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Co-designing of Innovative Nature Based Solutions for Sustainable Land And Water Management: The Living Lab experience in Salam- Med PRIMA Project

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Co-designing of Innovative Nature Based Solutions for Sustainable Land And Water Management: The Living Lab experience in Salam- Med PRIMA Project

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Abstract

The Living Lab approach is gaining popularity as a way to promote the co-design of innovative nature-based solutions (NBS) to improve the resilience of endangered Mediterranean dryland socio-ecological systems and to restore degraded ecosystems in lands arid and hyper-arid. However, the socio-ecological complexity of the rural and agricultural contexts of the Mediterranean presents specific potential and constraints that have been considered by six LLs in the context of the SALAM-MED PRIMA project. Identifying and engaging relevant stakeholders is a crucial first step. This ensures that all relevant voices are heard and that the solutions address the needs and concerns of the community. Since the stakeholder mapping phase and then in the co-design of the NBS, the LLs have been designed as spaces to generate lasting learning processes and tailored methodological approaches have been adopted to empower local stakeholders and support the scaling-out of NBS.

1. Introduction

Nature-Based Solutions (NBSs) are innovative actions that, either inspired or supported by nature (EC, 2015), offer systemic responses to the challenges of sustainable development. Increasingly relevant in EU policies, NBS are promoted to achieve multiple goals and incorporate multiple economic, environmental, and social benefits and costs by influencing the well-being of different stakeholders.

The innovative nature of many NBS increases the difficulty of designing, adapting and simulating them and requires further vision efforts to outline the solution in different future scenarios and according to different perspectives. Previous research demonstrates that the higher the number of services and stakeholder groups targeted, the lower the capacity to maximize the delivery of each service and simultaneously fulfill the specific needs of all stakeholders (Coletta et al. 2021; Lupp et al. 2021). The socio-ecological complexity of Mediterranean rural and agricultural contexts presents specific potential and constraints for adopting and adapting the LL approach and reveals further difficulties for a real and effective bottom-up approach (Yousefi and Ewert, 2023; Zingraff-Hamed et al. 2020). In this context, this work aims to provide answers to the following research questions:

Which stakeholders are or should be part of a co-design and implementation of NBS? What systematic method of stakeholder mapping can support the process and be replicated?
Which approach/methodological tools can support the process of understanding the different perspectives, developing a collective view of the challenges, and identifying potential innovation pathways? Could a shared framework for evaluation facilitate a more inclusive and long-lasting potential innovation pathways?

2. Material and methods

2.1. LL experience in SALAM-MED Project

"Sustainable Approaches to Land and water Management in Mediterranean Drylands" is a RIA project funded under the PRIMA 2021 program section 1. The project started in April 2022 and will have a duration of 3 years. SALAM-MED builds upon an interdisciplinary network of research organisations, NGOs, SMEs and international organizations, with long-standing collaborative activities across the MED. The consortium is composed of a multidisciplinary team of 15 partners from 8 MED countries.

SALAM-MED aims at co-designing, testing, validating, and implementing an array of advanced technologies and management NBSs to improve the hydrological ecosystem services of MED dryland socio-ecological systems. They include water harvesting technologies - crop cultivation in wadi rivers (Egypt) and subsurface water retention in pastoral argan forests (Morocco) -, managed aquifer recharge to enhance the groundwater capacity of rechargeable aquifers(Tunisia), management of native forests and silvo-pastoral systems (Spain, Morocco, Italy), and integrated management of olive groves (Greece), plant phenotyping and symbiotic plant promoting microbial consortia to increase plant water use efficiency, drought resilience, and productivity (Italy, Egypt, Morocco).

SALAM-MED promotes co-innovation through six Living Labs (LLs) where innovative NBSs are co-designed through an inclusive social learning process to integrate traditional and scientific knowledge. The participatory process strengthens the resilience of rural communities by creating new business opportunities particularly for youth and women while the scaling out of SALAM-MED outcomes will be enabled through different actions and strategies: vegetation/hydrological/system dynamics modelling and climate change impact assessment scenarios; extended cost-benefit analysis; capacity building and science-policy interface actions.

Despite being different in terms of context and focus, all SALAM-MED LLs present the five characteristics identified by the European Network on Living Labs (ENoLL): multi-method approach, multi-stakeholder participation; active user engagement; real-life setting; co-creation.

Figure 1: Living Lab *of SALAM-MED*

2.2. Stakeholders' mapping and analysis

The proposed methodology has been applied in all the six LLs between September 2022 and April 2023. It includes: identifying and defining individuals or groups of individuals who are directly or indirectly affected by the NBS, their role and their relationships; identification, determination, and analysis of one's interests, power, and level of influence on the project itself. The stakeholders' mapping consists of the following main three phases: identification, analysis, and, prioritizing:

Once the decision-maker and stakeholders' landscape is mapped, in-depth semi-structured interviews have been conducted with the Key-representative individuals amongst the decision-makers to analyze factors affecting the adoption decision and to deepen insight into the adoption processes. By setting the state of the art of traditional knowledge, current practices, available research, and technologies, it also allows to set the scenario which will be considered as the baseline in the monitoring and evaluation of SALAM-MED output and impacts.

2.2.1. Identification listing the potential stakeholders

The first task of stakeholders' mapping is the preliminary identification of the stakeholders. Clarifying the description of the project or the initiative will help the implementation of this task. These goals will contribute to the effective depiction of the required characteristics of the stakeholders and the identification of which types/categories of stakeholders are required.

Stakeholders must have specific roles during their engagement. Therefore, a prioritization exercise is needed to clearly identify their roles and to analyse their level of involvement. The identification of their role is crucial because some stakeholders' roles are more influential and significant than others.

For the identification of the stakeholders, an initial stakeholder screening is used as a top-down approach since it is less time- and resource-consuming. This initial approach is based on a literature review and previous conducted studies to collect data on potentially related stakeholders to the project. In a second step, a bottom-up approach is usually used by means of a snowball-sampling where researchers ask stakeholders (from the top-down identified list) to nominate other stakeholders as potential interested in the project (Clausen et al., 2020). This approach requires more experience and time and can be based on deep interviews and participatory qualitative methods such as Focus Groups, World Cafè discussions, Nominal Groups Discussions to analyse stakeholders' opinions and interests.

An initial identification of the stakeholders has been performed taking into account: the stakeholders who have a direct relation with the project – Direct stakeholders; the stakeholders who do not have a direct relation with the project – Indirect stakeholders; the stakeholders who support the success of the project – Supporting stakeholders; the stakeholders who hinder the successful implementation of the project – Competitor stakeholders.

Indicatively, the initial list of stakeholders may include: National or International organizations, Regional or local administrators, Agencies & authorities (national and international), Research & innovation agencies & authorities (national and Europeans), Universities, Research centres, think thanks & institutions, NGOs, Consumers, Consultancy firms, Investors, National Standardization bodies, National associations and European association (farming, food, consumers, forester, retailers), Media, Citizens, Others. Therefore, Stakeholders have been classified according to the 4 dimensions of the Quadruple helix innovation system: Government, Citizens, Academia and Industry, and a balanced representativeness of each dimension has been ensured.

2.2.2. Analysis evaluating the potential stakeholders

After the step of the stakeholders' identification, characteristics and profiles, stakeholders have been analysed. Different stakeholders may have completely different levels of interest and influence towards the project. Nevertheless, the stakeholders should represent a mix of perspectives, experiences and roles relative to the project. Profiling the potential stakeholders will help to map and assess them as mentioned before. The proposed approach targets the qualitative assessment of specific stakeholders' components such as their degree of expertise, their willingness for participation and the overall impact, which is expected to be triggered by their involvement.

The selected criteria, which must be evaluated, are: i) Capacity: Evaluate the resource capacity of each stakeholder taking into consideration their knowledge, expertise and technical capabilities; ii) Willingness: Evaluate stakeholders' availability and willingness for participation; iii) Influence: Evaluate the number and the quality of stakeholders' connections, which can influence all the involved parties; iv) Necessity: Evaluate stakeholders' necessity for inclusion.

All the above criteria have been first assessed by the researcher (case study leader) in each case study in order to identify the weight of each criterion and to better adapt the weight of each criterion for the specificity of each Mediterranean region analysed.

The prioritization of the criterion has been assessed through the Analytical Hierarchical Process (AHP) technique (Saaty, 1980). The AHP is a multi-criteria decision-supporting method in discrete environments. The AHP allows eliciting weights (w) (i.e., priorities) for elements or criteria that will be used to assess stakeholders. The priorities (w), also known as relative importance are estimated for the Criterion (Cn) where n is the number of the main categories. In our case, 4 main categories are identified: capacity, willingness, influence, necessity. A hierarchy then is created with the criterion to be assessed:

Figure 2: The Analytical Hierarchical Process

In order to implement the AHP, one needs to design a question (in our case answered by the researchers) where individuals are asked to evaluate the criteria in pairwise comparisons. Then, researcher has to indicate which of the two elements considered as important to evaluate the stakeholders using a nine-point scale to measure the strength of this importance by means of verbal judgment.

2.2.3. Prioritizing ranking the potential stakeholders

Once the criteria are analyzed, the next step of the stakeholders' mapping is the prioritization process which aims at the scoring (prioritization) of the identified stakeholders that should lead to identify between 12-16 stakeholders which will represent the core members of the living lab.

The prioritization should be carried out in 2 different steps: the first one will be based on pairwise comparing the Stakeholders type in order to identify the relative importance of the different categories for the project/innovations.; the second one will be based on comparing, for each type, the different stakeholders.

In this step, and for stakeholders and types, the total score (priority) assigned to a stakeholder "*k*" (total number of stakeholder/Stakeholder category is K) will be estimated using the AHP, by evaluating jointly all stakeholders within the same type on the basis of the 4 criteria mentioned before (capacity, willingness, influence and necessity). The number of the pairwise comparison to be done will depend on the total number of stakeholders identified. The initial outcomes of the stakeholder prioritization process required further adjustments. Specifically, some stakeholders have low scores, mainly due to their limited capacities in terms of knowledge and resources; yet, they have a considerable impact on the system of interest through their farming practices. After the interview process, we recalculated the mapping after the interview to ensure a correct ranking by co-designing the selection of the members in the LL.

2.3. From the Mind Map to the Causal Loop Diagram: design thinking for co-creation

SALAM-MED Living Labs are designed as learning systems for co-creation, i.e. the collaborative development of new concepts, solutions, products and/or services together with stakeholders.

After the stakeholder mapping and analysis (Scardigno et al., 2022), a theory of change was identified to map out future innovation pathways and role of the different actors involved.

The co-creation process is structured within the framework of design thinking as a method to practically and creatively address complex and undefined problems, following a systemic perspective to appreciate multiple viewpoints, and incorporating a reflective monitoring approach. Among the several tools available in co-creation processes – spray diagrams; scenario-ing exercises, (Ison et al. 2014; Rickards et al. 2014), pathways approach (Wise et al., 2014; Cradock-Henry et al., 2021) – we focus on the co-development of Causal Loop Diagrams (CLDs) (Lane, 2008; Morecroft, 1982). CLDs are used to describe and analyse perspectives from different stakeholders; to develop a collective view of the challenges and identify potential solutions and innovation pathways; to create a common understanding within each LL and a common framework for evaluation within and across the LLs (Tiller et al., 2021). Moreover, CLDs provide links between variables that can be later transformed to quantified System Dynamics Models (SDM) for scenario analysis and for decision-support-making (Maneas, 2023).

Following an iterative process (Tiller et al., 2021), a first LL event was organised to provide the space for discussions among researchers and stakeholders, with the aim to grasp the main bio-geo-physical and socio-economic settings – and their connections – into a participatory mind map (MM). The process provided the base for a common understanding among the different stakeholders, while the generated MMs provided the graphical representation of the context-specific challenges.

After the workshop, the MMs were digitized by using the VenSim simulation software, and they were further processed to translate case specific social-ecological components into ecosystem services (Maes et al., 2020; Díaz et al., 2015). The aim of this exercise was twofold: to provide a common language across the different countries, thus allow comparisons between the case studies; , and to allow the integration of socio-ecological metrics, and their interconnections with the suggested NBSs at a case study level. The last step of this process was to transform the MMs into CLDs by adding signs (plus or minus) to denote the nature of interaction between the variables.

During the second LL event, the generated CLDs were presented and discussed with stakeholders who were asked to validate their structure, by providing feedback on the nature of interaction between the variables, and their applicability in exploring business opportunities aligned with soil, water and biodiversity conservation objectives.

To evaluate the effectiveness of the CLDs as a tool/methodology/approach for co-designing NBSs in rural context, a short questionnaire was administered to LL managers. For each of the following questions:

1) Has the CLD allowed the combination of different stakeholders' points of view on the main challenges of the current situation, on the representation of the dynamics of the system and on the priorities?

2) Does the CLD Loop Diagram allow to properly include the Ecosystem Services in the narrative of the system?

3) Do you think that the CLD could be useful to design the Nature Based Solution and evaluate their impact on the system?

they were asked to replay by selecting values from 1 to 5, where 1 stands for “not at all”, and 5 “very much”.

3. Results and Discussion

3.1.1. Identification listing the potential stakeholders

The mapping of seven LL systems in six different countries in the Mediterranean arid zones resulted in the identification of 11 primary typologies of stakeholders, each tailored to a specific case study.

Table 1 Typologies of potential stakeholders

3.1.2. Evaluating the potential stakeholders: criteria to profile and analyse the potential SHs

In order to analyse the stakeholders identified in previous phases and obtain a composition of the Living Lab suitable for the co-design process to be carried out, a weight was assigned to the four selected criteria – Capacity (CAP), willingness (WIL), influence (INF), and necessity (NEC) - that reflects the importance in the specific context of each Living Lab.

Figure 3 Criteria's weight in the 6 countries

The box plot illustrates the distribution of values, indicating that the Capacity criterion exhibits greater variability, while Willingness and Influence present lower median values of 17.7% and 18.8%, respectively.

Figure 4 Criteria's weight distribution

3.1.3. The potential stakeholders list

Table 2 presents a comprehensive analysis of stakeholder significance categorised by subgroup and case study, demonstrating their pertinence to the various systems. Upon comparing the listed stakeholders, it becomes evident that not all countries possess stakeholders across all components of the quadruple helix. Furthermore, the various components exhibit differing degrees of significance, with civil society being notably under-represented in Italy, Morocco, and Tunisia.

The stakeholder map's development was dynamic, adapting to emerging priorities and perspectives from the participatory process. The ex-ante and ex-post percentages pertain to the stakeholder list generated from the AHP process and the modifications implemented following the interviews, respectively (Tab.2).

The preliminary results of the pair-wise comparison and prioritisation exercise were modified based on insights gathered from semi-structured interviews with local stakeholders. In certain instances, such as the Italian LL, academia was initially under-represented, highlighting the perceived disparity between scholarly research and practical knowledge within the local context. As the project advanced, academic institutions, especially universities and research agencies, were increasingly acknowledged for their capacity to close knowledge gaps and enhance innovation and sustainability. In Tunisia LL, the results highlighted that the regional authority (public administration) has the greatest need for inclusion. In fact, they supervise the work of operators (national agencies, regional associations, etc.), have alliances and influence with all institutions (research, private, civil society, etc.), possess both organizational and institutional as well as technical skills knowledge. As

a result, they have almost total responsibility for the region's water sector. In Greece LL, the mapping highlighted the fundamental role of local olive-oil producers and administration towards the adoption of more sustainable farming practices (phenology-based irrigation, cover crops), but also the importance of research in delivering data in relation to suggested NBS.

Table 2 The potential stakeholders' list

3.1.4. Development of Causal Loop Diagrams (CLDs)

Seven LL workshops were held from February to June 2023, bringing together all the main types of stakeholders: government, citizens, academia and industry.

The six causal loop diagrams, Fig. 5, provide an overview of the multiple variables currently connected or potentially related to the problem that the Living Labs aim to solve, as well as to the implemented solution. The CLDs also consider the interactions among these variables, highlighting positive relationships, e.g. the more soil fertility, the better olive oil production; negative relationships, e.g. the less precipitation the less groundwater recharge; negative to positive relations, e.g., the less aquifer degradation, the more environment conservation; positive to negative relations, e.g. the more evapotranspiration, the less groundwater recharge.

The number of variables differs among the Living Labs, ranging from a minimum of 21 to a maximum of 47. Consequently, the number of positive and negative relationships also varies, with a minimum of 24 and a maximum of 41 positive relationships, and a minimum of 7 and a maximum of 18 negative relationships.

The nature of the variables is also different as it can be distinguished between "determinant variables", "affected variables", "impacts" also defined in terms of ecosystem services and "strategies/actions" which refer to potentially adoptable NBS. It is important to note that, due to differences in reference contexts, not all maps fully include socioeconomic variables. In some cases, it was possible to record them completely, while in others not.

Figure 5: CLD of a) Italian b) Tunisian C) Egyptian d) Moroccan e) Spanish f) of Greek LL.

According to the respondents (Figg. 6-8), the use of CLDs facilitates the representation of the complex interrelationships existing within the ecosystem in all LLs, overcoming the divergences in the stakeholders' perception of the links between economic, resilience and the socio-cultural value of socio-ecological systems (Fig. 6). They also proved to be a tool to create a shared vision about the existence and the relevance of ecosystem services (Fig. 7) that, in some contexts, represent a quite novel issue to be considered.

Being an outcome of iterative interactions both among the members of the SALAM-MED research team and between the research team and the stakeholders of LLs, CLDs allowed the integration of different scientific expertise and stakeholder perspectives, perceptions and knowledge).

Additionally, the CLD demonstrates how the NBS proposed could contribute to the sustainable management of the natural resources and has a significant impact on all related variables: by using the CLD, is, in fact, possible to visualize the complete impact of any changes made to the system by examining all the variables that it affects.

Evidence indicates the potential of the CLD to promote co-creation in the design of the SALAM-MED practical solutions (Fig. 8) stand to highlight the multidimensionality of the

socioecological systems and the interaction between ecological and socioeconomic dynamics. However, the tool also can have sometimes limitations mainly related to its suitability to promote a smooth interaction with all stakeholders.

Figure 6: answers of Living Labs to the first question.

Figure 7: answers of Living Labs to the second question.

Figure 8: answers of Living Labs to the third question.

4. Conclusions

"Systematic methods to identify the relevant stakeholders seem to be crucial to a) enable higher planning efficiency and b) reduce bottlenecks and time needed for planning, deciding, and implementing NBS. Future studies should also focus on the role of policy on the stakeholder constellation to co-create NBS ." (Zingraff-Hamed A. et al 2020).

The experience from the SALAM MED project, demonstrates that it is essential to maintain a balanced selection of representatives from societal organisations, public bodies, the private sector, and scientific experts for stakeholder identification. This approach ensures the representativeness of all dimensions of the quadruple helix and promotes an open-minded consideration of potential stakeholders, acknowledging the innovative nature of Nature-Based Solutions (NBSs), which may introduce new markets, technologies, regulations, and legislation within socio-ecological systems.

The composition of the LLs facilitated an environment in which all participants felt at ease to articulate their ideas, concerns, suggestions, and solutions. Most stakeholders expressed shared challenges and concerns, which facilitated harmonious discussions devoid of conflict. Nonetheless, the living lab occasionally comprises a diverse array of stakeholders, and their understanding of the interdependencies among seemingly independent activities and processes is limited. The analysis revealed the differing influence and adaptability of stakeholders. In the Italian LL, certain stakeholders, including vine growers, cork producers, and dairy factory proprietors, exhibited considerable resilience to economic, climatic, and ecological challenges. In contrast, shepherds, beef cattle farmers, and sheep breeders were regarded as less influential and adaptable due to restricted access to knowledge and resources. Nonetheless, livestock farmers are essential to the sustainability of the system, underscoring the necessity to bolster and enhance their capabilities.

Additionally, interviews indicated a widespread underestimation of the ecosystem services provided by socio-ecological processes, with numerous stakeholders neglecting the critical connections among economic productivity, ecosystem resilience, and socio-cultural values. Agriculture and forest management are regarded as separate economic activities rather than integral components of broader sustainability efforts. In such instances, stakeholders' perceptions of the connections among economic productivity, ecosystem resilience, and the socio-cultural importance of landscapes could worsen conflicts and hinder the creation of new learning environments to identify collaborative actions or practical solutions. This insight highlighted the necessity of expanding the stakeholder map to more accurately represent the complex nature of various socio-ecological systems and to effectively capture the interactions among economic

performance, environmental health, and community socio-cultural dynamics, thus fostering a more comprehensive approach to sustainability.

The project emphasises the significance of inclusivity in stakeholder engagement, especially regarding the participation of women and youth. By intentionally incorporating these frequently marginalised groups, the project enhances its depth through varied perspectives while promoting increased community engagement and empowerment. This inclusivity enriches the stakeholder map and, consequently, the overall research, guaranteeing that the results are both scientifically rigorous and socially equitable, accurately representing the community's complete demographic range. However, challenges arose when engaging women and communicating with illiterate stakeholders in the rural region. To surmount these challenges, particular strategies have been proposed and will be evaluated.

Finally, an essential aspect to consider is the flexibility of the stakeholder mapping process, which may result in ongoing adjustments to the chosen stakeholders. It is essential to retain a core group of stakeholders from each of the four dimensions of the quadruple helix, who are committed to the entire process and receptive to exploring new concepts and reassessing challenging issues. For instance, regarding policy makers, who may alter during the LL process, it is more prudent to concentrate on lower-level administrative stakeholders rather than higher-level elected officials.

Concerning the CLD participatory approach selected for the solution's design, we conclude that, despite its complexity, it has yielded noteworthy outcomes in establishing a collective conceptual vision of the system and clarifying the interconnections and operations of its processes. It facilitated the identification of priority intervention areas and the establishment of new social learning environments. Enhanced social capacity and entrepreneurial prospects enable local communities to undertake effective initiatives for the restoration of land and water resources, as well as for bolstering the resilience of dryland zone ecosystems.

A more comprehensive assessment of the used methodology could be achieved through a deeper analysis of challenges related to the engagement of all stakeholders, and the importance of community ownership over processes, while a set of KPIs should offer a more objective analysis of the impacts. It could be also useful to explore the potentialities of the Quintuple Helix Model (Carayannis et al. 2012) to more explicitly consider into a transdisciplinary framework the interrelation among knowledge, know-how and the natural environment system recognized as a pivotal “component of and for knowledge production and innovation”. As the project progresses, it will be also valuable to conduct a retrospective analysis of how the identified stakeholders actually interact, collaborate, engage, and interconnect throughout the entire lifecycle of a co-creation process. Additional research into this collaborative effort could yield insights for developing stakeholder engagement strategies and improving process design, ensuring the appropriate stakeholders are involved in NBS co-design initiatives at each LL.

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Type	Stakeholder
Producers	Producers & Farmers
	Producers' Associations or Cooperatives
Transformers	HORECA
	Industry
Companies	International Private Company
	National Private Company
Consumers	Consumer's Associations
	Individual Consumers/ Citizens
Consultancy	Consultancy firms
	Marketing Consultancy
	Technical & Specialized Consultancy
Agencies &	International Organizations
Institutions	Public Agencies/Institutions
Public	Local Public Administration
Administration	Regional Public Administration
Education &	Institutions and centres for education
Research	Research centres, think thanks & institutions
	Universities
Partnerships	National or local associations
	NGOs
	Public-Private Partnerships
Investors	
Tourism Sector	

Table 1 Typologies of potential stakeholders

Type	Stakeholder	Spain- La Calderona		Spain-Ayora-La Hunde		Tunisia		Morocco		Italy		Greece		Egypt	
		Ex ante	Ex post	Ex ante	Ex post	Ex ante	Ex post	Ex ante	Ex post	Ex ante	Ex post	Ex ante	Ex post	Ex ante	Ex post
Producers	Producers & Farmers					4,18%	4,18%	18,79%	18,79%	18,88%	34,32%	20,82%	19,82%		
	Producers' Associations or Cooperatives							3,72%	3,72%			17,97%	16,96%		
Transformers	HORECA											1,16%	2,16%		
	Industry									59,07%	46,33%	1,58%	2,57%	4,13%	6,00%
Companies	International Private Company	8,77%	4.23%	8,30%	3.90%										
	National Private Company	12,60%	10.41%	11,92%	9.60%	3,64%	3,64%								
Consumers	Consumer's Associations	3,14%	4.66%	2,97%	4.30%			1,14%	1,14%						
	Individual Consumers/ Citizens													22,20%	15,00%
Consultancy	Consultancy firms											4,82%	5,82%		
	Marketing Consultancy			5,39%	7.80%							3,50%	3,50%		
	Technical & Specialized Consultancy											6,64%	8,64%		
Agencies & Institutions	International Organizations													14,43%	8,00%
	Public Agencies/Institutions	7,79%	6.62%	7,37%	6.10%	9,95%	9,95%	70,86%	70,86%	7,46%	5,52%				
Public Administration	Local Public Administration	12,69%	13.23%	12,01%	12.20%	2,02%	2,02%	1,94%	1,94%			17,97%	16,85%	8,56%	12,50%
	Regional Public Administration	13,40%	18.87%	12,67%	17.40%	44,56%	44,56%			3,63%	2,81%				
Education & Research	Institutions and centres for education	2,67%	4.66%	2,53%	4.30%									8,72%	8,72%
	Research centres, think thanks & institutions	8,46%	9.44%	8,01%	8.70%	0,93%	0,93%			7,26%	6,00%	23,14%	19,28%	13,01%	15,25%
	Universities	18,06%	15.08%	17,09%	13.90%	31,18%	31,18%	2,56%	2,56%		1,20%			7,28%	7,28%
Partnerships	National or local associations	7,26%	9.44%	6,87%	8.70%	3,54%	3,54%							9,10%	10,00%
	NGOs	5,14%	3.36%	4,87%	3.10%					1,47%	1,66%			4,82%	9,50%
	Public-Private Partnerships									1,47%	1,66%				
Investors									0,99%						7,75%

Tourism										0.76%	0,76%	1,50%	4.40%		
TOTAL		100,00%	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %

Table 2 The potential stakeholders' list

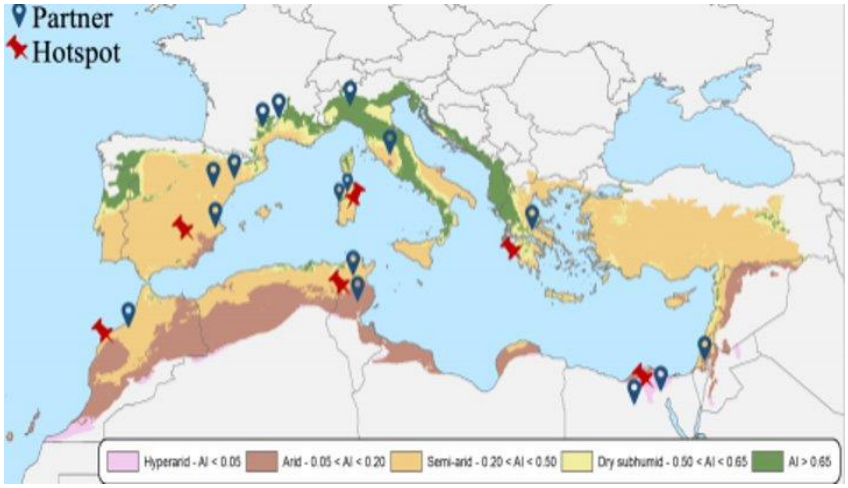


Figure 1: Living Lab *of SALAM-MED*

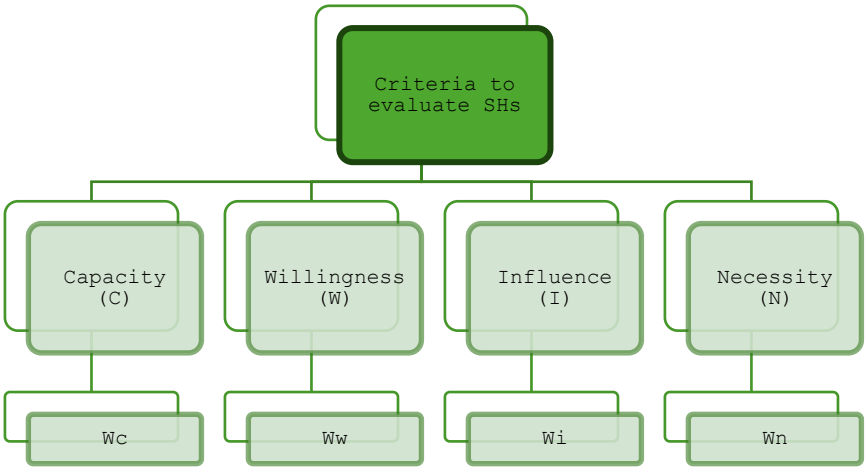


Figure 2: The Analytical Hierarchical Process

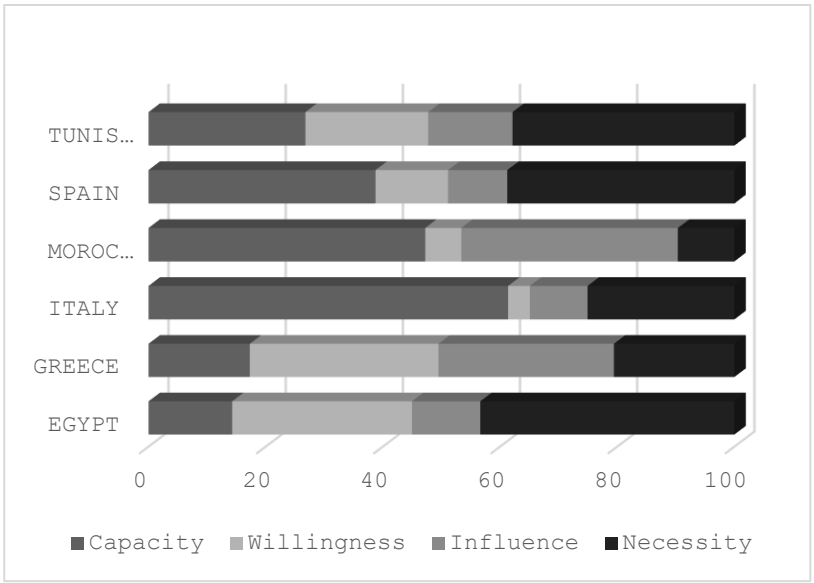


Figure 3 Criteria's weight in the 6 countries

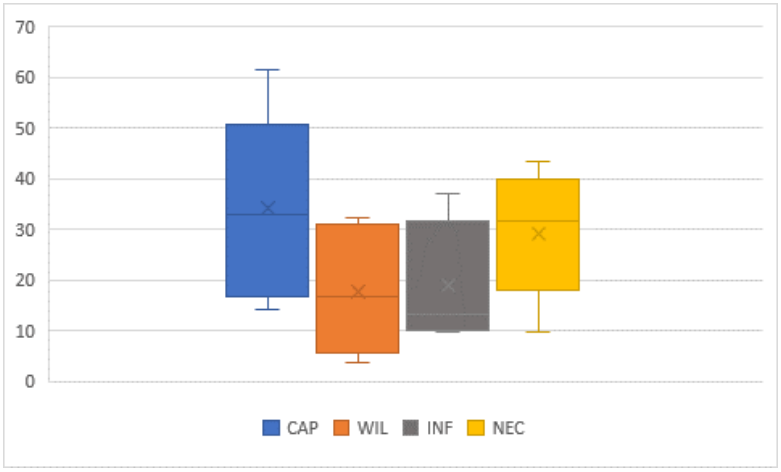
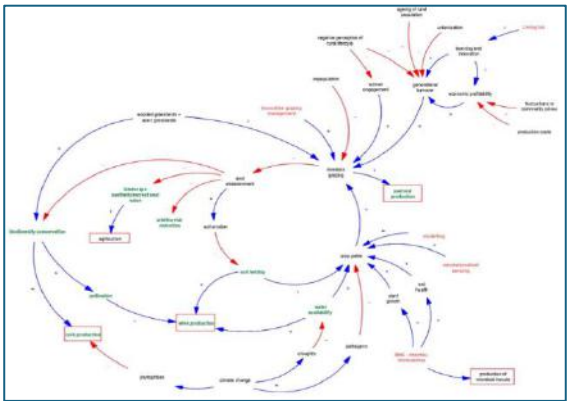
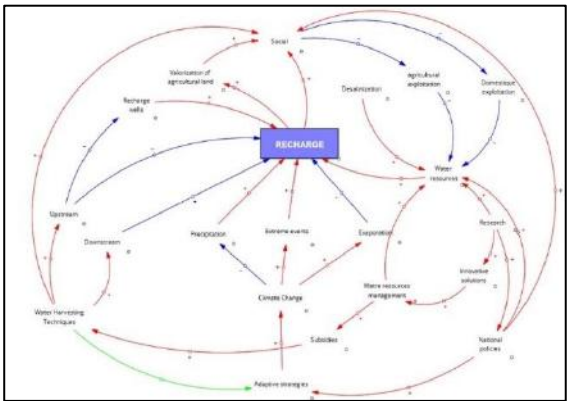


Figure 4 Criteria's weight distribution



a



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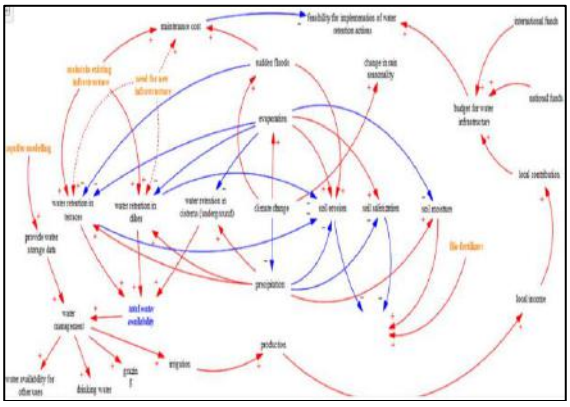

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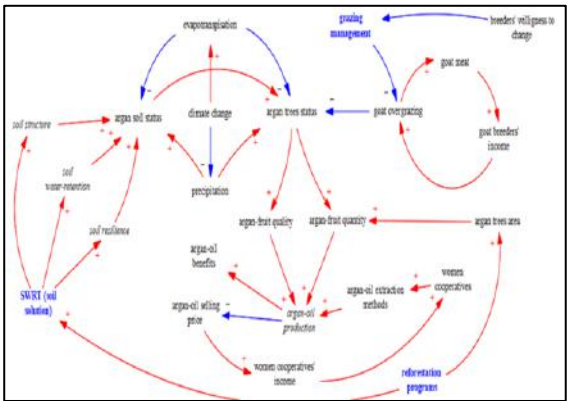

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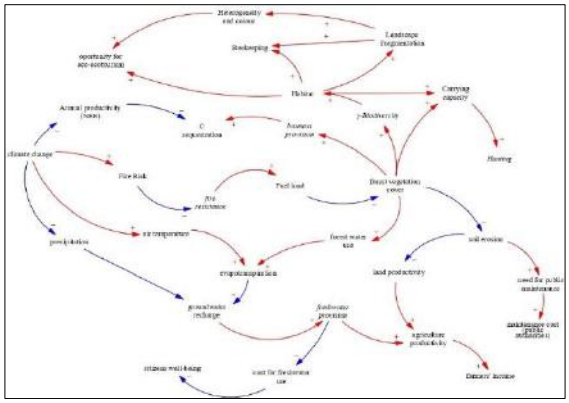

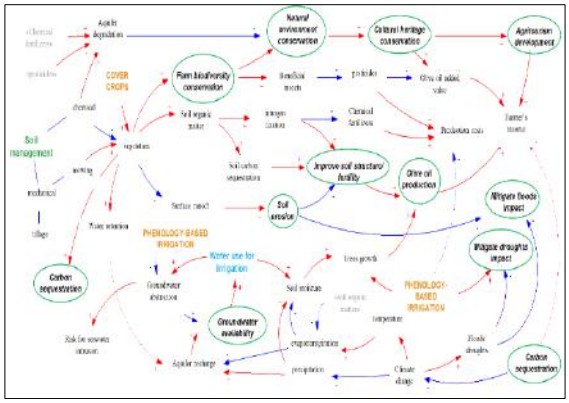

e f

Figure 5 CLD of a) Italian b) Tunisian C) Egyptian d) Moroccan e) Spanish f) of Greek LL.

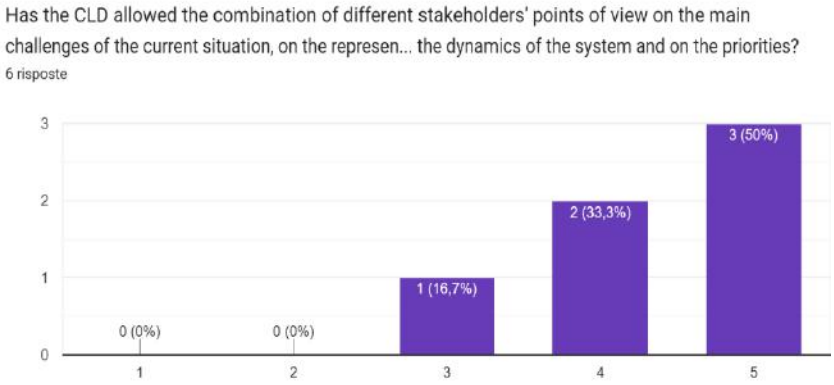

Figure 6: answers of Living Labs to the first question.

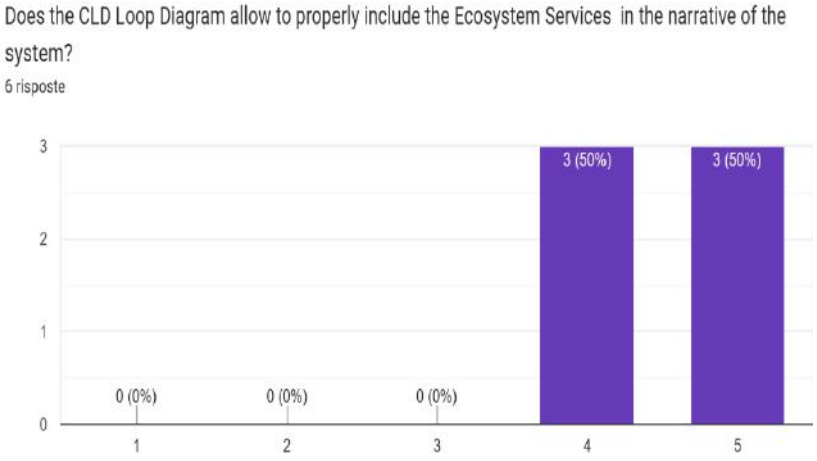

Figure 7: answers of Living Labs to the second question.

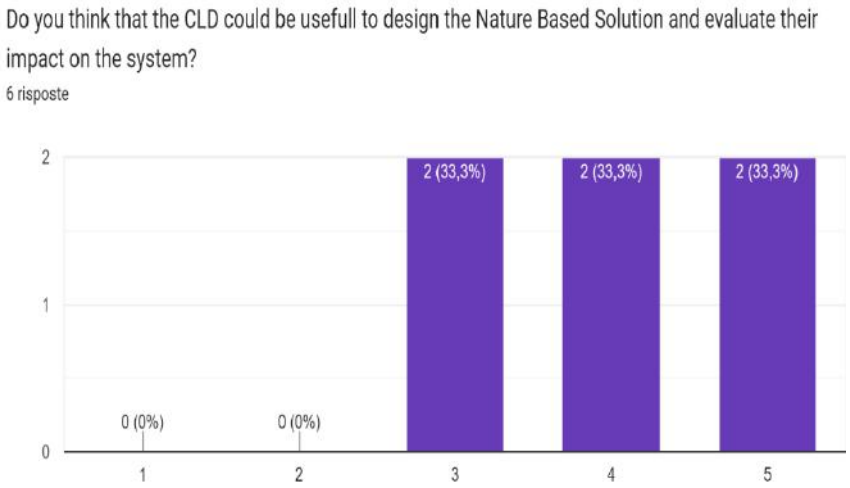

Figure 8: answers of Living Labs to the third question.