

Evaluating Living Labs for Systemic Change in Mediterranean Agroecosystems

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Introduction

Mediterranean agroecosystems face interconnected challenges driven by both socio-economic pressures – including rural depopulation, youth outmigration, and land abandonment – and intensifying ecological stresses such as water scarcity, land degradation, and wildfires. These complex, systemic challenges demand innovative approaches that transcend sectoral boundaries and foster collaborative adaptive strategies. Within the paradigm of social learning and systems thinking, Living Labs (LLs) are gaining recognition in agroecosystems for their potential to facilitate the co-creation of sustainable innovations (Ceseracciu et al., 2023; Potters et al., 2022). However, a knowledge gap exists regarding how to effectively monitor and evaluate LL processes, their innovation outcomes, and their long-term systemic impacts in agroecosystem contexts. This research contributes to addressing these gaps by developing and implementing a novel approach to monitoring and evaluating LLs for systemic change in agroecosystems.

Methods

We employed a comparative case study approach examining six strategically positioned LLs across the Mediterranean basin (Italy, Greece, Spain, Morocco, Egypt, and Tunisia) within the PRIMA-funded SALAM-MED project (www.salam-med.org). Each LL operates through a transdisciplinary, participatory action research approach that engages different stakeholders – including farmers, researchers, policymakers, women's groups, and youth organisations – in the co-design, testing, and validation of Nature-Based Solutions for sustainable land and water management. Our M&E framework integrates design thinking and systems thinking principles, applying the “3 Es” criteria from soft systems traditions (Checkland et al., 1990): **Efficacy**, assessing whether LLs achieve stakeholder-defined purposes and objectives; **Efficiency**, evaluating optimal use of economic and human resources; and **Effectiveness**, measuring LLs' contributions to the overarching goals of SALAM-MED. Evaluation criteria were iteratively developed and refined through collaboration with LL participants, ensuring co-ownership and shared understanding. Annual M&E reports, stakeholder interviews, focus groups, and participatory evaluation workshops provided multiple data sources for a comprehensive assessment.

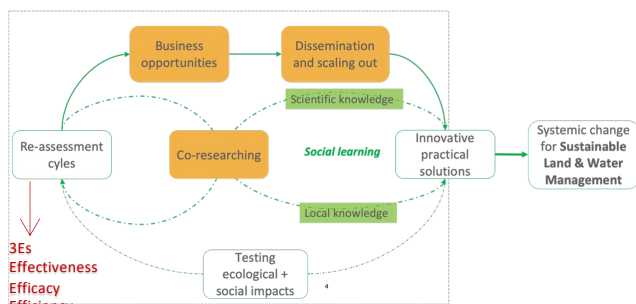


Figure 1. M&E for LLs as Learning Systems

Results

Our M&E findings reveal that LLs drive agroecological innovation through:

- **Individual skills development and collective social learning**
- **Knowledge co-creation** bridging scientific expertise and local traditional knowledge systems
- Enhanced **participation of marginalised actors** (women, youth)
- Context-specific **innovative adaptive strategies for sustainable agroecosystems** through iterative **co-design**

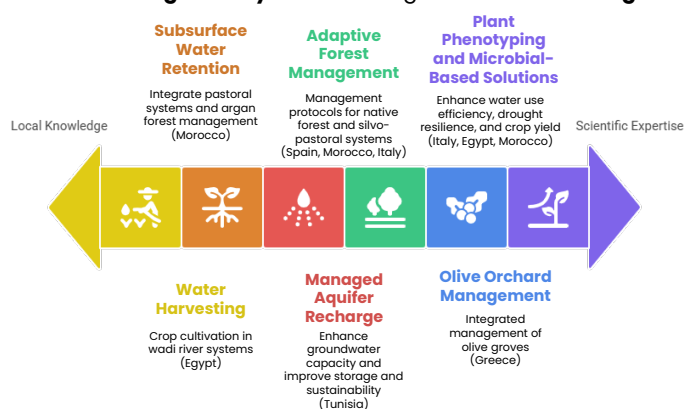


Figure 2. Co-designing agroecological innovation

A critical insight emerging from M&E reporting is the identification of **two operational paradigms** for LLs

1. “Outdoor laboratory” model

- Structured experimentation for replicable results
- Effective for data generation and practice dissemination
- Limited scope for systemic change

2. “Living learning-oriented” model

- Ongoing social learning processes
- Greater transformative potential
- Requires enhanced interdisciplinary capacity; researchers from non-social science backgrounds often find it more challenging to implement and evaluate

Conclusions and future research

Our comprehensive M&E framework positions LLs as vital components of **rural social infrastructure**, with significant potential for supporting innovation in combating land abandonment, preserving biodiversity and ecosystem services, scaling innovative technologies, and generating sustainable livelihood opportunities. However, critical **challenges** remain, particularly the misalignment between short-term project funding and long-term socio-ecological processes, alongside needs for effective LL governance models that sustain beyond initial project phases. Further empirical evidence, derived from robust M&E, is needed to enhance understanding of agroecosystem LL impacts beyond project completion. We invite researchers and practitioners to **participate in our ongoing survey** (scan QR code) to strengthen collective understanding of LL design, implementation, and outcomes.

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