



AG-WaMED | Advancing non conventional water management for innovative climate-resilient water governance in the Mediterranean Area

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Consolidated report on LL scenario modelling - part 2/3

Partnership for Research and Innovation in the Mediterranean Area Programme (PRIMA)

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Abstract	This deliverable reports the preparatory activities and the outputs of the third participatory workshop in each of the project Living Labs (LLs): Italy, Spain, Egypt and the transboundary Algerian/Tunisian. The preparatory activities revolved around framing the general objective and the methodology and the framing of the AG-WaMED activities within the RRI Roadmap[™]. The workshops were held in the period November-December 2024. The shared, general objective of the third workshop was to present the first draft of a Integrated Watershed Management Plan (IWMP) created within the project per each LL and to receive feedback about it. The participatory methodology was left as flexible as possible on purpose, to allow each partner to better fit with the needs and characteristics of each LL. A total of 59 stakeholders participated in the third workshops of the AG-WaMED project. Table 1 summarizes the main outcomes of the workshops in each LL. According to the LL, type of Non-Conventional Water (NCW), type of stakeholders and other characteristics, the feedback greatly varied. The suggestions of the stakeholders will be taken into account to further improve the IWMP drafts, which will be presented and discussed further in the next participatory workshop.		
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Abstract and summary table

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Table 1: Summary of the main outputs of the third workshops for each LL.

Third workshop	Italian LL	Spanish LL	Egyptian	Tunisian/Algerian
Participants	21	9	14	15
% of women	28.6%	22%	35%	46%
Feedback on the IWMP	Positive, in line with stakeholders' objectives and interests. Main suggestions regard the inclusion of phytodepuration wastewater as additional NCW source and possible solutions to the lack of funds for irrigation reservoirs creation and restoration. The main challenges remain the complex legal/administrative procedures and the lack of collaboration between the institutions involved in water management.	Positive, the involved stakeholders agreed on the importance of having a plan to address water resource management, especially for irrigated agriculture in a situation of scarcity, potentially aggravated by climate change. Main suggestions regard the improvement of runoff management also through rainwater harvesting. Precision agriculture techniques should also be promoted as well as the desalination of brackish water. The main challenge is the cost of water.	All participating stakeholders agreed with the vision and objectives of the plan but they stressed the need for coordination among stakeholders including governmental and non governmental organizations and farmers involved in water management and water use. The need for implementation of appropriate soil and water conservation techniques and of adequate, supported regulations is also recommended.	Positive, the stakeholders agree with the proposed scenarios and suggest to adapt the IWMP to the current water management plans and to include a water quality assessment.
Willingness of stakeholders to participate in further activities	yes	yes	yes	yes

Introduction

The deliverable “D2.3.2.2 - Consolidated report on LL scenario modelling - part 2” describes the second part of the subtask “D2.3.2 Consolidated report on LL scenario modelling” of the task “T2.3 Participatory modelling and scenario analysis” of Work Package (WP) 2 (Living Labs for innovative climate-resilient water governance) of the AG-WaMED project.

It draws on previous activities of the project, in particular on the D2.3.2.1 - Consolidated report on LL scenario modelling - part 1 and the task “T4.2 Integrated Watershed Management Plans and NCW out-scaling” with the initial activities related to the deliverable “D4.2.1 - 4 Watershed management plans including one transboundary case developed in LLs”.

The document is organized as follows. In a brief introduction, the key concepts of the general methodology of “T2.3.2 Participatory modelling” about LLs as addressed in the RRI Roadmap (Marina project, 2018) are introduced and contextualized within the AG-WaMED project. In the methodology section, information about the common preparation of the third participatory workshop in each LL is reported. Then, in the results section, the document describes (i) the implementation of the workshop with information about participants, agenda, participatory tools applied, objectives etc. and (ii) the analysis of the outcomes, related to the feedback on the IWMP. Results are reported individually for each LL. Finally, conclusions and next steps are reported briefly at the end of the deliverable. In the appendix, links to the additional information are reported.

A quick recap of the RRI Roadmap (from MARINA project, 2018)

Responsible Research and Innovation (RRI) aims at an “interactive process where societal actors, researchers and innovators actively cooperate to co-define, co-design and co-construct solutions, services and products that are socially acceptable, sustainable and resolve important societal issues”.

The RRI roadmap, developed within the MARINA project, should be used by those who want to:

- Create a collaborative environment with diverse stakeholders;
- Inspire change towards environmentally sustainable solutions;
- Stimulate research and innovation actions that will help reverse negative societal trends;
- Identify and implement co-defined actions;
- Gain wide acceptance of co-defined actions;
- Widely apply the RRI dimensions in research, development and innovation processes.

In the RRI there are 6 dimensions, described in Figure 1.

RRI Dimension	Definition and Explanation
Public Engagement 	Engaging all societal actors and stakeholders: researchers, innovators, industry, policy-makers, civil society and citizens for joint active participation in the research and innovation processes from co-definition to co-construction of innovative solutions, products and services for better alignment with society's values, needs and expectations.
Gender 	To unlock the full potential by having all societal actors of all genders on board in research and innovation activities. Fully integrated gender in research and innovation results. Gender must be considered when it can be expected that research and innovation findings may affect women and men differently.
Science education 	Enhance education processes to attract and better equip future researchers and other societal actors with necessary knowledge to fully responsible join research and innovation processes.
Open Science/ Open Access 	Provide easily understood scientific advancements and results in open platforms. Open science represents an approach to research that is collaborative, transparent and accessible.
Ethics 	Respect fundamental rights and highest ethical societal standards with research integrity in order to adequately respond to societal challenges. Ensure open, responsive and transparent processes.
Governance 	Research and innovation centers and policy-makers have responsibility to prevent harmful or unethical developments in research and innovation.

Figure 1: The 6 RRI dimensions, from Marina project (2018).

Within the RRI roadmap, 8 practical milestones are set to correctly carry out the approach (Fig. 2).

	IDENTIFY NEEDS	Milestone 1: Identify the needs of the challenge. Analyse current situation of the challenge Understand the stakeholders "Who is who" and their priorities Define the needs
	MOTIVATE CHANGE	Milestone 2: To motivate the need for change in societal actors, explain the urgency of the challenge. Use facts to create urgency Motivate stakeholders based on their priorities Explain the challenge using storytelling
	ENGAGE	Milestone 3: Engage all stakeholders through participatory workshops. Engage all stakeholders for active participation. Open dialogue based on challenge Build trust among stakeholders Enable Network Building
	IDEATE & FRAME	Milestone 4: Stakeholders generate and discuss ideas for solutions and frame how the future should be once the challenge is resolved. Invite different insights, listen and learn Generate ideas for solutions and for creating new opportunities Frame the future
	CO-DESIGN	Milestone 5: Based on the framed future situation, define and group actions. Through agreement, co-define the common vision and action plan. Co-design a common vision for the framed future Co-design an action plan and measurements Identify gaps of scientific information and science education Enable knowledge sharing for better decisions
	CO-CONSTRUCT	Milestone 6: All stakeholders implement the co-designed action plan. Implement the easier actions first Make research results available to enable action implementation Inform Policy and push for policy adjustments
	MEASURE & ADJUST	Milestone 7: Measure implemented actions and adjust the co-designed action plan. Measure actions Communicate widely the results Adjust action plan
	INTENSIFY	Milestone 8: Intensify the effort to reach the common vision. Co-construct bigger actions Involve more actors Push for RRI funding and incentives Build capacity through Science Education Intensify awareness

Figure 2: The 8 milestones of the RRI roadmap, from the Marina project (2018).

The RRI roadmap in the AG-WaMED project

Table 2 reports the links between the milestones of the RRI roadmap and the proposed methodology of the participatory co-modelling in the AG-WaMED project.

Table 2: The 8 milestones and the respective parts of the project in which they are implemented, together with general activities to be carried out in the workshops.

RRI milestone	LL workshop (or period within the project)	Activities in the workshops
1. Identify needs	Project conceptualization, #1, iterative Mainly until the first workshop, M1 - M12	- current situation analysis (with SWOT, PESTLEEC analysis) - stakeholder analysis (with Quintuple Helix Model analysis) - Women engagement activities. - Needs analysis
2. Motivate change	#1, #2, #3 and #4 Whole project, M1 - M36	
3. Engage	#1, #2, #3 and #4 Whole project, M1 - M36	
4. Ideate and frame	#1, iterative Mainly within the first and second workshop, M1 - M18	generate and discuss future scenarios for NCW management
5. Co-design	#1, #2, #3 and #4 and follow-up Mainly within the first and second workshop, M1 - M18	- co-define common vision for the future (#1 and #2) - identify scientific gaps (#1, mainly) - scenarios definition - data collection - advance in co-modelling by sharing setups of the models and the scenarios already simulated
6. Co-construct	#2, #3 and #4 and follow-up Starting from the second workshop, M18-M36	prepare the integrated watershed management plan
7. Measure and adjust	#3 and #4 and after Starting from the third workshop, M28-M36	critically evaluate co-modelling outputs through objective indicators
8. Intensify	#3 and #4 and after Starting from the third workshop, M28-M36	disseminate results, seek for additional funding opportunities, involve more actors, scale-up solutions

In the AG-WaMED project, the RRI roadmap inspires the participatory approach for co-modelling in each LL, given that many of the points discussed in the roadmap need simplifications or are not applicable. For example, the challenge, the needs and the vision were already broadly defined in the project proposal and also generally agreed upon within the population. Of course, every specific issue and LL has its peculiarities that need to be considered and approached consequently. Moreover, an important consideration about AG-WaMED is that the tasks and goals of the project are not direct actions but rather

analyses and studies that will contribute to the creation of an IWMP in each LL, an objective which is surely important but is not felt as such by the general population. In addition, we aim to propose solutions through a co-modelling approach, and we cannot exclude completely the technical aspects which hamper broader participation. A reflection about the impossibility of fully applying the roadmap is that the skills of the project partners do not cover communication with the general public or professional facilitators and event organizers.

Nevertheless, the 8 milestones of the RRI roadmap can still be used as general guidelines. We can affirm that the first 4 milestones (“1. identify needs”, “2. motivate change”, “3. engage” and “4. ideate and frame”) have been already addressed during the project writing, the initial activities of the project and in particular within the first workshop, whose methodology and results are described in detail in D2.1.1. Of course, the AG-WaMED project is based on an iterative approach and also information about these milestones can be partially re-discussed. Furthermore, most of these milestones need continuous efforts.

Here we report some suggestions (from the 3rd milestone of the RRI roadmap) and eventually some comments (in brackets) related to AG-WaMED that were considered useful for the workshops:

A. *Before the workshops:*

- “Make sure that you have a gender balance across the types of stakeholders” (at least try to, in all the forms allowed by local culture and social context).
- “Plan well in advance the workshop (location, invitations, structure, clear goals, what is expected from the participants)”.
- “Decide which participatory method to use and outline a clear agenda and time-slots” (in the proposed methodology for the next workshops, this part is flexible)
- “Prepare attractive invitations and include catching parts of the story” (these might be a flier to be attached to the invitation emails and eventually through social media)
- “Invite the stakeholders and follow-up with a phone-call and/or email”.

B. *During the workshops:*

- “Open dialogue based on challenge: the dialogue should be opened with the story in order to engage all stakeholders and to create empathy and willingness to cooperate among them”.
- “Build trust among stakeholders: it is very important to make stakeholders feel comfortable first of all with the setting of the room and with each other”.
- “Consider an icebreaker introduction event”.
- “Everyone must have the possibility to present themselves and their interest in the challenge. The workshop facilitator must make clear from the beginning that all opinions value the same in the process”.
- “The workshop facilitator has an important task to pass the floor to all stakeholders regardless of rank or gender”.
- “Enable Network Building: The first workshop is the beginning of a long collaborative process and it is very important for the rest of the process. Thus, facilitate and support every effort of the stakeholders to enlarge their network with fellow stakeholders”.
- “Allow time during the workshop for stakeholders to network and discuss among them. Good possibilities are standing breaks and lunches”.

C. *Outside the workshop:*

- “Provide an online platform to enable stakeholders to continue discussions with fellow stakeholders” (in our project, this might be a mailing list)
- “Engage them through online discussions and events to continue strengthening the engagement and empathy levels of the stakeholders” (trying to keep the LL alive involving the stakeholders in events outside the workshops in presence should be considered)

Milestones “5. Co-design” and “6. Co-construct” are crucial for the AG-WaMED project, since we can align these milestones with the participatory co-modelling approach. These can be also considered the parts that were not addressed completely in the first workshop and that have been initiated during the second workshop, they also need to be carried on in the remaining part of the project.

Co-design in particular is fundamental as it is the part where:

- The project objectives, vision and goals are adjusted and aligned between the AG-WaMED partners and the stakeholders. In the next workshops, LL leaders have to resume the main challenges and proposed solutions and share them with the stakeholders. According to the RRI roadmap, the vision should be “aspirational, concrete, concise, memorable and time-specific” and “between 10-15 words long”.

- The scenarios for improved water management, with a particular focus on Non-Conventional Water (NCW), are defined. In the first workshop, we have already depicted some scenarios. In the next workshops, we need to further explore them and eventually select the most interesting ones. The co-modelling should also advance and shared decisions about further steps, model setups, and validation of current scenarios should be taken.

- Additional data and information that is missing should be collected (or the strategy to collect them should be defined).

In the RRI context, according to the European Commission co-creation is the process of creating public policies and services with people and for them. As a result, the 6th milestone (“6. Co-construct”) largely corresponds to the main output of the project at the LL level, the IWMP. The RRI roadmap refers more to implementable actions, but the observation about the implementation of the easier actions first (in AG-WaMED the actions would be the analyses) is a useful hint that will be considered in the preparation of the agenda of the workshops.

Finally, milestones “7. Measure and adjust” and “8. Intensify the effort to reach the common vision” are relevant especially for the 3rd and 4th workshops and for the dissemination of the results of the AG-WaMED project. Of course, adjusting the analyses carried out and intensifying the effort through the involvement of new stakeholders, the proposal of further scenarios and analyses etc. are key elements of the iterative methodology applied in the AG-WaMED project.

In the participatory approach for co-modelling applied in AG-WaMED, it is important to remark that the in-presence workshops are fundamental parts of this approach, but there are also other ways with which models can be co-designed and scenarios co-simulated, such as semi-structured interviews, surveys, online workshops and so on. In this document, hence in the whole AG-WaMED project, when we refer to participatory co-modelling, we encompass the whole set of studies (or co-production of knowledge) that are carried out within the project, hence we refer not only to the agro-hydrological modelling but also the socio-economic and governance analyses, among others.

In participatory co-modelling, stakeholders can be involved with different levels of engagement (communication, consultation, participation) (adapted from Basco-Carrera et al., 2017). In AG-WaMED:

- Intermediate and final projects’ outcomes are communicated as wide as possible (press, social media, etc. as described in WP6)
- Through the surveys (for instance with the Choice Experiment, D3.3.1), interested stakeholders who do not participate in the in-presence workshops are consulted
- In the in-presence workshops, experts/motivated stakeholders participate actively

In AG-WaMED, stakeholders contribute mainly by:

- Definition of LL vision, objectives, future alternative scenarios, studies to be prioritized
- Providing input data and information
- Validating analyses performed
- (eventually) implementing some activities

Methodology

The organization of the third participatory workshop

As T2.3.2 leader, the UNIFI team prepared the general methodology for the whole task (presented for the previous workshop). The UNIFI team also drafted the general methodology for the third participatory workshop and how the AG-WaMED workshops are framed in the RRI Roadmap. The draft was presented to all LL leaders to obtain feedback in a dedicated meeting on the 13th of November 2024.

The methodology proposed for the third participatory workshop, similarly to the one of the second participatory workshop, was set as flexible as possible so that LL leaders can organize the activities considering local conditions. An in-presence workshop was strongly recommended. Whereas key stakeholders could not participate in the workshop, additional semi-structured interviews were encouraged. Even if past experience showed that achieving a gender balance was almost impossible, it was stressed to try to respect the gender balance as much as possible.

Since the main focus of the workshop is the discussion of the draft of the IWMP, its sharing with the stakeholders is a fundamental activity. This was supposed to be done for sure during the workshop, but a possibility was also to share a complete or resumed version so that interested stakeholders could check it before and after the workshop. As the draft of the IWMP was prepared in English, it eventually needed to be translated.

To prepare for the meeting, we recommended the use two tools of the RRI Roadmap, namely the Vision Canvas and the Transition Map. The Vision canvas in particular had to be presented and discussed with the stakeholders in the meeting and it will be eventually included in the IWMP. It includes four sections (A. Why do you want to see a change? - B. How do you want it to change? - C. What would success look like? - D. What are your LL ambitions?) that helps in the definition of the vision of the LL.

A very simple agenda for the workshop was recommended, in which the key points of the draft of the IWMP are presented and then discussed with stakeholders.

- General introduction:
 - welcome participants
 - workshop introduction (AG-WaMED project, story, workshop objectives and methodology)
- The integrated watershed management plan
 - Presentation of the draft (vision canvas, practical measures, ..)
 - Discussion of the draft
- How can AG-WaMED analyses contribute to the implementation of the plan?
 - Brief update of the modelling activities
- Conclusions
 - Final remarks
 - Motivation and engagement

- Follow up and fourth workshop

Since most of the stakeholders already participated in the previous workshops, we suggested avoiding long introductions in the initial parts of the workshop. To promote discussion, we strongly recommend to use [mentimeter.com](https://www.mentimeter.com) at the end of each part of the draft presented or some similar tool. Finally, it was remarked that it is very important to link the discussion in the workshop with modelling activities. If there are modelling updates, these should be presented.

Results

The third workshop in the Italian LL

Description of the workshop

The workshop was held in the morning of the 22nd of November 2024 at Palazzo Chigi of the municipality of San Quirico d'Orcia, Siena. The complete agenda is reported in Table 3.

Table 3: The agenda of the Italian workshop.

Agenda	
8.30 - 9.00	Welcome to participants
9.00 - 9.15	Welcome speech and workshop introduction
9.15 - 9.30	Presentation “the Water4all partnership and the Water Oriented Living Lab Atlas” by ISPRA
9.30 - 11.00	Presentation of the draft of the Watershed Management Plan for AGWAMED project - First part (introduction and vision) and discussion
11.00 - 11.30	Coffee break
11.30 - 13.00	Presentation of the draft of the Watershed Management Plan for AGWAMED project - Second part (problems, measures and regulation integrations) and discussion
13.00 - 13.30	Next steps and conclusion
13.30	Lunch

As resumed in Table 4, 21 participants attended the workshop (6 of them from UNIFI). Out of the 21 participants, 6 were women. The categories represented were institutions, small and medium enterprises, farmers/agronomists and farmer associations. Despite the large amount of invitations (60) that were sent, we could not rely on some categories of stakeholders such as smallholder farmers, consumer associations, watershed regional authorities other than the “Consorzio di Bonifica” and environmental associations. We also interviewed a key representative of the “Autorità di Bacino Appennino Settentrionale” (a watershed management authority) that could not attend the workshop and we plan in the final months of the project to collect additional feedback.

Table 4: List of participants to the Italian workshop.

Participant N.	Participant	Category	Gender
1	Elena Bresci	UniFi - AG-WaMED	F
2	Enrica Caporali	UniFi - AG-WaMED	F
3	Giulio Castelli	UniFi - AG-WaMED	M
4	Lorenzo Villani	UniFi - AG-WaMED	M
5	Luigi Piemontese	University of Florence	M
6	Eleonora Forzini	UniFi - AG-WaMED	F
7	Valentina Chiarello	Consorzio di Bonifica 6 (CB6)	F
8	Fabio Bellacchi	Consorzio di Bonifica 6 (CB6)	M
9	Marco Nicosia	Consorzio di Bonifica 6 (CB6)	M
10	Carlo pellegrino	Consorzio di Bonifica 6 (CB6)	M
11	Vittoria Laterza	ISPRA	F
12	Maria Chiara Sole	ISPRA (Institution)	F
13	Walter Paternesi	Università La Sapienza (Roma) (Institution)	M
14	Gianni Savelli	Banfi (big farm)	M
15	Danilo Savelli	Banfi (big farm)	M
16	Emiliano Chiavarini	Banfi (big farm)	M
17	Simone Pozzolini	H.S. Ingegneria (SME)	M
18	Elia degli Innocenti	H.S. Ingegneria (SME)	M
19	Lorenzo Costa	Farmer	M
20	Luciano Monaci	Institution (Mayor)	M
21	Paolo Bittarelli	Confagricoltura (Farmer association vice-director)	M

Methodology and presentation of the Integrated Watershed Management Plan

The objective and methodology presented in the preparatory meeting were confirmed for the Italian Living Lab. To collect feedback, we simply opened the discussion after the presentation of portions of the draft. We also allowed the possibility to insert questions/comments on Mentimeter, but this was not used during the workshop by the

stakeholders. To give the chance to the interested stakeholders to read the plan in advance, we translated the complete plan and sent it by email some weeks before the workshop. Furthermore, we printed some copies that were distributed during the workshop. Finally, we gave more time after the workshop to the stakeholders to provide feedback.

Validated Vision Canvas for the Italian LL

The proposed Vision Canvas was received positively by the stakeholders.

- Why do you want to see a change?

A significant part of Val d'Orcia farms do not have sufficient access to water for irrigation. There is an urgent need for action to deal with rising temperatures and irregular rainfall caused by climate change, to improve the quantity and quality of agricultural production and thus ensure the sustainability of the agricultural sector and the economy of the Val d'Orcia.

- Who and where exactly?

Farmers and entities involved in water management are the main actors in this change, but they need an enabling environment and the support of other institutions, farmers' associations, small and medium-sized enterprises and academia.

- How do you want it to change?

All farmers should have access to sufficient water to irrigate crops during summer and dry periods. Water can come from various sources, but the most sustainable and typical is probably from small hillside reservoirs. This is why we envision a future in which farmers have access to water mainly through small private or public reservoirs and, eventually, large reservoirs, provided they do not jeopardise the environment and cultural landscapes of the Val d'Orcia. The direct or indirect costs of water should be affordable, but not zero, so better management of soil erosion and changes in legislation should be adopted. The increased water availability for agriculture resulting from the use of reservoirs should be considered and included in the water resource management plans by the managing bodies to better allocate the water resources - from both conventional and non-conventional sources - available for each use.

- What would success look like?

Farmers have the technical skills and economic resources to afford sustainable, long-term access to water for irrigation of their high-value crops, setting an example for other rural areas in Tuscany and Italy. Furthermore, a better allocation of water that takes into account unconventional water resources can be a success and an example.

- Provide examples:

- Regulations to realize/restore small reservoirs are simplified.
- Experts that are familiar with the procedures and best practices can be consulted by farmers.
- Academia and farmers associations are able to share their knowledge and diffuse best management practices to avoid soil erosion.
- Water institutions have enough data, control and recognition that they can have an impact in water management.
- Conflicts related to water infrastructures are objectively debated by the various stakeholders

- What are your LL ambitions related to NCW?

We want to fuel the debate about small reservoirs and facilitate implementation of measures that improve the current situation. We do this by discussing with key stakeholders and by co-producing evidence that these changes would be beneficial.

More in detail, we want:

- That the suggested measures will be considered by institutions
- That the stakeholders of the living lab keep advocating for them in the future using the AG-WaMED outputs.
- To provide quantitative evidence of the benefits of applying such measures.
- Demonstrate the usefulness of the co-modelling approach
- Promote discussion about small reservoirs and make Val d'Orcia an example for Tuscanian and Italian rural areas.

- **LL vision:**

By 2040, all farms in the Val d'Orcia that need it will be able to count on a reliable source of water for irrigation that will guarantee sustainable, high quality agricultural production.

Stakeholders feedback

The plan is overall appreciated, and the following issues are stressed as critical. There is a lack of collaboration and communication between the many institutions involved in processes related to the creation and maintenance of irrigation reservoirs, moreover there is a significant lack of funding for these interventions. Another challenge is that available funds are mainly related to public interventions, while in Val d'Orcia the majority of infrastructures are private, hindering also the development of community irrigation. Furthermore, there are some European laws which aim to limit the increase of agricultural irrigated areas to reduce water consumption by agriculture. Technical assistance for farmers is also very expensive. Proposed solutions to the lack of funding are related to co-funding between private and public entities, the shared hiring of technical consulting between several farms or the whole LL and incentives for farmers sharing the water with other farms or making the stored water available for other public use such as fire extinction.

To improve the draft, it is suggested also to include the use of treated wastewater through phytodepuration. Another improvement is to divide the proposal in categories such as: technical interventions not requiring bureaucracy, regional and national measures. An interesting project outcome could also be the individuation of each water-management-related institution's competencies.

Next steps

During the third workshop, the stakeholders proposed to evaluate the use of phytodepurated wastewater in agritourism farms as a supplementary water resource for irrigation at least in summer. Thus, some further modelling activities could regard this issue. A more active participation of smallholder farmers will be sought through visits to their farms and dedicated questionnaires submission. They explained that it is difficult for them to attend the participatory workshops since they have to carry out all the activities themselves and no one can participate on their behalf. The contribution of other public institutions to the final version of the Integrated Watershed Management Plan will be sought as well, even if several attempts of contacting them previously failed. During the conclusions of the workshop, stakeholders confirmed the interest in continuing collaborating and in participating in the

fourth workshop. Depending on the remaining project budget, a final event in the Living Lab for the dissemination of results could be organized, together with other project communication and dissemination activities.

The third workshop in the Spanish LL

Description of the workshop

The workshop was held from 9.30 to 17.15 of the 3rd of December 2024 in Cartagena, Murcia. The complete agenda is reported in Table 5.

Table 5: The agenda of the third workshop in the Spanish LL.

Agenda	
9:30 – 10:00	Welcome to participants.
10:00 – 11:00	Vision Canvas: work on the shared vision of the LL before the workshop. Facilitator: Luis Garrote.
11:00 – 11:30	Coffee and informal discussions
11:30 – 12:00	Presentation of the draft of the Watershed Management Plan for AGWAMED project. Luis Garrote.
Brainstorming and debate:	
12:00 – 12:30	Key issues in the plan. Facilitator: Álvaro Sordo.
12:30 – 13:00	Formulation of plan objectives. Facilitator: Paola Bianucci.
13:00 – 14:30	Informal discussion during lunch. Advances in Fourth Workshop organization.
14:30 – 15:30	Plan measures. Facilitator: Luis Garrote.

15:30 – 16:00	Plan financing. Facilitator: Paola Bianucci.
16:00 – 17:00	Vision Canvas: work on the shared vision of the LL after the workshop. Facilitator: Luis Garrote.
17:00 – 17:15	Conclusions. Luis Garrote.

As resumed in Table 6, 9 stakeholders participated in the workshop (two of them from UPM). 7 women were invited but in the end only 2 participated. The invitations and the draft of the IWMP were sent by email in the period 7-30 November 2024. Invited participants covered all the range of stakeholders. Actual participants could be grouped in two main categories: scientific/academic; users (irrigation communities/farmers). Water authorities, industry and civil society were missing categories of stakeholders and most of the invited could not participate due to agenda problems.

Table 6: List of participants to the workshop of the Spanish LL.

Participant	Category	Gender
Manuel Martínez Madrid.	Chairman of Campo de Cartagena Irrigation District	Male
Mariano Soto García.	Coordinator of Cátedra Trasvase y Sostenibilidad J.M. Claver; and General Secretary of Campo de Cartagena Irrigation District	Male
José Ángel Pérez Abellán	Secretary SCRATS	Male
José Francisco Maestre Valero	UPCT Professor	Male
Francisco Pedrero Salcedo	CEBAS-CSIC	Male
Cristina Romero Trigueros	CEBAS-CSIC	Female
José Luis García Aróstegui.	Researcher of Geology and Mining Spanish Institute (IGME)	Male
Luis Garrote	UPM – AGWAMED Researcher	Male
Paola Bianucci	UPM – AGWAMED Researcher	Female

Methodology and presentation of the Integrated Watershed Management Plan

The involved stakeholders agreed on the importance of having a reasoned and well-founded action plan to address water resource management, especially in the field of irrigated agriculture in a situation of scarcity, potentially aggravated by climate change. For the Spanish third workshop, specific objectives were:

- Discuss draft of the integrated watershed management plan, by adding or adapting the management actions and the financing measures.
- Further refine the analyses and scenarios simulated in AG-WaMED, by adjusting the settings of the scenarios considered and by improving the capacity of the analysis to model the problem complexity.
- Define LL NCW vision: potential sources, need of infrastructure, water governance and authorities' coordination.

The participatory approach was divided into two parts. The first part consisted of asking the stakeholders to review the document of the Plan (sent by email). The second part corresponded to the development of the (face-to-face) workshop itself, favoring discussion. During the workshop three techniques were applied: oral presentation summarizing the main issues of the plan, brainstorming and guided debate.

Firstly, stakeholders from the following areas were consulted: scientific/academic, water users, water authorities and irrigation industry. This consultation was carried out by sending the draft plan by direct and individualized e-mail. Secondly, during the workshop, the facilitator of each section coordinated the participation of each stakeholder to guide the discussion, with the objective of efficiently gathering contributions to ensure that they were constructive.

The document of the IWMP was translated into Spanish and was disseminated to all the identified stakeholders by email, inviting comments. A powerpoint presentation was prepared and presented to the actual participants at the beginning of the workshop. A press release will be prepared when the final version of the plan is ready.

Vision Canvas for the Spanish LL

The Vision Canvas in the Spanish LL was discussed at the beginning and at the end of the workshop. Here we report both versions.

Initial Vision Canvas for the Spanish LL

- Why a change on water system is needed?

The LL water system is highly technical and well optimized. The forecasted reduction of surface water resources from the Tajo-Segura aqueduct and groundwater (to avoid overexploitation) makes it necessary to increase the supply of non-conventional resources. It is necessary to define the main lines of action to adapt the system to these changes. For these actions to be efficient, it is important that they be agreed upon by all stakeholders.

- Who and where exactly?

Farmers will have to adapt their agricultural practices to an even more irregular water supply. They will have to be ready to cover part of the cost of the needed infrastructure.

Water authorities will have to promote legislative changes to facilitate the increase in the use of NCW by distributing their cost among all users.

- Which are your main ideas for achieving change?

Balancing the need for environmental protection of the Tagus River with the need to maintain the water supply to the recipients of the Tagus-Segura water transfer

Adapting wastewater treatment plants to legislative changes to enable the application of the effluent to agricultural use

Developing additional capacity for desalination

Improving infrastructures to connect NCW resource supply systems with irrigation networks

Changing the cost recovery scheme to achieve greater homogeneity and stability in the price of water

Adapting regulations to provide legal certainty in the development of these policies in the medium and long term.

- What do you consider success?

Achieving the necessary resources to promote food security while maintaining the profitability and sustainability of these agricultural developments.

- Provide examples:

Tagus basin authorities acknowledge water transfer uses and invite them to participate in the public consultation of the watershed management plan

National authorities establish legislation to achieve equitable sharing of the cost of developing non-conventional water resources

Farmers agree to contribute to the cost of building and maintaining the necessary infrastructure

Scientists/academia develop better techniques to maximize water use efficiency

- What are your LL ambitions related to NCW?

In a system as technological as the Campo de Cartagena, whose agricultural production is focused on highly profitable horticultural products, the margin for further reducing water consumption is minimal.

It is therefore necessary to adapt the infrastructures to generate and take advantage of non-conventional water resources, as well as the regulations to provide security in the long-term development of the area's activity (food production).

In relation to the two previous points, it is important to establish the basis for determining water costs and the way in which they are transferred in the production and consumption chain.

- **LL vision:**

We envision a stable, reliable, affordable and equitable water supply system for Campo de Cartagena within ten years where:

The potential of non-conventional water resources for irrigation is fulfilled

Investments on infrastructure development to connect resource production systems with irrigation networks have been fully implemented.

Regulations provide legal certainty on the quantity, quality and price of water allocated to agriculture

Agricultural activity is sustainable over time, including the complexity of water price formation and its impact on the production and consumption chain

Final Vision Canvas for the Spanish LL

- Why a change on water management is needed?

A reduction of surface water resources from the Tajo-Segura aqueduct seems unavoidable

Use of groundwater is currently not feasible due to overexploitation and water quality degradation

Non-conventional water resources are the only alternative to sustain agricultural activity

The water management system needs a deep transformation to adapt to the required changes

Agreement by all stakeholders is essential to realize the change

- Who and where exactly?

Farmers will have to adapt their agricultural practices to an even more irregular water supply. They will have to be ready to cover part of the cost of the needed infrastructure. They will have to implement a strict control on pollutants to avoid environmental degradation

Water authorities will have to promote legislative changes to facilitate the increase in the use of NCW by distributing their cost among all users.

All sectors will have to cooperate to correct the environmental degradation of Mar Menor

- Which are your main ideas for achieving change?

Balancing the need for environmental protection of the Tagus River with the need to maintain the water supply to the recipients of the Tagus-Segura water transfer

Adapting wastewater treatment plants to legislative changes to enable the application of the effluent to agricultural use

Developing additional capacity for desalination

Improving infrastructures to connect NCW resource supply systems with irrigation networks

Using urban and agricultural drainage as a resource

Improving water quality in the aquifer

Enhancing the current capacity to desalinate brackish water

Changing the cost recovery scheme to achieve greater homogeneity and stability in the price of water

Adapting regulations to provide legal certainty in the development of these policies in the medium and long term

- What do you consider success?

Achieving the necessary resources to promote food security while maintaining the profitability and sustainability of these agricultural developments.

- Provide examples:

Circular economy is adopted to manage water resources, maximizing water recycling at all levels

Storm runoff from urban areas and agricultural land is captured, treated and applied to irrigation

Aquifer water is pumped and treated to allow its use in agriculture

National authorities establish legislation to achieve equitable sharing of the cost of developing non-conventional water resources

Farmers agree to contribute to the cost of building and maintaining the necessary infrastructure

All sectors cooperate to revert environmental degradation of Mar Menor

Scientists/academia develop better techniques to maximize water use efficiency

- What are your LL ambitions related to NCW?

Maintain and strengthen the technological component of precision agriculture, to maximize the efficiency of water use and minimize the emission of pollutants.

Have the necessary infrastructure to produce desalinated water from seawater and brackish water and transport it to the cultivation areas, allowing it to be mixed with water from other sources

Establish a regulatory framework that provides security in the long-term development of the area's activity (food production).

Implement a cost-recovery mechanism in which the excess cost of unconventional resources is distributed among all users competing in agricultural markets

To achieve a reliable diagnosis of the causes of environmental degradation of the Mar Menor and to implement a corrective mechanism that allows its recovery in the medium and long term.

- **LL vision:**

We envision a sustainable agricultural activity for all farms in Campo de Cartagena within 20 years where:

Water supply is stable, reliable, affordable and equitable

Agricultural activity is based on precision agriculture, with strict control of pollutants to prevent environmental degradation

The potential of non-conventional water resources for irrigation is fulfilled

Investments on infrastructure development to connect resource production systems with irrigation networks have been fully implemented.

Regulations provide legal certainty on the quantity, quality and price of water allocated to agriculture

Agricultural activity is sustainable over time, including the complexity of water price formation and its impact on the production and consumption chain

Stakeholders feedback

There were many comments and suggestions about the IWMP. Overall, the opinion was positive. It was considered a great success that a specific water management plan had been drawn up for the Campo de Cartagena area. The problems of Campo de Cartagena are very particular, since it is a region in which agriculture plays a preponderant role in the economy and the sustainability of this activity is threatened by the growing lack of water resources. It was therefore considered that it was of great interest to address the problem through an integrated plan.

The structure of the plan was considered adequate. The first part of the plan, which contains a description of the context and environment of the Campo de Cartagena, was the subject of

numerous observations as the figures it includes are very controversial. The discussion focused mainly on the origin and volume of water resources that are used, on the figures corresponding to the cost of water and on the description of the problem of environmental degradation of the Mar Menor and the influence that agriculture can have on it. The perception of the second part, which contains operational planning, was much more positive. The workshop participants considered that the main issues were appropriate and that the objectives were well defined. The list of measures contemplated in the plan was the subject of a very intense debate. Most of the measures were considered adequate, but many complementary measures were proposed, slightly different variants from those included in the plan and even measures opposed to those included in the plan. All of this was the subject of a great deal of debate, and it is hoped that most of the suggestions can be incorporated into the final version of the plan

Most of the concrete proposals for improvement focused on the measures contemplated in the plan. The first group can include measures aimed at managing surface runoff. The main problem of environmental degradation of the Mar Menor is the influx of water from the aquifer. These waters are polluted because of many years of intensive agriculture. Currently, the application of precision agriculture manages to prevent the entry of nutrients into the aquifer, but the waters stored in the aquifer contain a significant amount of nutrients that cannot be removed in the short term. The drainage from the aquifer to the Mar Menor produces the contribution of nutrients that causes environmental degradation. The measures of the plan include the implementation of the agreed protocol for the control of runoff into the Mar Menor. The participants of the workshop considered that these measures are insufficient and that they should be intensified.

First of all, they proposed to improve the harvesting of rainwater. The rainfall in the area is very torrential. Most of the precipitation falls in a few days a year. Therefore, it is necessary to have structures with a large storage capacity to retain surface runoff. At present there are different legal barriers for the authorization of this type of infrastructure and it is not easy to design the actions. They also considered that it would be desirable to build reservoirs to retain the runoff that occurs in flash floods. These reservoirs could capture runoff water and allow it to be used for irrigation. For this, it is necessary to develop new infrastructure for the transport and distribution of water. The participants in the workshop offered to share a study carried out a few years ago by the Polytechnic University of Cartagena to analyze this issue.

The need to improve the drainage infrastructure of the plots to collect and treat the surface runoff that occurs in rainy episodes was also raised. It is important to prevent this runoff from entering the irrigation plots and carrying away the fertilizing products that are used. To this end, it was proposed to study alternatives to improve the drainage of the entire irrigable area of the Campo de Cartagena.

The participants in the workshop indicated that a significant part of the pollution that enters the Mar Menor comes from the discharge of the sewer networks of all coastal populations. The sewer networks are unitary, which means that the same collector is used for wastewater and rainwater runoff. During episodes of heavy rain, the collectors do not have the capacity to transport the entire flow of runoff to the treatment plant and there are overflows from the sewer network to the Mar Menor. This means that untreated water enters the Mar Menor during these episodes of rain. This should be avoided. The proposed solution is the

development of separative sewer systems in which rainwater does not mix with wastewater and therefore does not produce pollution discharges in episodes of heavy rainfall. To do this, it is necessary to have storm water retention tanks that store the first runoff to be treated in the treatment plant. Several tanks of this type have been built in the area but some of them have not entered service due to lack of conservation and maintenance by the municipalities.

It was proposed to promote the idea of circular economy by proposing the collection of rainwater captured in urban sewerage networks for its application to agriculture. This is considered feasible if unitary networks are transformed into separative networks. During the discussion, it became clear that a significant part of the urban drainage networks in the area are not working properly. In episodes of heavy rain, it is observed that the runoff circulates on the street and does not enter the sewerage networks. This is because the pipes usually operate in free surface flow. The air contained in the pipeline must be evacuated before moving to pressurized flow. An inadequate design means that air pockets remain in the pipes that prevent water from entering through the drains.

Participants also made numerous suggestions related to the promotion of precision agriculture. This type of agriculture involves the use of advanced technology with numerous sensors to monitor the status of different parameters related to agriculture; for example: temperature, soil moisture, nutrient concentration, salinity, pH, etc. The use of precision agriculture makes it possible to maximize the efficiency of the use of water and fertilizers, using only what the plant needs. This technology not only saves water, but also prevents the percolation of pollutants into the aquifer. It is considered essential to promote the use of precision agriculture among all irrigators. To this end, it is essential to address capacity building programs that allow farmers to obtain the training they need for the use of this technology. In addition, it is necessary to offer the financial instruments that are required so that small farmers can make these investments. Research centers are actively working along these lines. They propose to identify a group of representative pilot farms to monitor the effectiveness of this type of agriculture. It is necessary to invest in research, innovation and technological development to improve instrumentation and refine analysis procedures and optimize the use of resources.

Another group of measures proposed is related to the development of facilities for the desalination of brackish water. The water in the aquifer has an appreciable salinity that prevents its direct use in agriculture, but its salinity is much lower than that of seawater. Therefore, the energy cost of desalination of this type of resource is much lower compared to seawater. It is considered that it is advisable to promote the use of desalination of brackish water. There is a plant of this type operating in the Campo de Cartagena region: the El Mojón facility. Historically, in years when water from the Tagus-Segura water transfer has not been available, water from the aquifer has been desalinated in the El Mojón plant. This also helps to remove polluted water from the aquifer. It is estimated that the aquifer drains between 20 and 30 hm³ of water per year into the Mar Menor. It would be very good to be able to capture these resources and use them for agriculture. Agricultural drainage can also be treated in the desalination plant. The Campo de Cartagena Irrigation District has made investments of €120 million to capture agricultural drainage and take it to the El Mojón plant for treatment.

Finally, in relation to financing, it was proposed that the cost of water should be addressed at a national level. Non-conventional resources, which are needed in areas of scarcity, have a higher cost than conventional resources. The difference must be shared and paid for by increasing the price of the less expensive resources. This can only be done by defining a wider scope of cost calculation than that restricted to areas of scarcity. In this way it can be possible to recover the cost of water by distributing it among all users, including those who pay very little for their water.

In the modeling section, the need to estimate the surface runoff water that could be used through adequate infrastructure was discussed. It was mentioned that the study has already been carried out by the Polytechnic University of Cartagena. An attempt will be made to access the study to incorporate it into the analyses carried out in the AG-WaMED project. The convenience of having an estimate of the volumes available for the Tajo-Segura water transfer was also insisted on. This analysis involves simulating the water resource management system of the upper part of the Tagus River basin, including very complex systems such as the water supply to the city of Madrid. The AG-WaMED team has developed a preliminary model using the software AQUATOOL that can be used for this purpose. The model will continue to be improved to offer solutions to the farmers of Campo de Cartagena.

Other modelling initiatives were suggested, like an integral water quality model of the Mar Menor, the contributing basin and the aquifer, an in depth analysis of the cost of water at the regional scale, or an estimate of the cost of transforming unitary sewer networks into separative ones. Unfortunately, these studies are clearly outside the scope of the project.

Some participants noted that the plan does not include indicators for monitoring and analysis of effectiveness. They suggested that a section for monitoring the implementation of the plan and assessing its impact should be included. This aspect is difficult to incorporate in the context of the AG-WaMED project because we do not have the capacity to put the plan into operation.

Next steps

The most relevant issue to improve for the next workshop is related to female participation, increasing the number of female stakeholders involved. In the case of Campo de Cartagena, this is extremely difficult, since most members of the Campo de Cartagena Irrigation District, water authorities and irrigation industry are males. Female contribution can be expected from academia or civil society, but they are still a small fraction of the total population of stakeholders.

Although the issues regarding Campo de Cartagena water management have been discussed at large in previous workshops, stakeholders might still be willing to participate in the 4th workshop. The managers of the Campo de Cartagena Irrigation District suggested opening the next workshop to the general public and taking it as an opportunity to disseminate the work done. They also suggested coordinating with other relevant local actors, like Universities or Public Administration, to gain momentum. They considered the AG-WaMED project as a valuable opportunity to provide their vision and experience to obtain a useful and feasible management plan.

Workshop dissemination is an important task. It was agreed to release a press communication to local newspapers and radio station to try and capture media attention.

The third workshop in the transboundary LL

Description of the workshop

The workshop was held on the 27th November 2024 in Gafsa (Tunisia). Participants from both Tunisia and Algeria participated for a total of 15 participants, 7 of them women (Table 7). The categories involved were living lab leaders, project members and stakeholders, and farmers, NGOs and municipalities were missing.

Table 7: List of participants to the workshop in the Algerian/Tunisian LL.

Participant N.	Participant	Category	Gender	Tunisian (T) or Algerian (A) part
1	Khlif Nadia	researcher	F	T
2	Karaouli Fatma	researcher	F	T
3	Abdeslam Ilhem	development	F	A
4	Fehdi Chamseddine	researcher	M	A
5	Layadi Mehdi	PHD student	M	A
6	Ouessar Mohamed	researcher	M	T
7	Gouaidia Layachi	researcher	M	A
8	Ben Zaied Mongi	researcher	M	T
9	Dhaouadi Latifa	researcher	F	T
10	Maachia Sihem	researcher	F	T
11	Hmaidia Hacene	engineer	M	A
12	Ben Abdelsalem Nouredine	development	M	T
13	Mabrouki Idriss	development	M	T
14	Mkadmi Khadra	development	F	T
15	Felah Nouha	development	F	T

Methodology and presentation of the Integrated Watershed Management Plan

Specific objectives of the workshop were to discuss the draft of the integrated watershed management plan and to further refine the simulated scenarios. The participatory methodology selected was World Café, in which the participants were divided by categories and gender into two groups. The questions were based on the Vision Canvas. The IWMP was orally translated to French and Arabic.

Vision Canvas for the Algerian/Tunisian LL

- Why do you want to see a change?

The plan focuses on improving water resource management, mobilizing and developing available water resources, reducing overexploitation, supporting population resilience, environmental protection, ensuring resource sustainability, optimizing the use of natural resources (NCWs), ensuring a better supply/demand balance, and involving Tunisian-Algerian stakeholders in the process. It also includes EU discharges.

- Who and where exactly?

The organization includes NGOs, decision-makers, farmers, scientists, authorities, local population, and basic organisms (Research/Development/Teaching Organizations).

The location of management concern mainly the irrigation area, aquifers, watershed, community and STEP.

- How do you want it to change?

Using various strategies for promoting sustainable development, including regulatory texts, changing techniques, raising awareness, encouraging resilient cultures, increasing revenue, granting grants, promoting efficient irrigation, sensitization, communication, experience exchange, consultation and monitoring bodies, aligning development strategies with specific legislation, valuing results, and capacity building.

- What would success look like?

The plan aims to reduce water loss, balance the balance sheet, and improve agricultural practices. It also includes crop diversification, irrigated areas extension, water recharge with the EU, and optimizing water productivity. It also includes establishing a consultation form, realizing joint projects, and formulating cross-border legal texts.

- Provide examples:

construction of CES structures, installation of appropriate irrigation technologies, implementation of monitoring and evaluation system, plot sites, reforestation at retention structures, and supplementary irrigation for cereals.

- What are your LL ambitions related to NCW?

The LL ambitions outline a transition to tertiary treatment, the application of development scenarios, collaboration between upstream and downstream actions, conflict management, wastewater reuse, mobilization of runoff water, effective cross-border consultation, and restoration of renewable groundwater reserves.

- LL vision:

Sustainable agriculture requires good production, quality resources, protection, and securing resources for future generations. Climate change adaptation is crucial, and cross-border consultation for better management of NCWs is essential

Stakeholders feedback

Stakeholders agree and validate the proposed scenarios to include in modelling.

Improvements to the IWMP are identified:

- Readjust the plan according to the local/national watershed management plans
- Include water quality assessment
- Other modelling exercises:
 - Consideration of the treated wastewater (tertiary level)
 - Additional water harvesting: i.e. recharge wells
 - Climate change scenarios
 - Perform deeper economic analysis (CBA, etc.)

Next steps and improvements

It was recommended to prepare the basic documents (in Arabic or French) before the workshop.

The participants confirmed the relevance of the workshops and the assigned objectives, and they indicated their motivation for further participation in different training and in the next workshop in Algeria (April 2025)

The participants indicate that the duration assigned to the workshops should be re-appreciated as the detailed discussion requires more than one day.

The third workshop in the Egyptian LL

Description of the workshop

The workshop was held in two days, on the 27th of December 2024 with local women while on the 28th of December 2024 with the other stakeholders in Marsa Matrouh, Egypt.

The workshop started at 12.00, after registering the participants. By 12:00, the facilitator, Dr Mohamed Bahnassy started to welcome the attendees then started to explain the Non-Conventional Water Vision Canvas and discuss it with the participants.

After the end of the discussion with the participants, Dr Mohamed Bahnassy starts to ask the participants about What is needed to move LL NCW Vision from the present scenario As-Is" to the best scenario "As-It should be".

As shown in Table 8, 14 stakeholders participated in the workshop (with 5 women). According to the QH model, the stakeholders were classified as 2 represent the education system, 1 represent the political system, 2 represent the natural environment system, 2 represent the economic system and 7 represent the Media-based and culture-based public.

Table 8: List of participants to the workshop in the Egyptian LL.

Participant N.	Category	Gender	No of Participants
1- Associate Professor at faculty of Agricultural and environmental sciences at Matrouh University.	Education system	Male	1
2- Research Manager at Agricultural research centre.	Education system	Male	1
3- Naghamish watershed Mayor.	Political system	Male	1
4- Local Bedouins (Farmers).	Media-based and culture-based public	Male	2
5- Production manager at Alekhwa company for wheat mills.	Economic system	Male	1
6- Manger at Garawla Marble factory.	Economic system	Male	1
7- Manager at Drinking water and sanitation company.	Natural environment	Male	1
8- Manager at Alrumaila desalination point.	Natural environment	Male	1
9- Local Bedouins women.	Media-based and culture-based public	female	5

Methodology and presentation of the Integrated Watershed Management Plan

The goal of the workshop is to present the work that took place after the 2nd workshop and explain the Non-Conventional Water Vision Canvas parallel with climate change and discuss it with the participants to get their input to co-defining a common vision and transition plan by asking them about What is needed to move LL NCW Vision from the present scenario “As-Is” to the best scenario “As-It should be”.

During the workshop, a small, diverse group of stakeholders brought together to discuss and provide feedback on the IWMP draft created within the project, with a particular focus on the Vision Canvas. Hence, the Vision Canvas was discussed to clarify why change is needed with respect to the current situation and to assess stakeholders' objectives to reach an optimal situation. The goal is to gather a range of opinions, insights, and reactions that can help us and the project to understand the best transition plan to manage their water resources for more food security in their communities.

The half-day-long workshop was facilitated according to the focus group method. The focus group method is considered effective for gaining insights and understanding the viewpoints of various stakeholders enabling them to share their experiences, concerns, and solutions, yielding valuable data while promoting collaboration and mutual understanding. Dr. Mohamed Bahnassy was the moderator who led the focus group and guides the discussion

with prepared vision canvas and ensures that everyone has a chance to contribute in specifying the challenges and opportunities associated with the use of NCW resources such as rainwater harvested by the Bedouins, desalinated water, waste water and other sources of NCW depending on a forum for stakeholders from many systems (e.g., Political system, Education system, Economic system, Nature environment system, Media based and cultural based system). In this way, various viewpoints on NCW use were debated, allowing participants to explore and develop innovative strategies and solutions for effectively managing and exploiting NCW resource taking into consideration evaluate the potential environmental and health consequences, ensuring that any techniques devised are sustainable and safe within laws and regulations that promote the safe and efficient use of NCW resources.

The Vision Canvas was prepared and printed in advance by the research team in Arabic to fit the stakeholders, then the stakeholders effectively explained their thoughts through the workshop.

Vision Canvas for the Egyptian LL

- Why do you want to see a change?
 - 1- Low and erratic rainfall rates, thus depending on non-conventional water.
 - 2- Expanding the cultivated area (adding new areas of olives (low-quality soils).
 - 3- Achieving sustainability of agricultural resources.
 - 4- Maximizing crop production.
 - 5- Increasing farm income.
 - 6- Reducing the risk of desertification.
 - 7- Increasing air temperatures.
 - 8- Fluctuating rainfall rates.
 - 9- Emergence of new agricultural pests.
- Who and where exactly?

At The Egyptian living lab, the change is required by:

 - 1- Farmers.
 - 2- Agricultural associations.
 - 3- Related civil associations and associations.
 - 4- Ministry of Agriculture.
 - 5- Universities and research institutes.
- How do you want it to change?
 - 1- Relying on non conventional water sources such as desalination of seawater and reusing treated wastewater in agriculture.
 - 2- Increasing the use of rainwater harvesting techniques.
 - 3- Expanding the use of modern irrigation systems.
 - 4- Developing drought-tolerant crop varieties.
 - 5- Providing financial support from the government.
 - 6- Cooperating civil society organizations and donors to tackle the effects of climate change.
- What would success look like?

1- Relying on available non conventional water sources to confront the effects of climate change and to increase crop production and farm income through the combined efforts of civil society and agricultural associations, the government, universities and research institutes, which in turn will help raise the professional competencies of farmers in addition to providing financial support.

- Provide examples:

The presence of farms with drought-tolerant crop varieties and their owners have excellent professional skills or capabilities in managing and maintaining rainwater harvesting systems and modern irrigation systems.

- What are your LL ambitions related to NCW?

Full harmony and coordinated efforts between farmers, government and civil society organizations to maximize the benefit from available non-conventional water resources, resulting in effective and beneficial changes at the living lab level.

- LL vision:

Maximizing the use of available non-conventional water resources, which increases farm income, raises the standard of living of the individual and the family, and achieves sustainable agricultural production until 2030. This will only be achieved through the collective efforts of farmers, the government, civil society organizations, universities, and research institutes

Stakeholders feedback

Most stakeholders agreed with the IWMP, and more in detail with the Vision Canvas, which was prepared in advance by the project's research team.

Improvements to the IWMP were suggested:

- 1- Stakeholders emphasize the importance of collaboration between local communities, government agencies, NGOs, and other relevant groups by (building dykes, digging wells, cistern maintenance, saving seeds with low prices,...etc) to support more sustainable agricultural practices and ensure safe and sustained food production within available resources and climate change disasters.
- 2- Stakeholders frequently prioritize the sustainable management of resources such as water, soil, etc. This involves implementing techniques that avoid soil erosion, and conserve water resources.
- 3- Stakeholders emphasize on the importance of laws and regulations that help them to promote development activities and sustainable watershed management.

Next steps

Modeling was discussed with the stakeholders in the second workshop (participatory modelling), and they were interested in discussing the economic analysis as it contained monetary values and profits which are understood by the stakeholders. The only part that was difficult to digest by the stakeholder was the SWAT modelling, as they are not familiar with the watershed concept.

We will organize a small meeting with some stakeholders to resolve problems and explain more about other aspects of modelling.

The stakeholders are willing to participate in one more workshop

References

Marina project, 2018. Responsible research and innovation roadmap.

last access 14/01/2025

https://www.xpro-consulting.com/uploads/4/9/5/5/49557869/rri_roadmap_online_single.pdf

Additional material

[Additional materials for the Italian LL](#)

[Additional materials for the Spanish LL](#)

[Additional materials for the Algerian/Tunisian LL](#)

[Additional materials for the Egyptian LL](#)