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Water and Environment Support

in the ENI Southern Neighbourhood region



WES Activity No. R-W-7-REG/ST

Regional Training and Study Tour on optimal irrigation management

Report on the Training

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WATER AND ENVIRONMENT SUPPORT IN THE ENI SOUTHERN NEIGHBOURHOOD REGION

The "Water and Environment Support (WES) in the ENI Neighborhood South Region" project is a regional technical support project funded by the European Neighbourhood Instrument (ENI South). WES aims to protect the natural resources in the Mediterranean context and to improve the management of scarce water resources in the region. WES mainly aims to solve the problems linked to the pollution prevention and the rational use of water.

WES builds on previous similar regional projects funded by the European Union (Horizon 2020 CB/MEP, SWIM SM, SWIM-H2020 SM) and strives to create a supportive environment and increase capacity all stakeholders in the partner countries (PCs).

The WES Project Countries are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Libya, Palestine, Syria and Tunisia. However, in order to ensure the coherence and effectiveness of EU funding or to promote regional cooperation, the eligibility of specific actions can be extended to neighboring countries in the Southern Neighborhood region.

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ABBREVIATIONS

<i>CB/MEP</i>	Capacity Building/Mediterranean Environment Programme
<i>ENI</i>	European Neighbourhood Instrument
<i>EU</i>	European Union
<i>EC</i>	European Commission
<i>NKE</i>	Non-Key Expert
<i>PCs</i>	Partner Countries
<i>SWIM</i>	Sustainable Water Integrated Management
<i>SWIM-Horizon2020 SM</i>	Sustainable Water Integrated Management – Support Mechanism Project
<i>UNEP-MAP</i>	United Nations Environment Program - Mediterranean Action Plan
<i>UfM</i>	Union for the Mediterranean
<i>WES</i>	Water and Environment Support
<i>WUA</i>	Water Users Association

1 GENERAL INTRODUCTION

Agriculture consumes more than 70% of the available water resources throughout the Mediterranean and the largest part of freshwater resources withdrawals, while both food and water demands are on the increase due to rapidly increasing population and changes in lifestyle. Water availability is, in addition, significantly affected by climate change and variability, while stormwater and wastewater are increasing. The latter should be properly introduced into the available water cycle.

Because of the increasing challenge of water scarcity, there is an urgent need to improve water management, at both farm and irrigation scheme levels. Overexploitation of water resources, particularly groundwater, is beyond the sustainability limits in the WES project countries. The irrigation agencies and/or water users associations (WUAs), which are responsible for the management of water at the scheme level, must implement comprehensive strategies for the management of limited water resources. These strategies should focus on helping farmers improve their irrigation practices to conserve water and improve yield, allocating irrigation water in a more efficient, reliable, and equitable ways, and ensure the economic sustainability of the irrigation schemes and the WUAs.

In view of the above and as part of the WES project workplan for the fourth year (2022-2023) related to the Regional Activities, a **regional training focusing on optimal irrigation management and practices** (RW-7-REG) and a **Study Tour** (ST) on the same topic took place in Bari, Italy, over a five-day period (**12-16 June 2023**).

2 OBJECTIVES OF ACTIVITY

The purpose of the specific regional training activity RW-7-REG is to build the capacity of the project countries (PCs) on optimal irrigation management and practices using appropriate irrigation methods for improved irrigation efficiency and water productivity and highlighting the benefits of using treated wastewater and rainwater harvesting. The training was combined with a Study Tour (RW-7-ST) in Italy, an advanced country in this field, providing examples of hands-on practices followed.

To achieve the training objectives, a highly dynamic, interactive, facilitated, and participatory approach was adopted, making use of professional learning tools such as:

1. Presentations by trainers and by the participants.
2. Facilitated round table discussions.
3. Personal and/or national perspectives.
4. Break-out sessions engaging the participants in group discussions and group work with the Non-Key Experts (NKEs) who steered and facilitated these discussions, with the aim to apply what they have learnt during the training.
5. Visual aids (videos) to facilitate understanding by the participants.
6. Hands-on exercises.

7. Study tour to enhance the learning process and expose the participants to success stories in the management of irrigation systems at the irrigation scheme and on-farm levels under water scarce conditions.

The training also considered pressing interests identified during the sessions. Pre and Post training assessment provided specific feedback on the impact of the training on the understanding of fundamentals and concepts and knowledge acquired in the field.

3 EXPECTED RESULTS OF ACTIVITY

By the end of the training, the participants were introduced to:

A. optimal management of collective irrigation systems, water allocation and distribution and its impact on productivity, in order to:

1. understand the importance of irrigation water use efficiency in the context of water resources management at the collective irrigation scheme/network level,
2. know the concepts of water management at the collective irrigation scheme/network level, including irrigation water allocation and distribution (water delivery schedule) and its impact on water productivity at the farm level,
3. know the concepts of planning, designing, and operating collective pressurized irrigation distribution systems to provide reliable, adequate, timely and equitable irrigation water supply as it relates to on farm water productivity,
4. get introduced to the main considerations for the optimal design of collective irrigation systems,
5. Learn about the concepts and the importance of hydraulic analyses of collective systems to provide optimal services to farmers,
6. learn about the specific considerations associated with irrigation using treated wastewater reuse,
7. learn about available tools that allow for an optimal design and analysis of collective pressurized irrigation systems.

B. optimal on-farm irrigation management and its impact on irrigation efficiency and water productivity, in order to:

1. understand the importance of irrigation efficiency in the context of water resources management at the farm level,
2. know the concepts of water efficiency and productivity in agriculture and the links between the different definitions used in the literature to express water efficiency at different scales (collective irrigation schemes/network level, farm level),
3. learn about the parameters/considerations affecting the variability in the water efficiency of a crop,
4. get introduced to the different technologies used for optimal irrigation at the farm level including the use of smart irrigation,

5. learn about the specific considerations associated with irrigation using treated wastewater reuse focusing on technical and environmental aspects,
6. get introduced to the tools available for efficient irrigation water management, estimating yields and developing irrigation schedules at the farm level,
7. get introduced to the applications of renewable energies in on-farm irrigation.

Other outcomes included

1. **Enhancement of the ability of the trainees to** implement rapid exercises in addressing practical problems,
2. Promotion of north to south and south to south exchange and experience sharing through:
 - a. Presenting practical examples also from a European context, as needed,
 - b. Facilitating the exchange of experiences between participating practitioner and discussing real situations in their own countries,
 - c. Cross-fertilisation between the WES DEMO projects and this project on the subjects related to optimal irrigation management and treated wastewater reuse with a view to promote preservation of water resources under increasing water scarcity,
 - d. Dissemination of related WES demo projects results and outcomes to date.
3. Field visits to show case examples of experience in optimal irrigation management at both the collective irrigation scheme/network and farm levels including the use of smart irrigation technologies and treated wastewater reuse, and the utilisation of renewable energy in irrigation at the farm level.

4 ELEMENTS OF THE WORKSHOP IMPLEMENTATION

No. of presentations on examples/case studies (sharing of experiences, good practices, etc.)	4
No. of international speakers from the Region	
No. of international speakers from the EU	4
No. of training-oriented presentations (on concepts, methodologies, etc.)	7
No. of interactive/participatory activities (open discussions, brainstorming sessions)	4

5 PROFILE OF THE PARTICIPANTS

A total of Thirty (30) participants participated in the training. This number reaches a total of 39 when including the 5 WES experts and LDK team (WES project coordinator, 2 interpreters and 1 event organiser). The duration of the training was 5 days from Monday 12 June to Friday 16 June 2023, including two (2) days in the field: The demographics of the participants excluding the experts, etc. are presented below.

Training Workshop Demographics

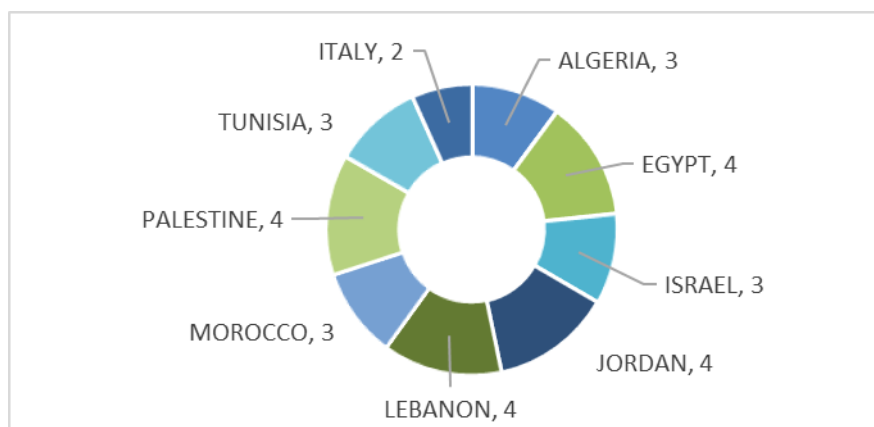


FIGURE 5-1: REPRESENTATION OF TRAINEES PER COUNTRY

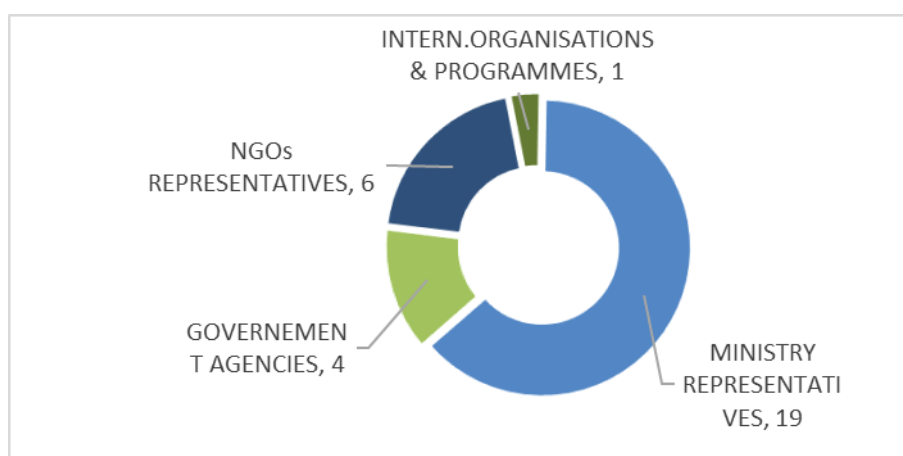


FIGURE 5-2: REPRESENTATION OF TRAINEES PER TYPE OF INSTITUTION

6 STATISTICS GENDER AND YOUTH

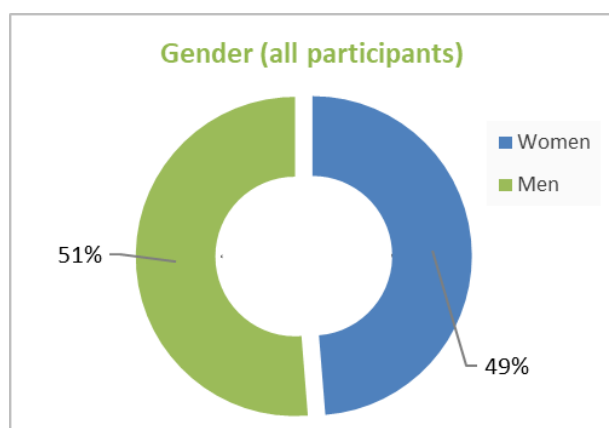


FIGURE 6-1: GENDER (ALL PARTICIPANTS)

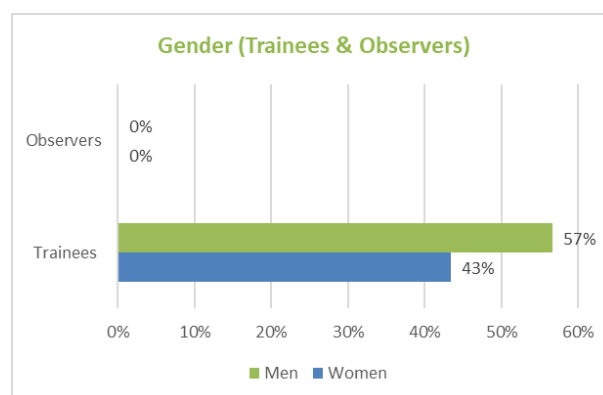


FIGURE 6-2: GENDER (TRAINEES AND OBSERVERS)

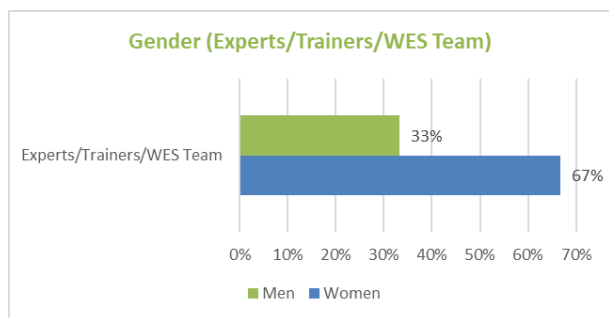


FIGURE 6-3: GENDER (EXPERTS/TRAINERS/WES TEAM)

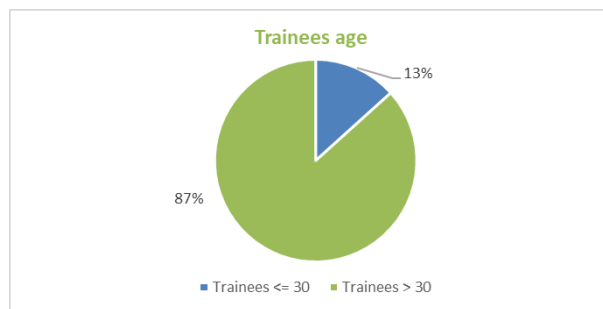


FIGURE 6-4: TRAINEES - AGE

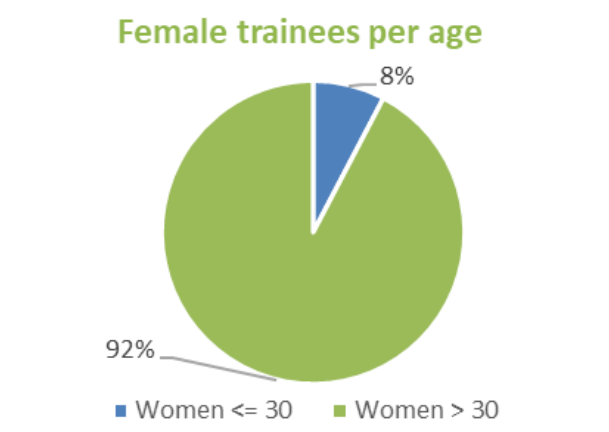


FIGURE 6-5: FEMALE TRAINEES - AGE

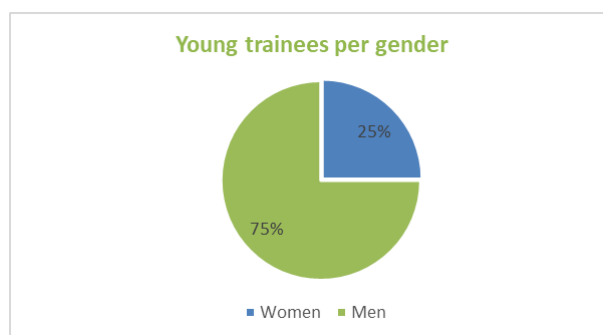


FIGURE 6-6: YOUNG TRAINEES (18-30) - GENDER

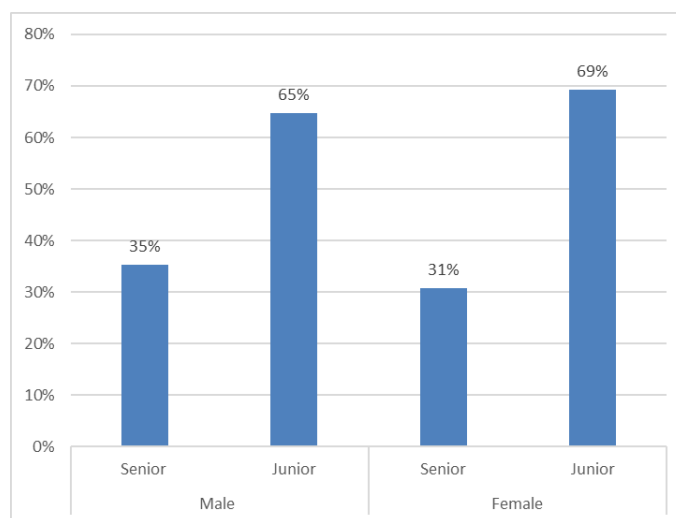


FIGURE 6-7: GENDER - POSITION LEVEL

7 EVALUATION OF THE EVENT¹

7.1 EVALUATION RESULTS OF THE EVENT

A. Organisational, administrative, and planning issues before and during the event

A set of 11 criteria; A1-A11 (See table below) were assessed by the participants, using a qualitative description ranging between “Excellent” to “Poor”.

TABLE 7-1: RESULTS OF THE EVALUATION QUESTIONNAIRES

A. ORGANISATIONAL, ADMINISTRATIVE AND PLANNING ISSUES BEFORE AND DURING THE EVENT		EXCELLENT (4)	GOOD (3)	AVERAGE (2)	POOR (1)	Total Replies	Average Score (max = 4)
A1	Appropriate handling of invitations, visa support, information sharing and smoothing obstacles	23	5	0	0	28	3.82
A2	Efficient logistics: accommodation, transportation, location of venue and interpretation	17	10	1	0	28	3.57
A3	Provision of support (if requested) for participants' preparation for the event	17	10	1	0	28	3.57
A4	Efficient and effective follow-up of preparations and progress towards the event	21	6	1	0	28	3.71
A5	Planning for the event: selection and design of methodology, programme/daily agenda and work rules	16	10	2	0	28	3.50
A6	Smooth flow of programme, efficient handling of emerging needs and attentiveness to participants concerns	14	11	1	0	26	3.50
A7	Presentations correspond and contribute to the planned objectives and are conducive to enhanced shared understanding and participation on addressed topics	15	11	2	0	28	3.46
A8	Clarity, coverage and sufficiency of concepts, objectives, anticipated outputs	18	8	2	0	28	3.57
A9	Usefulness of the distributed material	10	17	1	0	28	3.32
A10	Efficiency and effectiveness of the facilitation	12	15	1	0	28	3.39
A11	Overall rating of the event	16	10	2	0	28	3.50

¹ As Event is considered to be: training session, peer-to-peer session and study tour

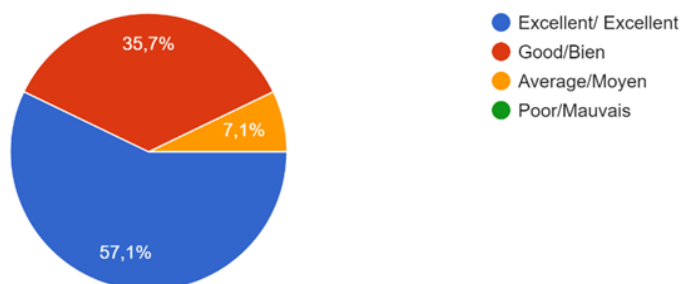


FIGURE 7-1: PLANNING FOR THE EVENT (A.5)

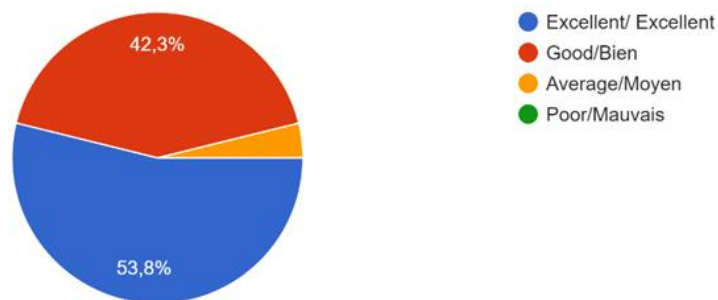


FIGURE 7-2: FLOW OF PROGRAMME, HANDLING OF EMERGING NEEDS (A.6)

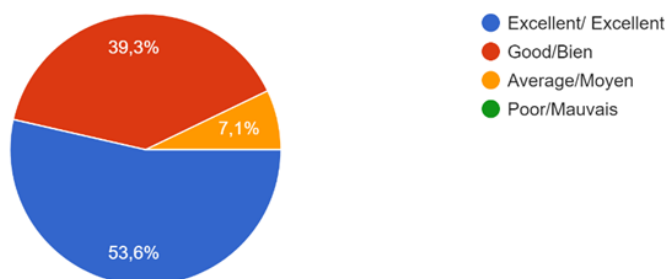


FIGURE 7-3: EVALUTION OF PRESENTATIONS (A.7)

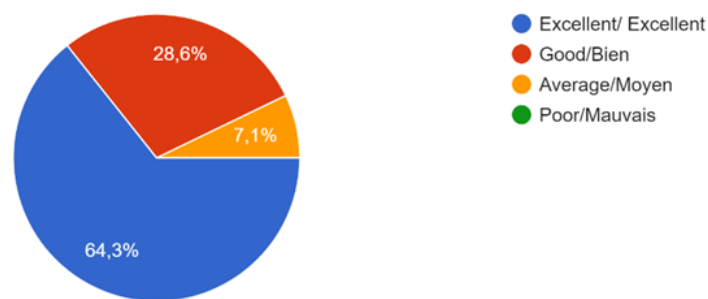


FIGURE 7-4: CLARITY, COVERAGE AND SUFFICIENCY OF CONCEPTS, OBJECTIVES, ANTICIPATED OUTPUTS (A.8)

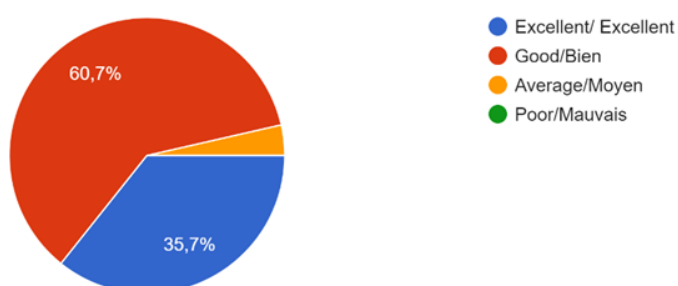


FIGURE 7-5: USEFULNESS OF THE DISTRIBUTED MATERIAL (A.9)

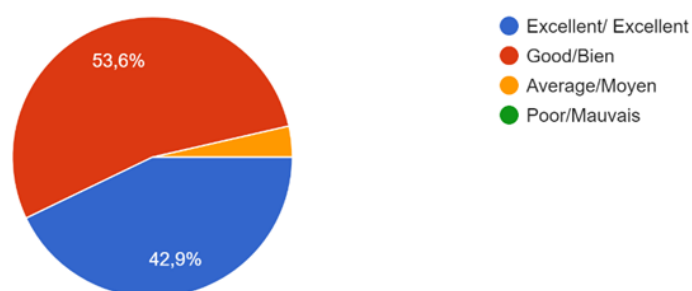


FIGURE 7-6: EFFICIENCY AND EFFECTIVENESS OF THE FACILITATION (A.10)

B. Feedback by participants:

B.1. Coverage of the event. In your opinion did the event cover (tick one of the following): /
Couverture de l'évènement. A votre opinion l'atelier a traité (cochez une des options suivantes):

28 απαντήσεις

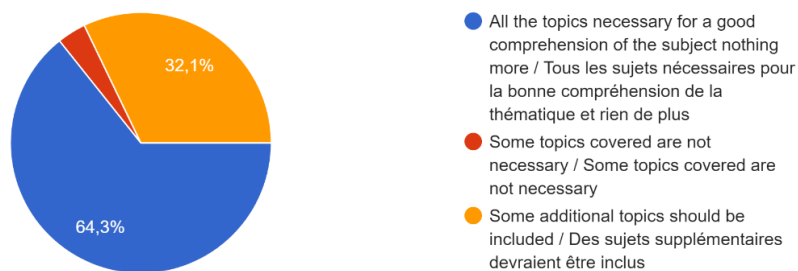


FIGURE 7-7: WORKSHOP COVERAGE

B.2. Level of difficulty (tick one of the following): / Niveau de difficulté (cochez une des options suivantes):

28 απαντήσεις

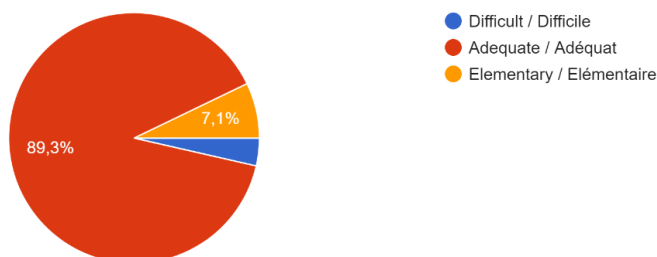


FIGURE 7-8: WORKSHOP DIFFICULTY

B.3. Length of the training. In your view the workshop duration (tick one of the following): / Durée de l'atelier de formation. A votre avis, la durée de l'atelier était (cochez une des options suivantes):

28 απαντήσεις

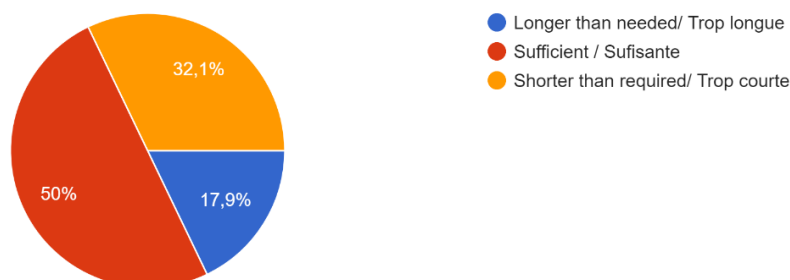


FIGURE 7-9: WORKSHOP LENGTH

TABLE 7-2: SUMMARY OF PARTICIPANTS' MOST COMMON RESPONSES

Summary of most frequent statements made by the participants	
B4	<p>What is the most valuable thing you learned during the workshop (knowledge or skills)?</p> <ul style="list-style-type: none"> • Presentations shared by other countries' experience. • Smart agriculture and solar pumping irrigation. • Visit to the water user association. • Research on agrovoltaic, solar pumping and non-conventional water use. • Water Management at the scheme level. • Water treatment requirements and legislation. • Regulation of TWW. • The many variables to consider in collective irrigation. • All the things we learned are valuable related to safe water reuse, the water smart society, water efficient innovative solutions. • The regional knowledge sharing. • Optimal water management and the use of decision support tools (COPAM). • Get knowledge about the EU regulation for reuse of treated wastewater in irrigation. • Use of Internet of Things in agriculture. • Knowledge of modern irrigation techniques and solar energy.
B5	<p>How do you think that the current event will assist you in your future work on the subject?</p> <ul style="list-style-type: none"> • Enrich the ongoing related project and plan more innovative water related projects. • Reuse of treated wastewater in agriculture. • Provides a basic framework and helps create a network with experts in the MENA region that can be contacted during the work. • Opens new horizons of application that can be considered in our context. • Will allow supporting partners of the project managed by me in more fine-tuned way. • Share solutions of using TWW at less cost, using the Italian concept that the farmer doesn't pay to treat TWW. • Application of what we have learned. • I think the workshop was an opportunity to understand and learn about the experience of neighbouring countries, which share almost the same characteristics, with irrigation optimization. So, we can take the problems they have encountered and avoid them in our country. • I think it's better to transmit the new Smart Irrigation technology to our country to ensure water saving and going towards optimizing the irrigation water management. I will do deep evaluation with my colleagues to modify our regulation regarding the reuse of treated

Summary of most frequent statements made by the participants

	<p>wastewater.</p> <ul style="list-style-type: none"> • Support my knowledge in the design of irrigation systems. • In planning. • Plan pilot actions as part of a project. • I will transfer the knowledge to my network. • Assist us to take and practice the most effective technical measures to make large-scale irrigation schemes more profitable in terms of quality, quantity and cost. • It will be useful for practically applying the knowledge on my same project at Gaza Strip, Palestine • Many ideas and concepts that should be implemented to address current and future challenges in water and agriculture. • Better management of the resources.
B6	<p>Please indicate whether (and how) you could transfer part of the experience gained from the event to your colleagues in your country?</p> <ul style="list-style-type: none"> • By conducting reflection workshop with my team and local partners. • Meeting with the staff. • Communication of some new knowledge, slide sharing, references. • By sharing results and lessons learned through ad hoc meetings and workshops. • I have to prepare a brief on the subjects to my manger and colleagues. • I can talk about collective irrigation, about what it should take into consideration and about smart irrigation. • Through the action plans related to our water sector strategy in collaboration with related ministries and water institutions. • I'll share the material as part of knowledge sharing. • Through scientific dissemination. • I will organize skills and information transfer meetings and presentations for my colleagues at work, so that they can have a vision of everything that has been passed during this training. • Smart Irrigation technology, EU regulation and other regulations regarding the reuse of treated wastewater and all topics learned from this event will be disseminated for our colleagues in my department by conducting meetings and workshop. • A report on the visit and a presentation to my work colleagues will help transfer what I learned. • Through sharing the material and organizing a similar training in my country. • Improvement of large-scale irrigation scheme management procedures to minimize water consumption vis-à-vis water scarcity.

Summary of most frequent statements made by the participants

B7	What did you like most about this event?
	<ul style="list-style-type: none"> • The multicultural trait of this event. • Honestly, I really enjoyed this event from A to Z, especially the organization, course content, quality of the speakers... • The quality of the materials presented + group work between participants. • Reusing treated wastewater in irrigation. • Good interaction with the lecturers. • Meeting with new people, the irrigation system and the association • The multi-diversity of irrigation enhancement aspects and the competence of the key speakers. • The team and trainers. • All. • Getting to know a lot of people from partner countries. • Water management. • Wastewater. • Venue. • Digitalized agriculture and smart irrigation, also the reuse of treated wastewater in the agricultural field. • Italian food and the atmosphere of being part of this delegation. • The presence of several country representatives.
B8	What needs to be improved?
	<ul style="list-style-type: none"> • Hosting people in a foreign country need at least one free orientation day about the participants and city facilities before starting the training. • Use more interactive activities between the participants. • Reduce theoretical material. • Hotel distance from the center/absence of public transport. • Opening an opportunity for interesting participants to enhance their comprehension and be able to apply in a more detailed focused manner on a subject at once. • The way we sat at the event, it's better in circle that you can see everyone. A table would be more comfortable. • Make the lectures a little bit shorter. • More practices on the ground with success stories. • It is preferable that the places of the trainings and meetings will be close to the hotel (with the exception of field trips).

Summary of most frequent statements made by the participants

- Reduce training schedules per day as much as possible. And thank you for your understanding.
- I need more information about the reuse of treated wastewater management to produce safe fruit and eliminate negative impact on soil, dealing with Smart Irrigation technology, practical application with the fertigation model mentioned in this event, EU law and regulation regards water user association, and more information about water accounting.
- More details and technical materials on the subjects are needed.
- The time for the lectures and content should be less than this.
- Go more in deep with the aspects of treated wastewater by giving long time window to each aspect.
- To learn about more experiences.
- Considering the accommodation near the city center.
- Nothing.
- Training on how we can prepare an active delivery/irrigation schedule. Training on how we can determine the tariff considering all factors.
- New concepts that give solutions to current and future challenges in Irrigated Agriculture.
- Sharing of the presentations.

C. Remarks by the trainer

A set of 9 criteria; B1-B9 (See table below) are assessed by the trainer(s). Please use either the qualitative descriptions used in Section A or open text, as appropriate.

TABLE 7-3: REMARKS BY THE TRAINER

B1	Efficient and effective performance and interaction by participants Excellent
B2	Efficient and effective cooperation and team spirit Excellent
B3	Level of achievement of planned objectives Excellent
B4	Did the event contribute to helping participants practice skills or gain knowledge related to course concepts At a large extent
B5	What worked well during the event All, particularly group work and field visits
B6	What didn't work well and why N.A.
B7	What components/concepts did participants seem to understand well The practicality of the training
B8	Were there any components/concepts that participants appeared to not understand

	The complexity of some agronomic concepts
B9	What aspects of the event could be improved and what to be kept More practical applications of the concepts,

8 ANALYSIS OF THE TRAINING COURSE RESULTS (QUIZ RESULTS)

TABLE 8-1: ANALYSIS OF TRAINING RESULTS (QUIZ RESULTS)

Changes in awareness, knowledge and skills. New acquired knowledge	Before	After	Before the training		After the training		
No. of completed Q2 (Training Assessment Questionnaire) received by the PC participants	30	30	Correct replies before the event	Correct %	Correct replies after the event	Correct %	Improvement based on right answer
Question No1			29	97%	28	93%	-3%
Question No2			28	93%	28	93%	0%
Question No3			30	100%	30	100%	0%
Question No4			6	20%	14	47%	133%
Question No5			21	70%	22	73%	5%
Question No6			27	90%	27	90%	0%
Question No7			13	43%	20	67%	54%
Question No8			5	17%	9	30%	80%
Question No9			27	90%	29	97%	7%
Question No10			21	70%	26	87%	24%
Question No11			22	73%	22	73%	0%
Question No12			25	83%	30	100%	20%
Question No13			29	97%	30	100%	3%
Question No14			28	93%	30	100%	7%
Question No15			26	87%	29	97%	12%
Question No16			30	100%	28	93%	-7%
Question No17			25	83%	26	87%	4%
Question No18			30	100%	30	100%	0%
Question No19			30	100%	29	97%	-3%
Question No20			29	97%	30	100%	3%
Question No21			14	47%	13	43%	-7%

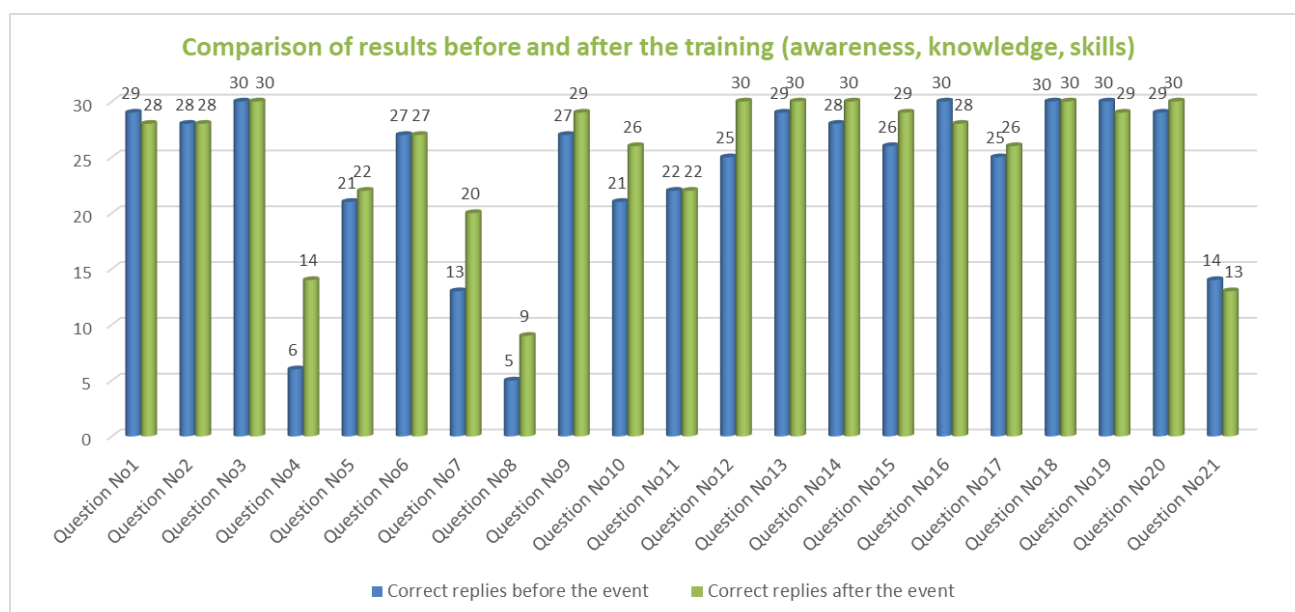


FIGURE 8-1: CHANGES IN THE PARTICIPANTS' AWARENESS, KNOWLEDGE AND SKILLS

9 CONCLUSIONS & OVERALL ASSEMENT

The regional training and study tour held in Bari was very successful according to the participants. Participants clearly expressed their satisfaction with the training in general and all the topics covered during the 5 days:

- Water management at the scheme level.
- On-farm irrigation management.
- Safe reuse of non-conventional water resources in agriculture.

Considering the quiz that was provided before and after the training, the participants have already enough knowledge about some of the concepts covered during the training. Nevertheless, they expressed that they gained a lot of new information and concepts about irrigation management at both on-farm and scheme levels, smart irrigation and its applications, and the use of treated wastewater for irrigation. This is indicated by the extensive discussions held during the 5 days training as well as the participants' evaluation. In addition, the two field visits were highly appreciated by the participants.

This training and study tour has certainly achieved its objective and it is imperative that the gained knowledge be transmitted to local technicians and farmers. The participants still need more practical applications of the concepts they learned, but they are able to disseminate the gained knowledge.

10 ANNEXES

10.1 AGENDA

Activity Number: RW-7-REG/ST

Regional Training and Study Tour on optimal irrigation management

AGENDA

12-16 June 2023 - CIHEAM Bari, Italy

DAY 1 (Monday June 12, 2023)	
Training module 1: Water management at the scheme level – Part 1	
7:45	Meeting in the hotel lobby
08:00	Leaving hotel To CIHEAM Bari (bus ride of 20-30 min, depending on traffic)
08:30	Registration of participants
09:00	<div> Opening ceremony and Overview of the objectives of the training and study tour by: <ul style="list-style-type: none"> CIHEAM Bari WES Project </div> <div> Dr. Maurizio Raeli, director/ Dr. Nicola Lamaddalena, Deputy director, CIHEAM Bari Evie Litou/WES Project Coordinator </div>
09:15	Training module 1: Water management at the scheme level <div> <ul style="list-style-type: none"> QUIZ – Pre-training General introduction to Module 1 </div> <div> Dr. Nicola Lamaddalena, CIHEAM Bari </div>
10:30 -11:00	Coffee Break
11:00	<div> Large scale pressurized irrigation systems <ul style="list-style-type: none"> General introduction Design and performance assessment Operation and management of large-scale irrigation systems: Capitanata case study </div> <div> Dr. Nicola Lamaddalena, CIHEAM Bari </div>
13:00 -14:00	Lunch Break
14:00	<div> Design and performance analysis of large-scale pressurized irrigation systems using decision support systems <ul style="list-style-type: none"> Introduction to COPAM Showcasing </div> <div> Dr. Nicola Lamaddalena, CIHEAM Bari Dr. Abdelouahid Fouial, CIHEAM Bari </div>
15:30 -16:00	Coffee Break
16:00	Presentation of WES Demo Project in Lebanon: <div> Representative from the </div>

<ul style="list-style-type: none"> Saving Water, Growing Crops: remote-controlled irrigation system to address water scarcity and promote preservation of available freshwater resources Q&A 	Istituto Oikos
17:00 End of Day 1 (Return to hotel)	

DAY 2 (Tuesday June 13, 2023)	
Training module 1: Water management at the scheme level – Part 2	
8:15 Meeting in the hotel lobby	
08:30 Field Visit (From the hotel, bus ride to San Ferdinando around 1.5 hours, depending on traffic)	
<ul style="list-style-type: none"> Field visit to a local Water User Association “Capitanata Consortium” near Foggia (management strategies of large-scale irrigation distribution systems, infrastructure) 	Dr. Nicola Lamaddalena, CIHEAM Bari Dr. Abdelouahid Fouial, CIHEAM Bari
13:00 -14:00 Lunch Break (Local restaurant)	
<ul style="list-style-type: none"> Return to CIHEAM BARI 	
16:00 -16:30 Coffee Break	
16:30 End of Module 1 <ul style="list-style-type: none"> Discussions and Conclusions 	
17:00 End of Day 2 (Return to hotel)	

DAY 3 (Wednesday June 14, 2023)	
Training module 2: On-farm irrigation management	
8:15 Meeting in the hotel lobby	
08:30 Leaving hotel to CIHEAM Bari (bus ride of 20-30 min, depending on traffic)	
09:00 Training module 2: On-farm irrigation management	Dr. Roula Khadra, CIHEAM Bari
<ul style="list-style-type: none"> General introduction to Module 2 Interfacing off- and on-farm irrigation systems: constraints and opportunities for a better management. 	Dr. Roula Khadra, CIHEAM Bari
10:30 -11:00 Coffee Break	
11:00 Solar energy for sustainable agriculture: theory and practice <ul style="list-style-type: none"> Challenges and opportunities Prospects of promoting the sustainable use of solar pumping through technology and policies. 	Dr. Abdelouahid Fouial, CIHEAM Bari
12:00 Innovative solutions towards enhanced on-farm management <ul style="list-style-type: none"> Challenges and opportunities 	Dr. Roula Khadra, CIHEAM Bari
12:45 Open discussions	Dr. Roula Khadra, CIHEAM Bari

13:00 -14:00 <i>Lunch Break</i>	
14:00 Field visit and practical exercises <ul style="list-style-type: none"> On-site training (CIHEAM Bari): Technical Tour demonstrating the digital agriculture lab, research for development experimental site (smart irrigation, solar energy/agrivoltaic) Practical exercises 	Dr. Roula Khadra, CIHEAM Bari Dr. Abdelouahid Fouial, CIHEAM Bari
15:00 -16:00 <i>Coffee Break</i>	
16:00 End of Module 2 <ul style="list-style-type: none"> Discussions and Conclusions 	
17:00 End of Day 3 (Return to hotel)	

DAY 4 (Thursday June 15, 2023)	
Training module 3: Safe reuse of non-conventional water resources in agriculture – Part 1	
8:15 Meeting in the hotel lobby	
08:30 Leaving hotel to CIHEAM Bari (bus ride of 20-30 min, depending on traffic)	
09:00 Training module 3: Safe reuse of non-conventional water resources in agriculture	Dr. Gaetano Vivaldi, University of Bari “Aldo Moro”
<ul style="list-style-type: none"> General introduction to Module 3 Transitioning to a Water-Smart Society 	Dr. Gaetano Vivaldi, University of Bari “Aldo Moro”
10:00-11:00 <i>Coffee Break</i>	
11:00 <ul style="list-style-type: none"> Reclaimed water treatment, standards, and reuse: Apulia Region context A user-friendly tool for a sustainable reuse of reclaimed water in agriculture 	Dr. Gaetano Vivaldi, University of Bari “Aldo Moro”
13:00 -14:00 <i>Lunch Break</i>	
14:00 Hands-activity: <ul style="list-style-type: none"> Explore international guidelines to compare and interpret the difference between water quality standards for reuse in agriculture 	Dr. Gaetano Vivaldi, University of Bari “Aldo Moro”
15:00 -16:00 <i>Coffee Break</i>	
16:00 Presentation of WES Demo Project in Gaza: <ul style="list-style-type: none"> Enhance the resilience of vulnerable communities through efficient water solutions and addressing climate change in the Eastern area of Khan Younis in the Gaza Strip 	Representative from Oxfam
16:30 Presentation of WES Demo Project in in Jordan and Tunisia: <ul style="list-style-type: none"> Water efficient Innovative Solutions Portfolio for Enhancing Resilience – WISPER implemented by in Jordan and Tunisia 	Representative from the Istituto per la Cooperazione Universitaria ICU- Onlus
16:55 Q&A	
17:05 End of Day 4 (Return to hotel)	

DAY 5 (Friday June 16, 2023)

Training module 3: Safe reuse of non-conventional water resources in agriculture – Part 2

7:45 Meeting in the hotel lobby

08:00 Field Visit (From the hotel, bus ride to Gallipoli over 2 hours, depending on traffic)

- Field visit to Gallipoli tertiary treatment plant

Dr. Gaetano Vivaldi,
University of Bari “Aldo
Moro”

13:00 -14:00 Lunch Break (Local restaurant)

- Demonstration case study of olive and pomegranate orchards irrigated with reclaimed water
- Return to CIHEAM BARI

Dr. Gaetano Vivaldi,
University of Bari “Aldo
Moro”

17:00 End of Module 3

- Post Training QUIZ
- Discussions and Conclusions

17:15 -17:30 Coffee Break

17:30 Closing of the Regional Training and Study Tour

- Evaluation of the training

17:45 End of Day 5 (Return to hotel)

10.2 QUIZ FORMS

Activity Number: RW-7-REG/ST

Regional Training and Study Tour on optimal irrigation management

12-16 June 2023 - CIHEAM Bari, Italy

QUIZ

1. It is possible to reduce amounts of water in irrigation without affecting yields production but often farmers do not have sufficient knowledge and/or incentives to do so.
☒ True
☐ False
2. The primary components of a delivery schedule (at the irrigation scheme level) are the delivery flowrate, the irrigation frequency, and the crop water requirements.
☒ True
☐ False
3. Data collection on irrigation systems operation is not important.
☐ True
☒ False
4. A collective irrigation system with rotational schedule can better meet the water needs of crops as compared to other methods of water distribution.
☐ True
☒ False
5. The Clément discharges are computed only for the peak period.
☐ True
☒ False
6. When it comes to irrigation decision, the farmers' behavior changes during nighttime respect to daytime.
☒ True
☐ False
7. The identification of the peak period in an irrigation scheme is based on the experience of the manager.
☐ True
☒ False

8. The adoption of smart irrigation systems guarantees a reduction in water usage on every farm.
☐ True
☒ False
9. Smart irrigation systems typically utilize wireless communication protocols such as Wi-Fi or LoRaWAN.
☒ True
☐ False
10. Smart irrigation systems completely eliminate the need for manual monitoring and intervention.
☐ True
☒ False
11. The performance of on-farm irrigation systems is independent of the performance of the collective irrigation distribution systems.
☐ True
☒ False
12. It is feasible to implement closed-loop feedback control systems that continuously monitor soil moisture and automatically adjust irrigation based on set thresholds.
☒ True
☐ False
13. It is important to consider the overall life cycle impact, including production and disposal, of solar panels used in irrigation systems for a comprehensive assessment of their environmental impact.
☒ True
☐ False
14. Agrivoltaic solely focuses on the production of solar energy without any consideration of an agricultural component.
☐ True
☒ False
15. The use of treated wastewater in agriculture can improve soil fertility due to the presence of nutrients.
☒ True
☐ False
16. Treated wastewater used in agriculture is completely free from any potential health risks.
☐ True
☒ False
17. The nutrient content of treated wastewater is consistent and standardized, regardless of the treatment process or source.

- ☐ True
☒ False

18. Irrigation with treated wastewater does not require any additional monitoring or management compared to the use of freshwater.

- ☐ True
☒ False

19. The use of treated wastewater in agriculture requires careful consideration of soil type, irrigation methods, and crop selection to minimize the risk of waterlogging, salinization, and nutrient imbalances.

- ☒ True
☐ False

20. The quality of treated wastewater for agricultural use is assessed based on parameters such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), nitrogen content, and fecal coliform counts.

- ☒ True
☐ False

21. Treated wastewater used in agriculture is always economically advantageous and reduces irrigation costs.

- ☐ True
☒ False

10.3 Photos



