nature-based, technological, and social innovations, and provide policy recommendations that support their uptake to transform the resilience of land and communities to desertification.

TERRASAFE is funded by the EU under Horizon Europe and UKRI (UK Research & Innovation).



Italy:
Land abandonment
and depopulation



Spain:
Water scarcity



Romania:
Vegetation
decline



Tunisia:
Soil salinisation



Cyprus:
Soil organic carbon
decline

Pilot areas

We are working with communities in five countries to test innovations for combatting desertification.



Interview: ELD Initiative



We interviewed Mark Schauer, Co-coordinator of the Economics of Land Degradation Initiative (ELD), about the ELD's work, success stories, and why calculating the true value of land matters to land restoration.

When and why was the ELD initiative set up?

The ELD Initiative was set up 15 years ago after a series of reviews and the other Rio conventions highlighted that climate change mitigation and adaptation, biodiversity and so on had an economic value. It's aim was to rectify the persistent failure to assess the true value of land, bridge the science-policy gap and drive investment in land restoration. ELD is supported by the German Federal Ministry for Economic Cooperation and Development (BMZ) and hosted by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

How does changing the way we think about land value feed into reversing land degradation from your perspective?

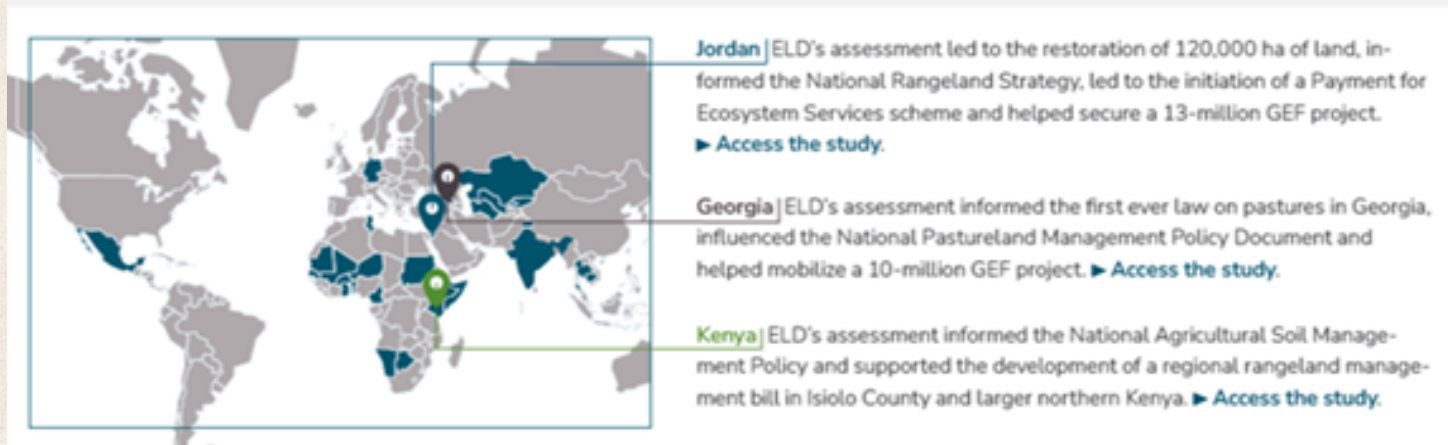
So in the beginning, the work we did was

more about the costs of land degradation. But increasingly our narrative has changed. It's currently more about pointing out the opportunities, that investing in sustainable land management pays off. We push for investments, be it public or private money, into reversing land degradation, into sustainable land use measures, into combating desertification.

How would you describe those opportunities?

A nature-positive economy could generate up to US\$10.1 trillion in annual business value and create 395 million jobs by 2030. But I can also show some examples where we did an impact assessment and where the scientific results that we produced have been taken up and been used, as seen on this slide.

ELD implemented 50+ case study assessments in 30 countries since 2011 supporting governments around the world in taking better land decisions (as of end of 2025).



Your approach feels very pragmatic, recognising what governments and maybe businesses are mostly interested in.

We provide economics as some kind of language to reach out to these guys, right? So they understand the tree is valuable. We put a dollar, euro, pounds value to it. And this makes also the guy from the finance ministry understand, okay, it's worth an investment then.

The work we're doing is always on demand. We do not just parachute in and do a little study, you know, and just for the sake of it. We always work very closely with the stakeholders on the ground and we also train them, so they can carry on the work after our immediate engagement.

And have you had any like specific projects around reversing desertification?

Many. For example, we've been working in Somalia in combating desertification through investment into a more sustainable grassland use. We've been working in Spain - Europe is also affected by these issues. We did work in Mexico, which can be a dry place. This was more on agave and tequila production. But having sustainable production in that context also contributes to reversing desertification.

Now we have a broader approach, working in countries that are not directly affected by desertification specifically, but also by land degradation.

Do you also work with private organisations?

It's mostly governments but also private organisations. We work for NGOs - Groundswell, for example, in Haiti or in Senegal. We've been working with other international institutions, IUCN or UNEP and so on, around larger reports as well. And we are increasingly working with the private sector. Maybe, I don't know, 10 years ago or so, we had a first go at creating something that was called ELD for the private sector. At the time, we did not have the resources to respond to the needs and time frame that the private sector requires for decision making. This has changed, though.

But now we're working very closely with an initiative that's called Business for Land, driven by UNCCD. And you see many international institutions acknowledging that public money is not sufficient to achieve all these sustainable development goals or international targets, and that we need to bring in the private sector.



How difficult is it as an organisation to try and change policy perspectives on land value, given the prevalent short-term and extractivist behaviours that are possibly getting worse because of the current geopolitical situation?

We've been around for 15 years, it takes some persistence, actually, to keep going and see some changes. I'm a forester. I am used to planning longer term and I don't mind being a little patient, but often you need immediate feedback or immediate outcomes that can be quickly seen. I also want to be optimistic here and say that some of the private sector enterprises see that long-term or mid-term investments also pay off, right?

We still get a lot of bad news on the table every day when you're in our line of work. But there is also positive news and some positive examples that we can contribute. There is growing awareness. So I feel like I can still look in the mirror every morning and say, that's all right. But I would be very happy if it would be acknowledged that it's worth maintaining and sustainably managing our natural resources without all this economic information that we're providing.



Mark Schauer is the co-lead for the GIZ project Resilient Rural Areas and for the ELD Initiative.

Before Mark joined GIZ, he worked for the United Nations Environment Programme as the Head of the Central Office of TEEB and the German Federal Ministry for Environment (BMU). His work has been centred on coordinating projects which link economic and ecologic issues, providing economic information for better decision making in the context of sustainable ecosystem management. Mark holds a master's degree in Forest Management from the University of Göttingen, Germany.



TERRASAFE

news



In all of our five pilot areas, work-package teams along with local stakeholders are busy implementing their innovations, which are a mixture of technical, social, traditional and other local strategies. Here we showcase Romania, Cyprus, Spain and Tunisia. We're so excited to be finally well through the implementation stage, and we look forward to seeing the results that will hopefully be successful in building healthy soils and communities.

Romania



Number of plots: 5;

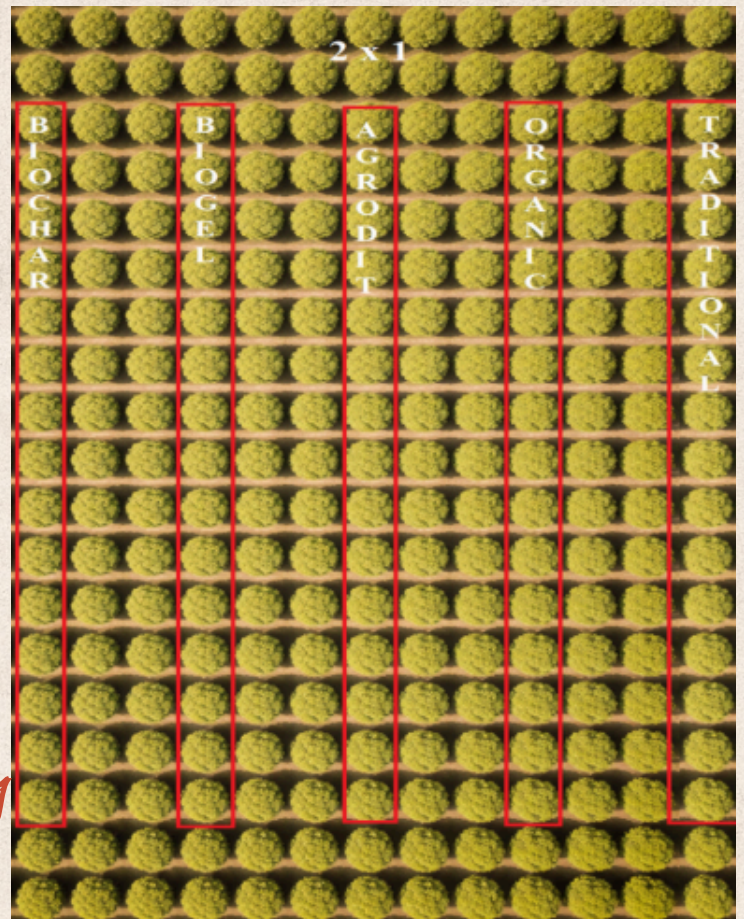
Number of plants per experiment: 15;

Innovations: Biochar, Biogel, Agrodit sensors, conventional (with a polymer gel used by the planting company) and traditional (just the seedling as it exits the nursery);

Species that are planted: Black locust (*Robinia pseudoacacia*);

Standard hole for the seedlings:
30x30x40

Layout of the experimental rows



Innovations chosen for the Romanian pilot area

Biochar (medium): After doing the planting hole, 1000 grams of biochar is mixed with the material (soil) taken out from the hole. Then the hole is filled with the material and the seedling is inserted.

Agrobiogel (medium)

After doing the planting hole, 100 grams of biogel is placed at the very bottom of the hole. As it has the capacity to store water 10 times its weight, 1000 ml are used to water the biogel. After it hydrates after a couple of minutes, the seedling is placed in the hole. It is very important that the roots of the young black locust don't get into contact with the gel as it can dehydrate the roots.

Agrodit sensors (medium)

Three sensors are balanced placed on the designated row for the innovation. The sensors are spaced at intervals on the length of those 15 seedlings (15 m). The three sensors are placed at three different depths to have a better understanding of the temperature or moisture from the soil.

Conventional

For the row with the traditional solution, the seedlings are dipped into polymer gel (Zeba). The Forest Management Unit (FMU) and the company that is performing the planting mentioned that it has a positive effect on the survival rate of the seedlings.

Traditional

All the seedlings that belong to the organic row are seedlings that are planted exactly as they are shipped from the nursery. They don't have any addition of substances, etc.



Biogel



Biochar



Agrodit sensor

Cyprus



The Cyprus field trials were established in late 2025 across five cereal fields in the Western Mesaoria Plain, one of the driest regions of Cyprus. The trials focused on rainfed durum wheat and followed a randomized complete block design, with the five fields serving as blocks.

Each field was divided into five treatment plots (17 m × 6 m). The trials directly compare three innovative soil amendments, compost (ISOTECH), Retentis® hydrogel (AGROBIOGEL), and enriched Ecochar (IMFLORESTAL), alongside an organic fertilisation treatment using poultry manure pellets (Italpollina). Their performance is evaluated against the farmers' common practice of applying slow-release mineral fertilizer.

Prior to the application of the soil amendments, baseline soil samples were collected from all experimental fields to characterize the initial soil properties and provide a reference for assessing treatment effects over time. Subsequently, all soil amendments were applied manually to ensure maximum accuracy and uniform coverage. Using fixed-area wooden frames, the exact quantities required for each treatment were calculated according to the recommended application rates per hectare, carefully weighed, and evenly distributed within the designated plots.

Following amendment application, the fields were sown, and the amendments were incorporated into the soil during sowing. The first harvest sampling was conducted in June 2026, when the crop had reached physiological maturity. Representative samples were collected from each plot using fixed-area wooden frames, and maximum crop height was measured. These samples will be used to determine key yield components, including aboveground biomass, grain yield, and harvest index.



Spain



On April 15th we held the TERRASAFE Project Demo Day in Fuente Álamo (Murcia, Spain).

At the farms La Carrasca and Los Paganos, farmers, technicians and researchers came together to see firsthand how carob tree cultivation can become a powerful tool against desertification in water-scarce environments.

Attendees saw live demonstrations of planting techniques using biochar, biogel and almond shell, materials being tested within TERRASAFE to boost plant survival under extreme drought conditions.



Tunisia



All treatments were applied to date palm trees within the tree basin area, which covered approximately 9 m² per tree. Before application, the amendments were prepared according to the specific protocol of each innovation. The materials were then uniformly incorporated into the upper 20 cm of soil within the basin to ensure optimal interaction with the root zone and improve soil physical and chemical properties.

After incorporation, the treated area was covered with a layer of sand to protect the amendments and enhance their effectiveness under local field conditions.

Three different innovations were tested :

- Agrobiogel consisted of a mixture of 2 kg of hydrogel and 90 kg of manure per tree basin.
- Isotec involved the application of 35 kg of compost derived from coconut waste.
- CETIM was based on an integrated soil amendment approach combining several locally available materials. Each treated basin received 18 kg of date palm waste compost, 3 kg of biochar, 2 kg of phosphate, 3 kg of sand, 3 kg of gypsum, and 3 kg of bentonite.



TERRASAFE Annual Plenary (by Dr Charlotte Chivers)

The TERRASAFE team met up in Djerba, Tunisia for our annual plenary.

As part of the programme, we travelled to Kebili to visit our pilot site in Oum Soma.

The pilot is based in a date palm plantation, where the project is testing a mix of technological and nature-based solutions, including machine learning soil sensors, natural amendments such as compost, and hydrogel. The aim is to see whether these approaches can help restore degraded land and support more resilient desert agroecosystems.

We also visited some memorable places across the region. One stop was Chott el Jerid, Tunisia's largest salt flat. This is an unusual landscape shaped by salt, heat and seasonal water cycles, and is important for migratory birds and desert ecosystems. It was also used as a filming location for several Star Wars films.

Next we visited the El Berrada cooling system, which has been used in the Tunisian Sahara for centuries. Water is pumped from deep underground aquifers at around 70°C, then cooled naturally through towers and porous clay vessels by evaporation, reaching roughly 25°C before entering the oasis irrigation system.

The final stop was Matmata, where we had the privilege of meeting members of a Berber community who still live in underground troglodyte homes. Around 2,000 people live in these cave-like structures, with everyday practices of baking, farming, weaving and adapting to the landscape.

A fascinating few days and lovely to have a rare opportunity to catch-up with colleagues from across Europe and North Africa.

The images below are the winners from our photo competition!



Winner Bouajila Essifi



Winner Jannes Stolte

Desertification blogs



Desertification and soil salinisation in Tunisia

Excessively salty soil is one of the biggest threats to agriculture and food security. According to the UN FAO, soil salinisation takes up to 1.5 million hectares of farmland per year out of production. The global annual loss in agricultural productivity caused by salinisation is estimated to be US\$ 31 million.

The most affected regions of the world are the Middle East, Australia, North Africa, and Eurasia. Tunisia is one country where soil salinisation is a significant problem; around 10% of the land in Tunisia is affected by salinisation (Salvucci, A. et al. 2023). Tunisia, therefore, is one of TERRASAFE's five locations for testing anti-desertification measures.

In this blog, Dr Nissaf Karbout explains why soil salinisation is degrading critical cropland in Tunisia and considers what the future holds for farmers in the region.

Says Nissaf:

"We work closely with farmers in the Nefzaoua region to understand their situation and their land expertise. Together, we have selected three innovations to combat desertification. We will test them out in the oases, and report on their effectiveness and feasibility."



[Read the blog](#)





Desertification is a contemporary problem, exacerbated by human-driven climate change and the mismanagement of natural resources. Efforts are underway worldwide to remediate and reverse desertification, with some successes.

[This blog by Andrew Arkle](#), a placement student within the Countryside & Community Research Institute, University of Gloucestershire, looks at some of these initiatives, specifically, the Great Green Wall (Africa), the Loess Plateau (China), and Ningxia Hui (China).

Andrew says:

“The examples shared here show that it is possible to prevent and reverse desertification, especially where there is a deep understanding of the issues and a collective willingness to adopt collaborative, integrated approaches that empower local stakeholders”

Carob – a future-food that can grow in dryland areas



Carob, a drought-tolerant Mediterranean tree, is gaining attention as a climate-resilient crop for drying regions where traditional agriculture is struggling. Mature trees survive on minimal rainfall and poor soils, though seedlings need careful establishment.

Beyond its agricultural benefits for soil conservation and carbon storage, carob produces nutritious pods used in traditional Mediterranean cooking, from biscuits to pasta dishes. However, slow maturation, labour-intensive harvesting, and limited commercial infrastructure currently restrict wider adoption.

[In this blog](#), Dr Charlotte Chivers looks at the history of the carob tree, how versatile it is for cooking, and even cooks up some carob bars.





Lindsay C. Stringer MBE, Professor in Environment and Development and Dr Thomas Timberlake, Postdoctoral Research Associate, Leverhulme Centre for Anthropocene Biodiversity, share their research on community visions of the future for each of the five pilot areas of the TERRASAFE project.

They reflect on how shared the aspirations are across the pilot areas, but also how each has a distinct take on how they interpret the broad themes of community, power, diverse economies, environmental action and innovation.

They end by saying:

“The six communities share a vision that reconnects economic activity, social life, and land management. Diversified economies, retained and retrained populations, restored landscapes, local facilities and more participatory governance appear in every vision in different ways.

The aspiration to leave a healthy landscape and thriving communities for future generations is perhaps the deepest shared value.”

Visions for desertification resilience

Communities across all five pilot areas
shared **six common priorities**

1



DIVERSE ECONOMIES

2



POPULATION
RETENTION

3



WATER SECURITY

4



SOIL & LANDSCAPE
RESTORATION

5



PARTICIPATORY
GOVERNANCE

6

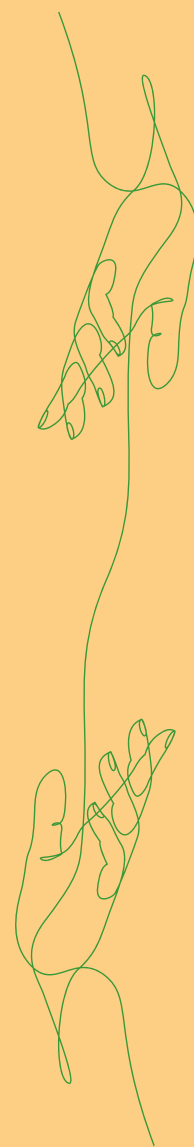


EDUCATION &
CULTURAL IDENTITY

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The [EARTHONE project](#) has released the second episode of its podcast series, featuring pilot experiences from Croatia, Slovenia, and Spain and exploring how different regions are tackling climate change through sustainable land-use practices. The episode highlights approaches such as adaptive grazing, agroforestry, forest management, and the role of soil biodiversity in strengthening resilience. It also discusses how scientific data can support land managers and policy makers in climate adaptation and biodiversity protection. Listen to the episode [here](#).



The ENFORCE project will organise a special session at the 13th International Conference on Environmental Management, Engineering, Planning and Economics (CEMEPE 2026), jointly convened with the LIFE-FROSTDEFEND and SECOTOX projects. The conference will take place in Thessaloniki, Greece, from 12 to 16 July 2026, with the ENFORCE session scheduled for 14 July.

ENFORCE partners will present and discuss their work with the wider scientific community, focusing on environmental compliance, citizen science, Earth Observation, community engagement, and the use of innovative technologies and data to support environmental governance and enforcement.



The Nemesis project is inviting applications to add additional experimental sites to their Living Labs to fight desertification and land degradation in the Mediterranean. Successful applicants should have access to an experimental site in the regions of one of the Nemesis Living Labs (France, Spain, Italy, Cyprus, and Tunisia / Algeria) and will be actively contribute to soil health co-creation, testing, and demonstration activities within the respective Living Labs. [Find all information here](#).

Events



TERRASAFE is one of the conference partners for the Soils for Europe conference, co-organised by multiple Mission Soil projects. The conference will highlight panels on the Mission Objectives, including cross-cutting sessions aiming to showcase the latest research being developed across Europe. The impact and contributions of scientists, policymakers, land managers, civil society, and industry representatives in research and innovation.

While the event will allow for the showcasing of innovations being produced by various European-funded projects, the conference will be open to all researchers and practitioners in an effort to bring together the best and most innovative initiatives in the European space, including a day dedicated to the Living Labs initiatives.

[Link to conference](#)



MedGU
08-11 NOV. 2026
CAIRO, EGYPT

**MEDITERRANEAN
GEOSCIENCES UNION**
6TH ANNUAL MEETING

MedGU Annual Meeting provides a dynamic international platform where scientists from the Mediterranean region and across the globe, particularly early-career researchers, can exchange ideas, discuss unpublished findings, and engage with experts from the diverse disciplines of Earth and planetary sciences. [Link to 2026 conference here.](#)

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Who we are

TERRASAFE is a consortium of research and innovation organisations, coordinated by the University of Aveiro.

Framework and Pilot Area Partners

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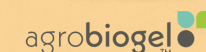
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