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Water and Environment Support

in the ENI Southern Neighbourhood region



WES RW-6-P2P NRW

Peer-to-Peer on Non-Revenue Water Management

Final Report

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WATER AND ENVIRONMENT SUPPORT IN THE ENI SOUTHERN NEIGHBOURHOOD REGION

The "Water and Environment Support (WES) in the ENI Neighbourhood 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 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 I and II, SWIM-Horizon 2020 SM) striving to create a supportive environment and increase the capacity of all stakeholders in the partner countries (PCs). The WES Partner Countries are Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, and Tunisia. However, to ensure the coherence and effectiveness of EU funding or to promote regional cooperation, the eligibility of specific actions can be extended to neighbouring countries in the Southern Neighbourhood region.

As part of the WES project workplan for the third year (2021-2022) related to the Regional Activities, a regional training (RW-6-REG), study tour (RW-6-ST) and a Peer-to-Peer (RW-6-P2P) exchange were organized with a focus on Non-Revenue Water (NRW) management. The regional training and the study tour were carried out over five (days) between the 16th and 20th of January 2023. The P2P exchange kick-started on 21st November 2022 and was finalized end of November 2023.

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ABBREVIATIONS

AWWA	American Water Works Association
CB/MEP	Capacity Building/Mediterranean Environment Programme
CBA	Cost-Benefit Analysis
DMA	District Metered Area
EC	European Commission
ENI	European Neighbourhood Instrument
EU	European Union
ILI	Infrastructural Leakage Index
IWA	International Water Association
(K)PI	(Key) Performance Indicator
MNF	Minimum Night Flow
NGO	Non-Governmental Organisation
NKE	Non-Key Expert
NRW	Non-Revenue Water
PCs	Partner Countries
PMI	Pressure Management Index
P2P	Peer-to-Peer
SOP	Standard Operating Procedure
ST	Study Tour
SWIM	Sustainable Water Integrated Management
SWIM-Horizon2020 SM	Sustainable Water Integrated Management – Support Mechanism Project
UNEP-MAP	United Nations Environment Program - Mediterranean Action Plan
UfM	Union for the Mediterranean
WES	Water and Environment Support

1 GENERAL INTRODUCTION

As part of the WES project workplan for the third year (2021-2022) related to the Regional Activities, a regional training focusing on Non-Revenue Water (NRW) Management (RW-6-REG) combined with a study tour (RW-6-ST) was held during January 2023 and followed up with a Peer-to-Peer Exchange (RW-6-P2P) addressing the same topic. The P2P Exchange started with the kick-off meeting on 21 November 2022 and involved two plenary meetings on 21/06/2023 and 20/11/2023 in addition to adhoc and working groups meetings.

This report constitutes the final report on the P2P Exchange activity on NRW Management.

1.1 RATIONALE

Non-revenue water (NRW) presents a critical challenge for water operators, utilities, and authorities in Mediterranean countries, where optimizing the efficiency of distribution networks and ensuring the sustainable use of water resources are both pressing concerns. NRW encompasses both physical (or: real) losses, such as leakages, bursts, and unauthorized consumption, and commercial (or: apparent) losses, including metering inaccuracies, billing errors, and illegal use. Addressing these losses is crucial to conserving scarce water resources and enhancing the viability of water utilities.

Water operators, utilities, and authorities are therefore challenged to find cost-effective solutions that prioritize NRW reduction while also meeting their environmental responsibilities. Effective strategies include the adoption of advanced technologies, improved water management practices, and community participation in leak detection and reporting. The P2P Exchange zoomed into the implementation of cost-effective NRW management and reduction interventions, more precisely on the development of Standard Operating Procedures that target NRW reduction.

1.2 OBJECTIVES

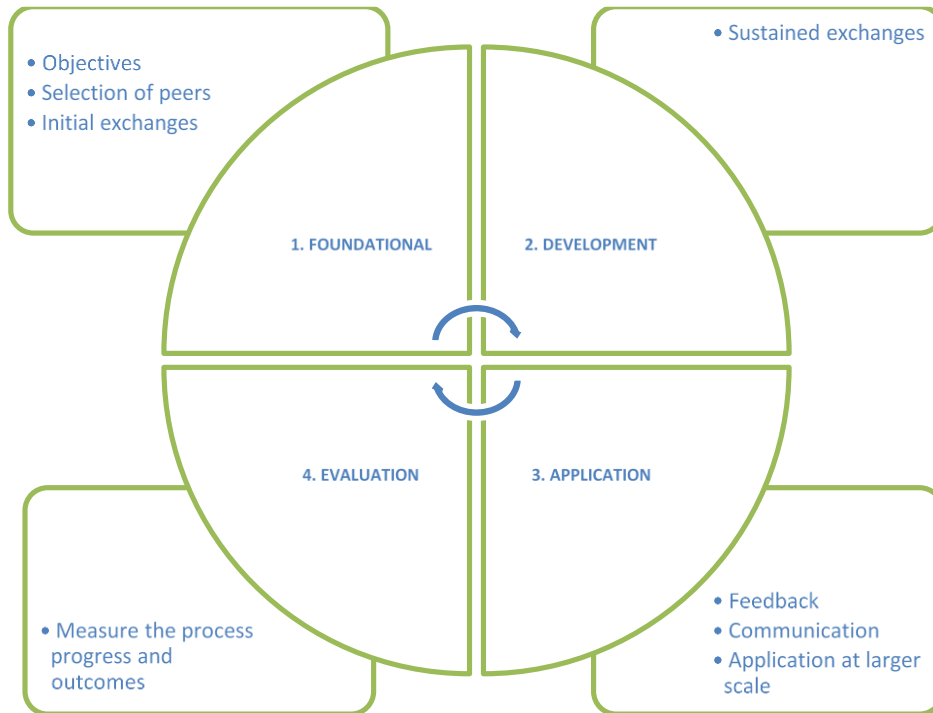
The P2P Exchange focused on NRW management interventions. Throughout the P2P Exchange, facilitators and participants had the opportunity to:

1. Facilitate dialogue and exchange of experiences between participating practitioners.
2. Promote sharing of experiences and Standard Operating Procedures (SOPs) among the PCs on NRW management practices; facilitate exchanges and the development of synergies and complementary activities within the Mediterranean.
3. Promote North-to-South and South-to-South exchange and experience sharing around NRW management through presenting practical examples also from a European context, as needed, and facilitating the exchange of experiences between participating practitioners.
4. Professional relationship building among participants.
5. Bridging knowledge gaps and strengthening of capacity with the help of concrete experiences and established procedures shared by experts' examples and resources from around the world, as well as participants' examples from related contexts and shared hurdles.

2 METHODOLOGY AND STRUCTURE OF THE PEER-TO-PEER

2.1 METHODOLOGY

The approach to the P2P Exchange built on the below showcased methodology, which has demonstrated success in the past WES activities.



A total of five virtual meetings were organized. The P2P Exchange was carried out by the Ramboll Non-Key Expert (NKE), Cor Merks, under the guidance of the WES Key Water Expert (KWE), Ms. Suzan Taha (based in Amman, Jordan). The implementation has been facilitated by Ms. Fantine Hureau and Ms. Andreea Florea, both Young Water Professional from Ramboll's International Water & Climate Resilience Department.

In preparation of the Kick-Off Meeting, the P2P Concept Note was developed by Ramboll in close collaboration with Ms. Suzan Taha. Furthermore, Ramboll developed a questionnaire that would set the way forward during the exchange. Generally speaking, the meetings addressed the priority topics emanating from the results of the questionnaire, which was elaborated on during the first working session (21.06.2023). The purpose of the questionnaire was to identify the most relevant topics for **the development of Standard Operating Procedures (SOPs) on NRW** for the participating countries and the expectations from the exchange. The proposed list of topics included:

- Water balance
- Key performance indicators
- NRW reduction measures
- Leakage detection and repairs
- Metering

- Pressure Management Zones
- District Metered Areas

The topics were further shortlisted to two topics during the same meeting (1st P2P working session (21.06.2023)); and two groups were formed for the development of SOPs on these shortlisted topics; namely:

- Workgroup on “Calculating a Water Balance”; and
- Workgroup on “Selecting relevant KPIs & Target Setting”.

Finally, as per Terms of Reference, a Google Form evaluation questionnaire (aiming to evaluate the overall exchange) was shared with all participants during the final meeting and circulated by email after the meeting.

2.2 STRUCTURE OF THE PEER-TO-PEER

The P2P Exchange included one Kick-Off Meeting (21.11.2022), one plenary working session (21.06.2023) and one working session with the working group on one theme (11.09.2023), two short ad-hoc meetings (18.09.2023 and 07/11/2023) , and a final meeting (20.11.2023). The appointed Ramboll staff attended each meeting. The invited peers attended most of the meetings.

The structure of each session is described in the following:

- **Kick-Off Meeting with Peers (21.11.2022)**
 - Welcome, opening and introduction WES.
 - Short personal introduction appointed Peers.
 - Introduction P2P Exchange on Non-Revenue Water (NRW) management.
 - Available and to be developed Standard Operating Procedures (SOPs) for NRW management.
 - Identified imminent issues and questions pertaining to NRW management.
- **1st P2P working session (21.06.2023)**
 - Meet and greet.
 - Lessons learned from the training in Athens during 16-20 January 2023.
 - Summary of the evaluation of the regional training.
 - Summary of identified SOPs – Existing and proposed.
 - Selection of SOPs to be developed (using Mentimeter).
 - Working Group formation and collaboration arrangements.
- **Working Group Meeting – Calculating a Water Balance (11.09.2023)**
 - Presentation of the Calculating a Water Balance draft SOP.
 - Feedback and discussion on the progress to date.
- **1st Ad-hoc meeting (18.09.2023)**
 - Discussion on the possibility of using Egypt as Case Study.
 - Required data preparation for the water balance calculation.

- Planning of the next ad-hoc meeting.
- **2nd Ad-hoc meeting (07.11.2023)**
 - Preparation and discussion of the Case Study for Egypt.
 - Review of collected data.
 - Feedback on the water balance for DMA Halwat.
- **Final Meeting (20.11.2023)**
 - Welcome, General introduction.
 - Current NRW situation in the WES countries.
 - 2nd Draft SOP on Calculating a Water Balance.
 - Calculating a Water Balance for Egypt – Case study.
 - 1st Draft SOP on Selecting relevant Key Performance Indicators (KPIs) & Target Setting.
 - P2P Evaluation.
 - Summary.

3 P2P RESULTS

During the kick-off meeting, a number of different themes were suggested as a selection pool for the SOPs and the questionnaire was discussed, where peers indicated topics to be addressed in connection with their NRW management practices. The identified SOPs were shortlisted to two topics during the first working session. Two groups were formed for the development of SOPs on the topic of “Calculating a Water Balance” and “Selecting relevant KPIs & Target Setting”. Multiple countries participated in the dedicated sessions. The outcome of the P2P process is described in this section.

3.1 CALCULATING A WATER BALANCE SOP

One of the selected topics for the development of a SOP was “Calculating a Water Balance”. In the context of sustainable water supply systems, efficient water management is an imperative. Water utilities face huge losses at varying points in the system, emphasizing the need for loss control strategies to achieve system efficiency and economic and environmental purposes.

The SOP introduces the concept of Water Balance, and the calculation thereof, a critical initial stage in water loss control. The result provides an overview of loss sources and their magnitude, which helps estimate the related financial and resource implications.

The Water Audit process is explained in different steps. It elaborates on the importance of the calculation and the components of the balance, after which the data collection step is described. Recommendations include identifying system boundaries, establishing a time frame, determining measurement units, and gathering data. Information about the distribution system characteristics is required, such as infrastructure and financial data. An example case study is included, which is the result of the P2P Exchange with the participants from Egypt. This was concretized during the process, and it was discussed with all the participants during the final meeting.

This SOP is crucial to understanding losses within a water distribution system, assisting in strategic interventions for loss reduction. Through careful analysis and the proactive management of water resources, a balanced and efficient water system can contribute to fostering healthy and prosperous communities.

3.2 SELECTING RELEVANT KPIS AND TARGET SETTING SOP

The second selected theme provides a comprehensive SOP on Selecting relevant Key Performance Indicators (KPI) & Target Setting related to Non-Revenue Water reduction in water supply networks. Documents shared in the exchange with Palestine and Jordan informed the process.

This SOP facilitates the monitorization of impacts of the chosen interventions that aim at reducing NRW. Additionally, it emphasizes the importance of the Annual Water Balance and establishes the connection with the first SOP, since the necessary data to determine KPIs, is obtained from the Water Balance. Lastly, the SOP provides guidance on how to get started in using the indicators and targets.

Hence, the document starts by providing an overview of the Standard Annual Water Balance after which it lays out the four basic strategies to control real and apparent losses. Then it goes on to showcase the usage of the International Water Association's (IWA) system of Performance Indicators (PI), in a step-by-step approach. The AWA's PI system for NRW Target Setting is also explained, with a summary of the indicators and an in-depth description of three indicators that IWA's PI system does not include.

The European Directive (EU) 2020/2184 on the quality of drinking water is inserted for reference, as Member States are mandated to assess water leakage levels. The Directive underlines the importance of the presented strategies and indicators. Recommendations from the EU Reference Document Good Practices on Leakage Management are utilized, highlighting the importance of context-specific indicators for accurate evaluation of leakage controls. The importance of the Infrastructural Leakage Index (ILI) and the Pressure Management Index (PMI) in the evaluation and control of real losses are highlighted.

By implementing these strategies and harnessing these KPIs, water utilities, can enhance their water loss control, leading to economic savings, environmental sustainability, and improved service to the communities they serve.

4 EVALUATION RESULTS OF THE PEER 2 PEER EXCHANGE

The P2P Exchange was assessed by participants on several criteria, such as overall delivery and facilitation, expectations, interaction with the peers and the coach, duration, outcome, personal takeaways, and suggestions for improvement. Background information on the participants was collected as well, such as gender, age, position/working title, country of origin. A total of three and four responses were collected from the participants.

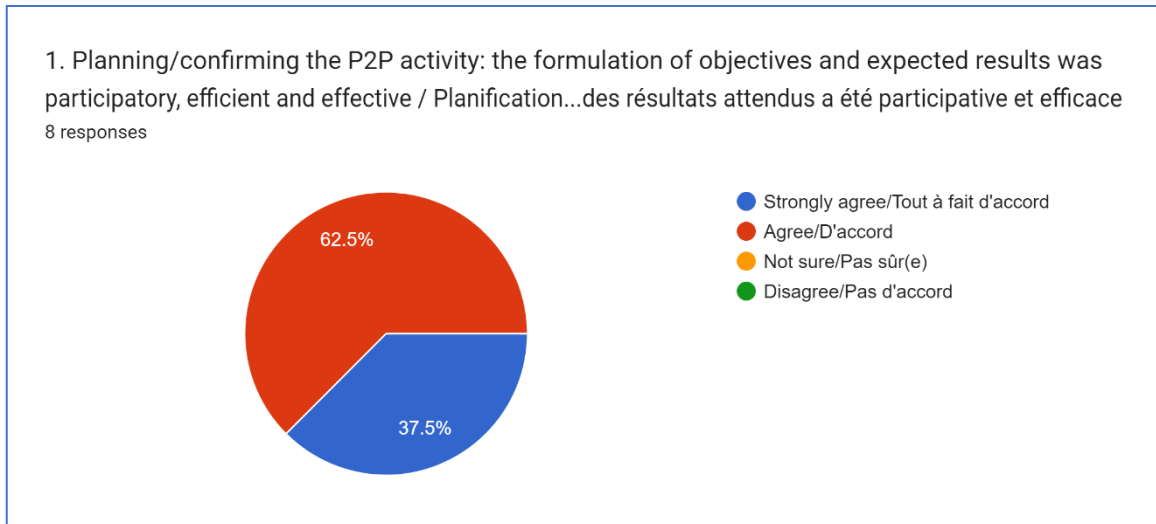


Figure 4-1: Planning and expected results

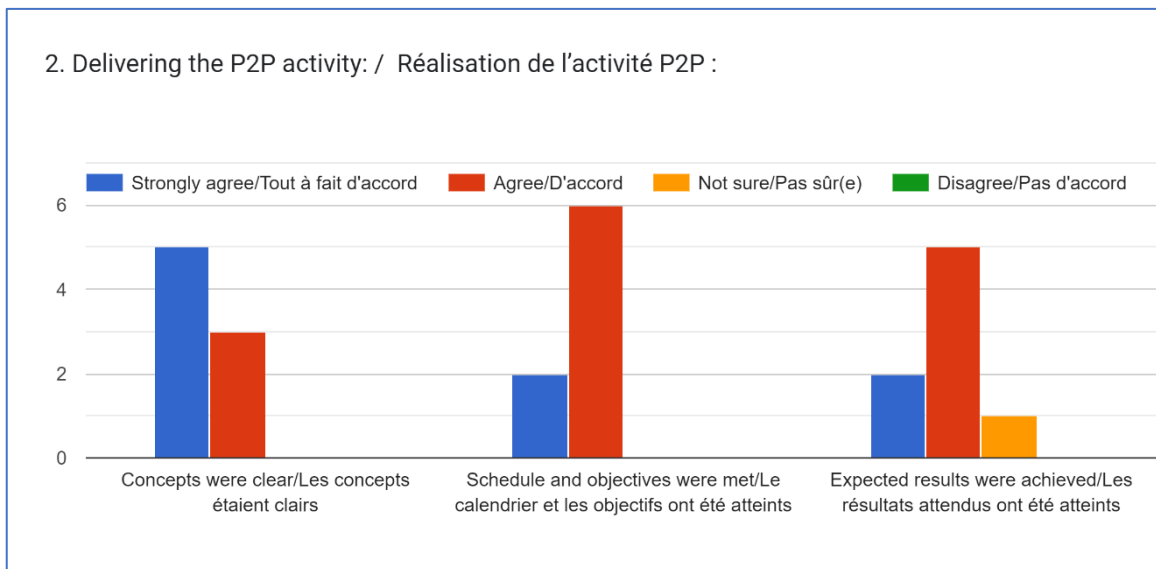


Figure 4-2: Managing expectations

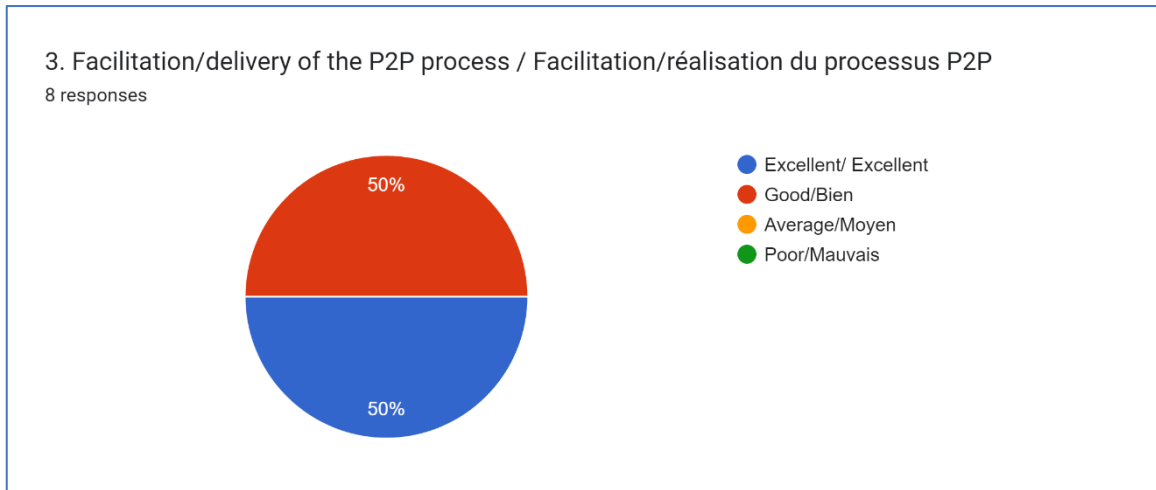


Figure 4-3: Facilitation of the exchange

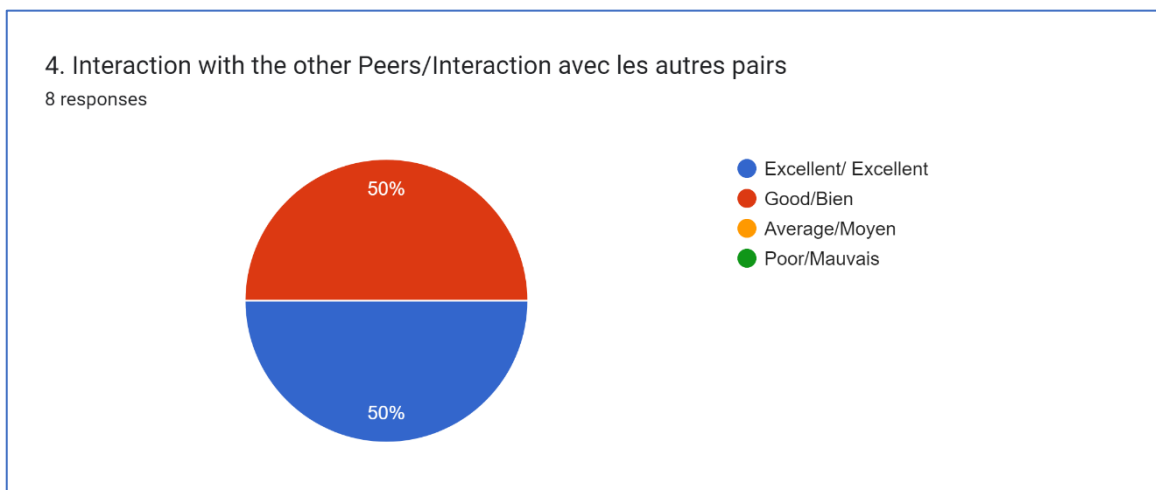


Figure 4-4: Collaboration between peers

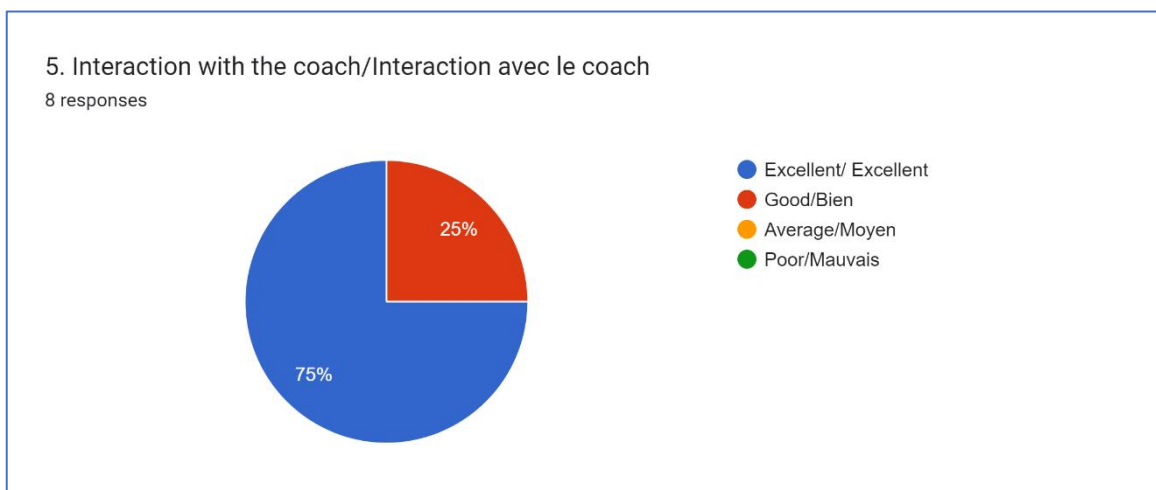


Figure 4-5: Collaboration with the facilitators

6. Duration of the process: In your view the duration of the peer to peer process (from conception to the delivery of the output(s)) was: / Durée du proces...conception à la livraison du/des résultat(s)) était :
8 responses

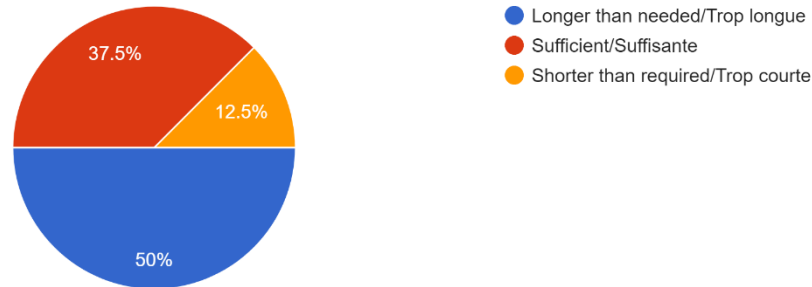


Figure 4-6: Exchange duration

7. How did you benefit most from this P2P process?/Comment avez-vous bénéficié le plus du processus P2P ?

- Understanding the Water Balance and KPIs.
- Understanding the procedure.
- Experience exchange (2 answers).
- Information useful to ongoing study in the PC.
- Understanding the issue and benefits to interventions through a case study.

8. What did you like best?/Qu'avez-vous apprécié le plus ?

- Case study
- Virtual follow up of the live regional training and study tour (2 answers).
- The applicability; “theoretical” knowledge and experience are made practical.
- NRW – the topic on itself is very challenging and interesting.
- Learning about others’ experience.
- Connection with the peers in the group.

9. What needs to be improved or could be done differently?/Qu'est-ce qui doit être amélioré ou pourrait être fait différemment ?

- Nothing.
- Extend the training to be Face-to-Face (2 answers).
- **Add practical workshop for NRW and Active Leak Detection.**
- **Work on site with the latest technology for Active Leak Detection.**
- Exchanging experiences between Middle East countries (i.e., Abu Dhabi, Bahrain, and Oman).
- Peer participation

1. Do you consider the peer-to-peer processes a suitable tool for knowledge transfer?/Considérez-vous les processus entre pairs...il approprié pour le transfert des connaissances ?
8 responses

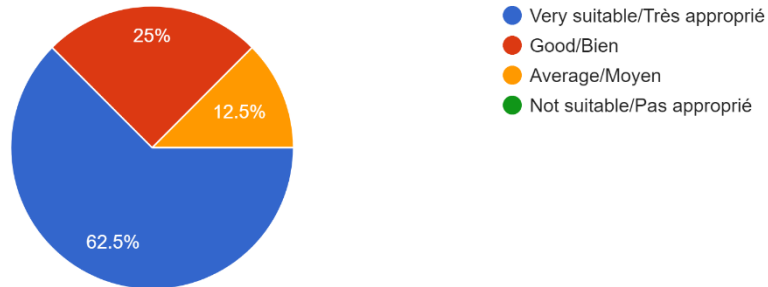


FIGURE 4-7: P2P AS A KNOWLEDGE TRANSFER MEDIUM

2. Overall rating of the P2P process/Evaluation globale du processus P2P
8 responses

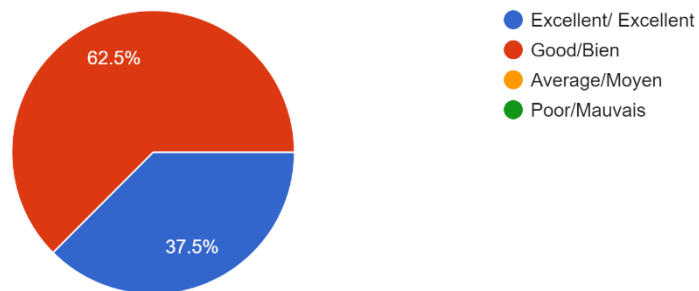


FIGURE 4-8: OVERALL RATING OF THE P2P

Any other comments/Autres commentaires

- Programmer d'autre session de formation en presentiel.
- Thank you for everything especially for the instructor (Mr. Cor).

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The P2P Exchange provided knowledge and insights to the participants on the following topics:

- Common challenges related to NRW Management in the South Mediterranean region.
- Benefits to water loss control.
- Reliable sources of information and software for further consultation and development; sources for good practices and guidance for the water industry.
- Improved knowledge about NRW management and its application through a set of relevant SOPs.
- Improved capacity and collaboration among the participating PCs.
- Two concrete SOPs that can be adopted and implemented in the PCs respective countries.

5.2 RECOMMENDATIONS

Based on lessons learnt from the exchange programme, the following recommendations can be made to strengthen capacities for effective NRW in the South Mediterranean:

1. With timely and proactive involvement of the peers, the P2P Exchange sessions lead to fruitful discussions and rich outcomes that peers can take away as learnings. **A good connection with the peers must be maintained by the facilitators as well as organizer.** The peers have shown great interest in the topic and SOP subjects, which they deemed as central in the context of their countries and their daily professional activities.
2. The P2P Exchange program has been a success. A variety of relevant Standard Operating Procedures were presented with the benefits they provide. Participants had the opportunity to capitalize on the two central SOPs that bring most value in their organization. The two selected topics had been the subject of further elaboration during the P2P sessions. Peers from Egypt acquired hands-on practice by engaging with the SOP developed through the program and shared their experience with the other peers. During the exchange, shared challenges were acknowledged, and the peers shared their own perspectives, and discussed possibilities for improvement with the wider group.

In conclusion, the peers' toolbox has been enriched with two SOPs that help them calculate Water Balances for their water system to track the system's efficiency, as well as set KPIs and targets to maintain and track performance on several levels. Their knowledge has been broadened through the different exchanges on local experiences, but also international perspectives. Moreover, they now have the chance to implement suitable approaches in their country and an expanded network for future exchanges.

Consideration can be made in future interventions for organising practical training/workshop on Active Leak Detection (ALD), combined with working on-site with the latest ALD technologies and equipment.

6 ANNEXES

The two SOPs have been distributed to the peers and can be found as separate files on https://www.wes-med.eu/activities_type/rw-6-p2p-training-on-non-revenue-water-including-the-role-of-geographic-information-system-in-facilitating-non-revenue-water-management-in-addition-to-a-study-tour/

The list of participants is available on request. The agenda of each meeting and the slide decks (as presented) were distributed by email to all participants and can also be solicited on the above web address.