SALAM-MED

Sustainable Approaches to Land and water Management in Mediterranean Drylands

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sustainable approaches to land and water management in mediterranean drylands

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PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

The PRIMA programme is an Art. 185 initiative supported and founded under Horizon 2020, the European Union's Framework Programme for Research and Innovation

Salam MED at a glance

Hypotheses

- Desertification, drought and land degradation (DLDD) emerge from **complex socio-ecological systems**, where biophysical and social drivers are **structurally coupled**
- DLDD calls for **systemic innovation**
- **Soil fertility and water conservation** are pre-conditions for sustainable development in drylands
- MED is a mosaic of contexts: **tailored solutions** needed

Objectives

- Establish living labs (LL) to engage stakeholders in the design and testing of Nature Based Solutions:
  - Increasing **resilience** of endangered drylands
  - **Restore** degraded ecosystems in hyper-arid drylands
- Generate **investments and business opportunities**
- Improve stakeholders' **capacity** to respond to crises

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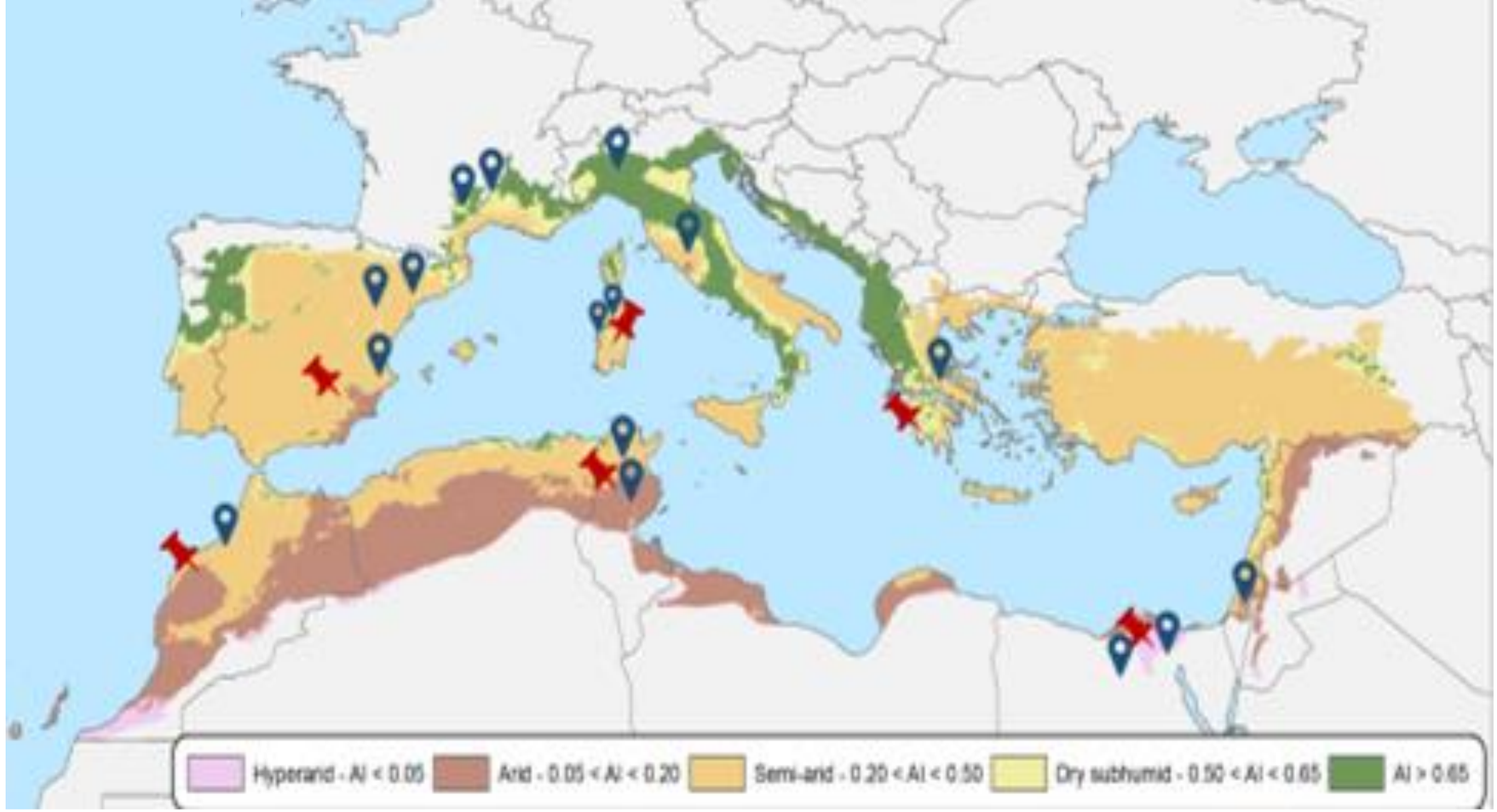


Salam MED at a glance

Partnership & demo sites

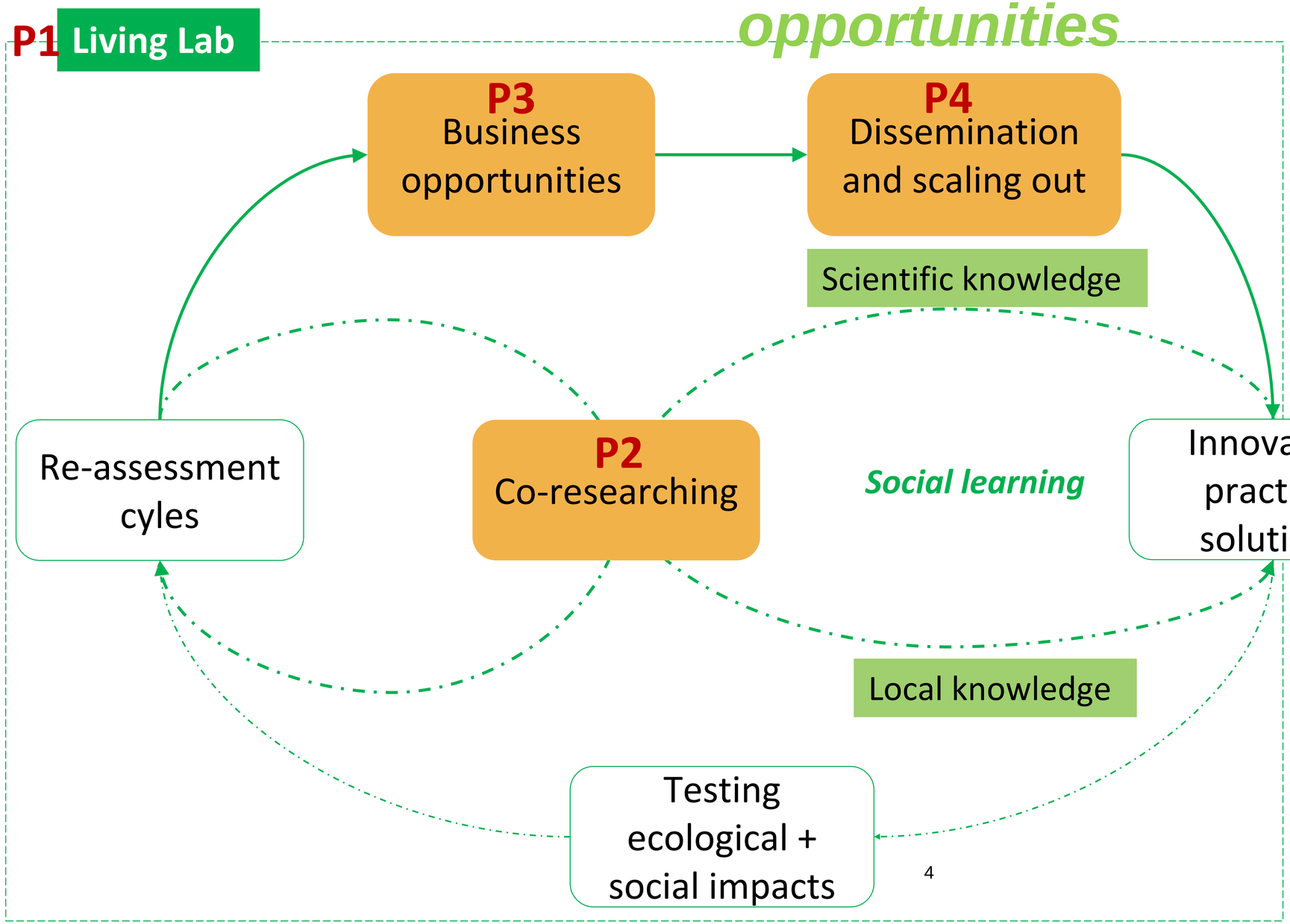
15 Partners

8 MED Countries

6 Living Labs in ‘hotspots’ for land degradation

April 2022 → March 2025

*New spaces for **co-researching** and the generation of **business opportunities***



Removing the barriers for innovation development and scaling-out

Structurally coupling between new business opportunities and soil fertility improvement

Sardinia (IT, AI=0.5)

Essaouira (MO, AI=0.15)

Grazing tools, microbial inoculants & water management to enhance the resilience of endangered **silvopastoral systems**

Messinia (GR, AI=0.5)

Integrated olive orchard management to **enhance water retention** and **mitigate soil degradation**

ACADEMY OF ATHENS

Valencia (ES, AI=0.45)

C.A.F.E. approach to address **sustainable forest management** to combat forest abandonment

carbon, aqua, fire & eco-resilience c.a.f.e.

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Dryland resilience

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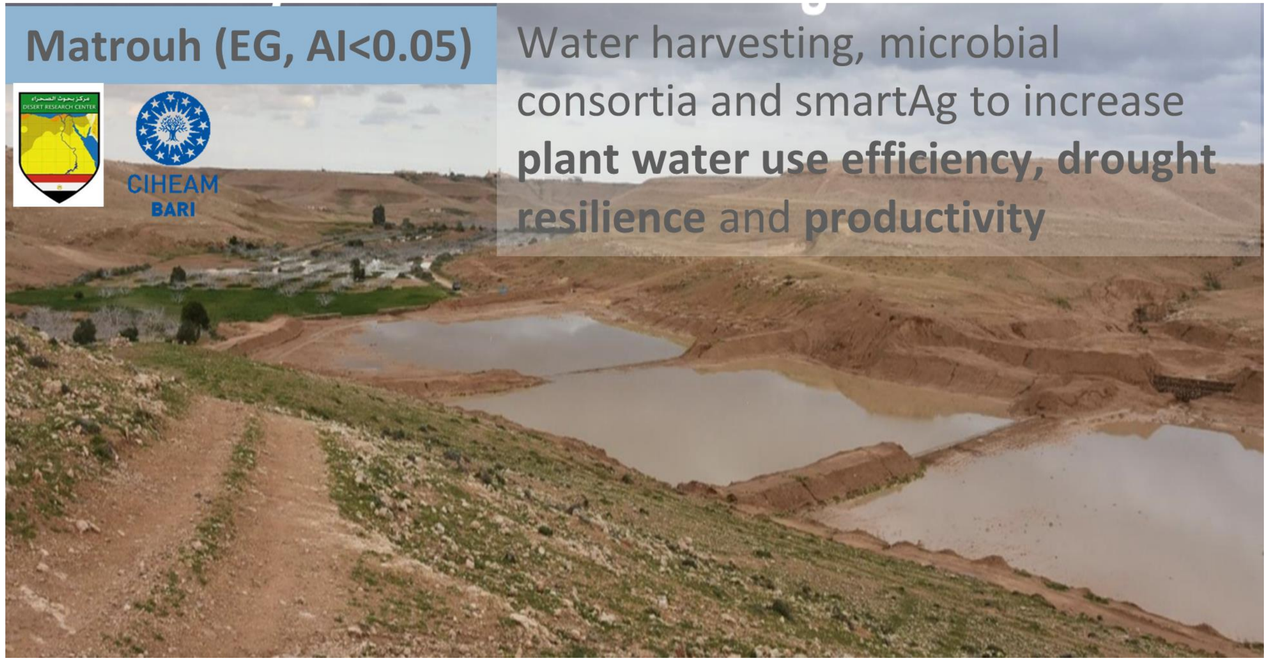
Dryland restoration

Managed aquifer recharge for sustainable agriculture

Medenine (TU, AI=0.05-0.2)

Matrouh (EG, AI<0.05)

Water harvesting, microbial consortia and smartAg to increase **plant water use efficiency, drought resilience** and **productivity**



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Subsurface Water Retention for **argan forest restoration**

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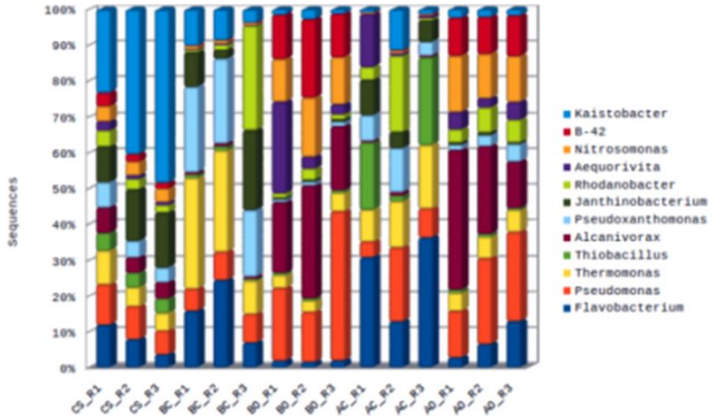
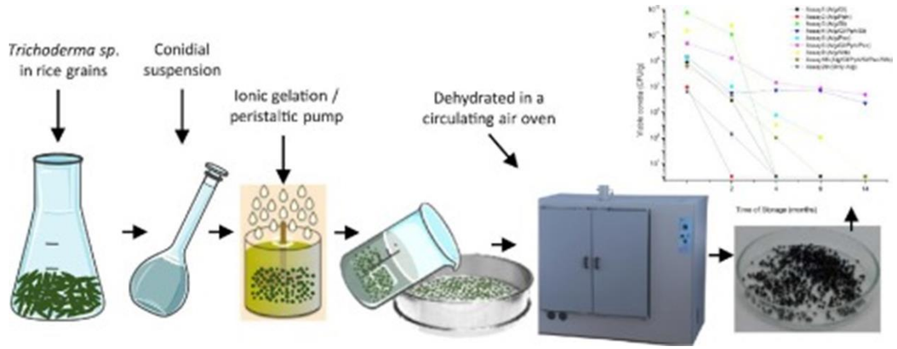
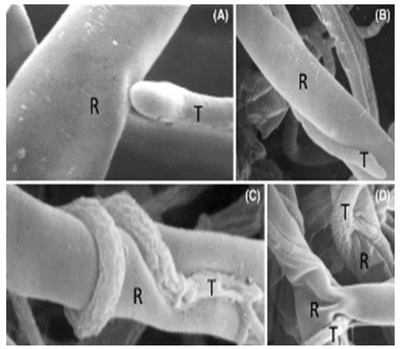






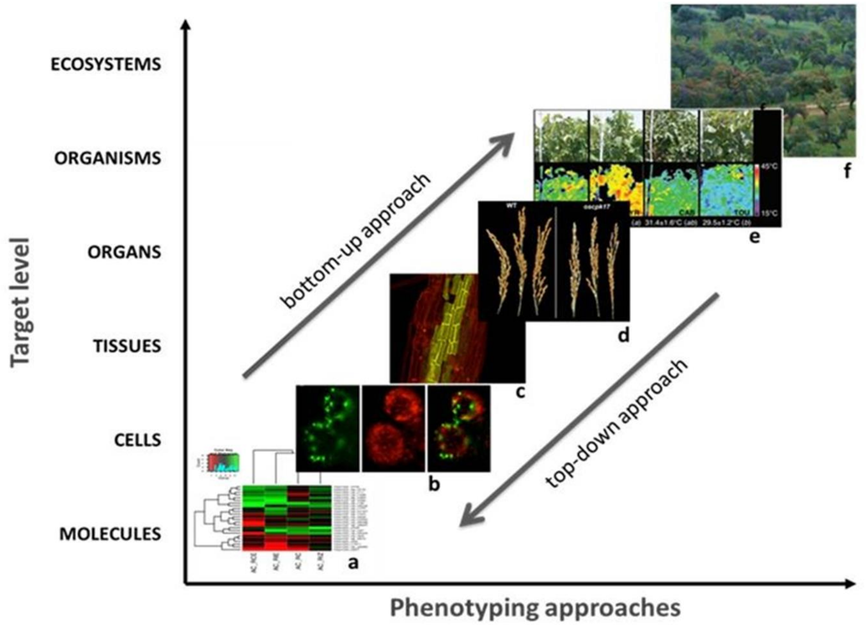
Cross-cutting

Microbial-based biotechnological solutions (MBBS)

- **Exploring** soil, rhizosphere and root-associated microbial communities
- **Selecting** microbial strains with beneficial traits
- **Testing** small-scale inocula and formulations in *Trifolium* and *Lolium sp.*
- **Developing protocols** for the production of microbial inoculants from local substrates, low tech needs, handy formulation techs, quality control

Cross-cutting

High throughput phenotyping



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PSP

Is agriculture possible in hyper-arid lands ?

MAR in Tunisia

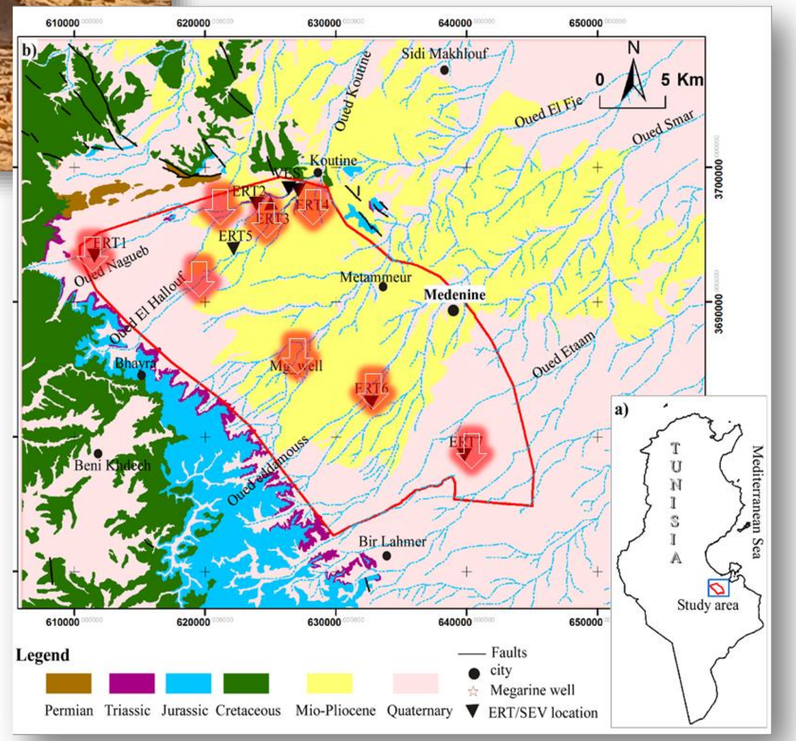
Tunisia case study

CHALLENGE

Due to **drought and occasional surface water availability**, farmers are forced to access groundwater, causing **aquifers' overexploitation**

ACTIONS UNDER TEST

- **Managed Aquifer Recharge** (MAR) systems to support agriculture in arid lands



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Is agriculture possible in hyper-arid lands ?

MAR in Tunisia

Electrical Resistivity Tomography (ERT) method to assess soil conductivity

Is agriculture possible in hyper-arid lands ?

MAR in Tunisia

Topographic methods to estimate the surface and the relief of deposed sediments

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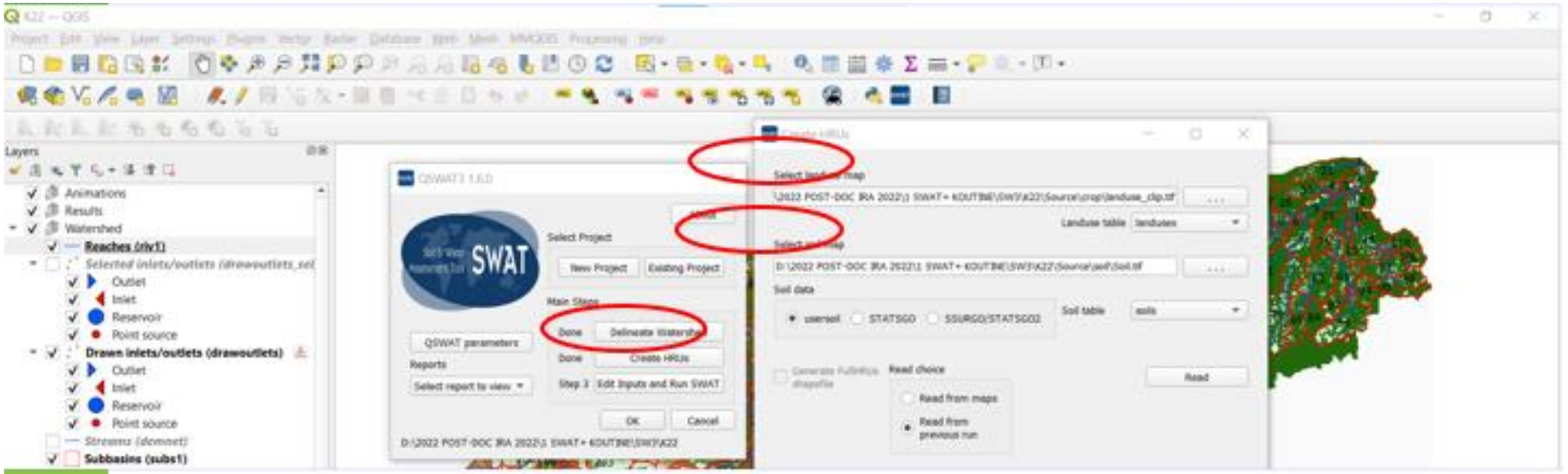
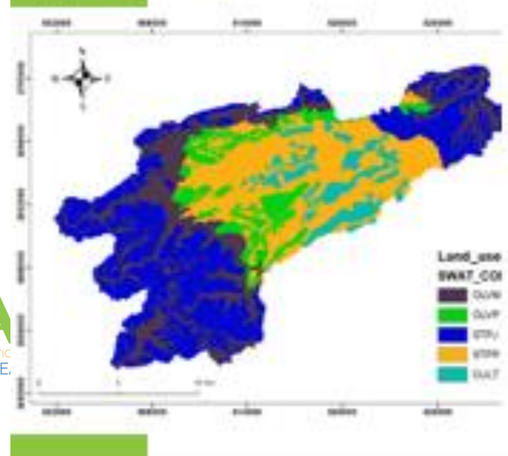
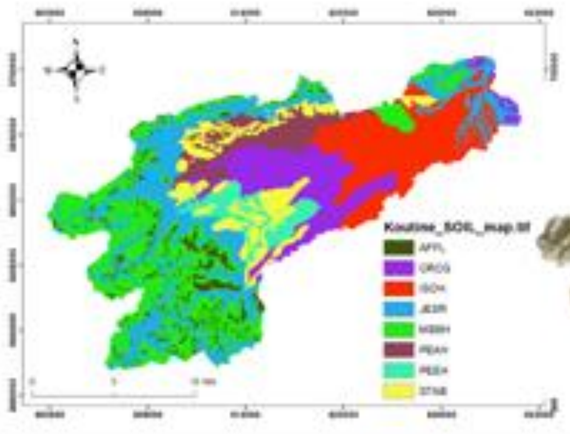
Is agriculture possible in hyper-arid lands ?

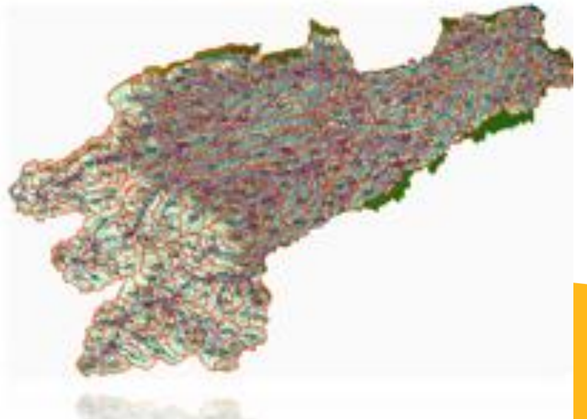
MAR in Tunisia

Modelling (SWAT model)









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Is agriculture possible in hyper-arid lands?

MAR in Tunisia

- The **restoration of sustainable agriculture** **in arid lands** through MAR systems offers **business opportunities** and prevent from land abandonment

- **Out-scaling potential** to similar MED drylands, where drought, migrations and land abandonment are leading to land degradation

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Can we improve reforestation efficiency in desert areas threatened by droughts, soil erosion and overgrazing?

Argan forest restoration in Morocco

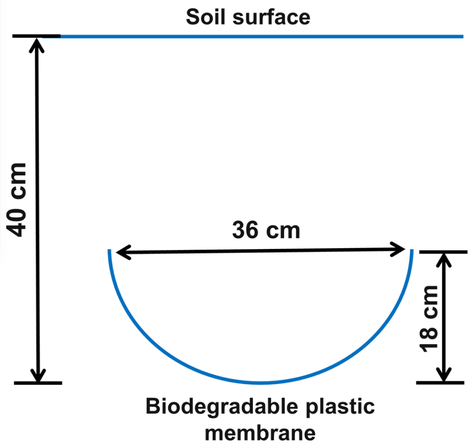
Moroccan case study

CHALLENGE

Land degradation due to **overgrazing**, **climate change** and **demographic** dynamics

ACTIONS UNDER TEST

- **Argan reforestation** activities to combat desertification
- **Subsurface water retention technology** (SWRT): impermeable, biodegradable plastics placed on the soil surface to prevent water percolation and nutrient leaching after seedling transplanting



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SWRT for Argan forest restoration in Morocco

















ANDZOA: National Agency for the Development of Oasis Zones and Argan

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SWRT for Argan forest restoration in Morocco

- The argan forest plays a vital role in **combating desertification** while offering **fundamental economic opportunities**, particularly for women
- Almost 90% of the **rural economy** in the region is dependent on the argan agroforest system
- The lessons learned from the LL process will feed the out-scaling

Can we improve irrigation efficiency while minimizing aquifer exploitation and mitigating soil degradation?

Olive orchards in Greece

Greek case study

CHALLENGE

- Over-exploitation of olive groves leading to soil degradation and reduced productivity
- Overexploitation and inefficient use of irrigation water leading to water scarcity

ACTIONS UNDER TEST

- use of more **efficient irrigation technologies**
- implementation of **soil conservation practices**
- **organic farming** methods

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Can we improve irrigation efficiency while minimizing aquifer exploitation and mitigating soil degradation in Mediterranean olive orchards?

Integrated olive orchard management in Greece

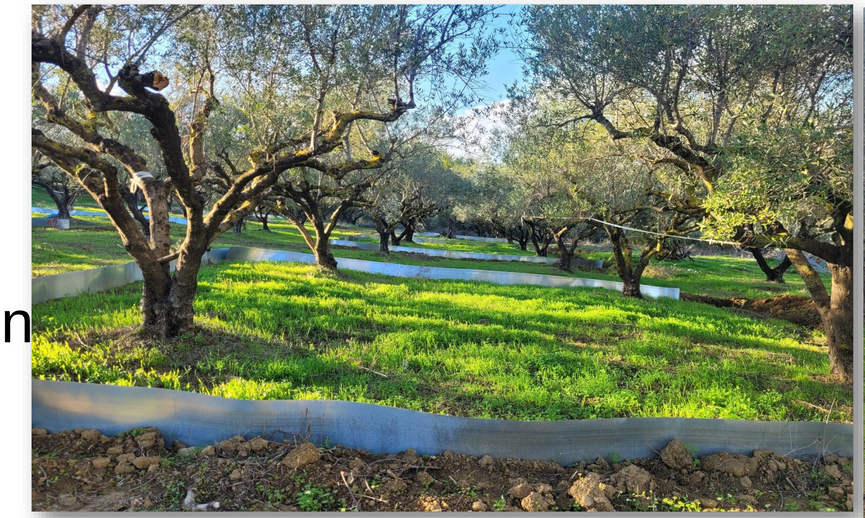
Greek case study

2 participatory experiments

- Soil erosion assessment
- Sustainable irrigation management

Three irrigation management systems

- ***rainfed***
- ***irrigation based on 3 phenological phases***
  - *Flowering-March
  - *Active vegetative growth-June
  - *Yield formation-August
- ***Business as usual*** irrigation practices



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Can we improve irrigation efficiency while minimizing aquifer exploitation and mitigating soil degradation in Mediterranean olive orchards?

Integrated olive orchard management in Greece

- Olive oil production is a **major contributor to the local economy**, and Messinian olive oil is widely renowned for its high quality

- **Out-scaling potential**: olive orchards are a typical MED ecosystem covering over 8 M ha in the MED

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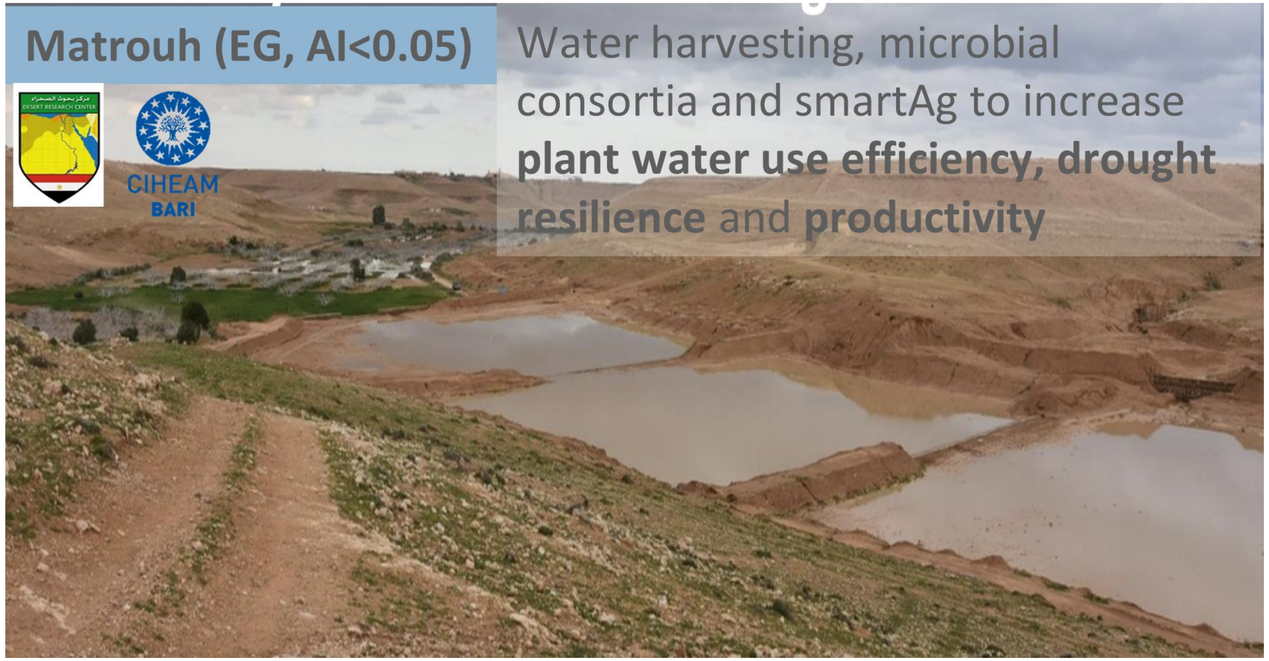

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Subsurface Water Retention for **argan forest restoration**

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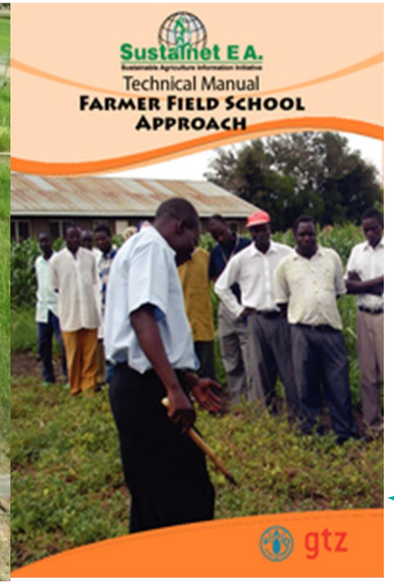
New modalities for connecting science, end-users, SMEs and NGOs with decision-makers



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منظمة الأغذية والزراعة للأمم المتحدة

FAO FIAT PANIS

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Capacity development

- **PhD** programs focusing on SWLM
- **FFS** via FAO-RNE
- **Co-design of protocols** for local production of inoculants

LL for the generation of **business opportunities**

•**Matchmaking** between problem owners and solution providers

- **Decision support tools** to understand the complexity of land and water degradation challenges

SALAM-MED
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Pier Paolo Roggero
salam-med@uniss.it

https://www.salam-med.org/

Thank you

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