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Water and Environment Support in the ENI Southern Neighbourhood region

WES INFO BULLETIN
REGIONAL ACTIVITY ON NON-REVENUE WATER

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Overview

As part of the "Water and Environment Support (WES) in the ENI Southern Neighbourhood region" project, a Regional Activity focusing on Non-Revenue Water (NRW), including the role of Geographic Information System in facilitating NRW (RW-6-REG/ST/P2P), was tailor-designed and delivered to thirty-nine key stakeholders from the WES Partner Countries (PCs).
The Activity was developed from November 2022 till March 2024 and included a Training, a Study Visit organised in Athens, Greece, and several Peer-to-Peer exchanges that took place before, during and after the Training and Study Visit.

Non-revenue water (NRW) presents a critical challenge for water utilities and authorities in the 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 uses. Addressing these losses is crucial to conserving scarce water resources and enhancing the viability of water utilities.
Water 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.

Objectives

The purpose of this regional activity was to build the capacity of the PCs on Non-Revenue Water, including the role of GIS and hydraulic modelling in facilitating NRW management.
The activity followed specific objectives such as:

- Training on the quantification of Non-Revenue Water, the establishment of district metered areas, models for assessment of physical losses, key-performance indicators, NRW reduction and management measures, the role of information systems (GIS) and hydraulic modelling in NRW management, etc.
- A Study Tour that showcased measures for reducing physical and commercial losses taken by the Athens' water utility EYDAP with successful outcomes.
- A **Peer-to-Peer exchange** focusing on sharing of experiences "North-to-South" and among the Project Countries (PCs) "South-to-South" in Standard Operating Procedures (SOPs) linked to NRW management practices by presenting examples from a European context and facilitating the exchange of concrete experiences between participating practitioners, real examples and resources from around the world.

Methodology and Implementation

Training and Study Tour

The Training was divided into four classroom training days, held between the 16th and 20th of January 2022 and a Study Tour in the same week at the Athens' Water Utility EYDAP.
Main topics:

- ☐ Training day 1: NRW Definitions and tools
- ☐ Training day 2: NRW Reduction interventions
- ☐ Study Tour day 3: Technical visit at EYDAP in Athens
- ☐ Training day 4: NRW Data Management
- ☐ Training day 5: NRW Asset management

During the **Training and Study Tour**, the participants were introduced to the Standard IWA/AWWA Annual Water Balance and models, relevant Key Performance Indicators (KPIs), IT tools for performance monitoring, NRW reduction interventions, NRW Data Management, NRW Asset management. A cross cutting module was also included for the implementation if NRW and capitalisation of lessons learnt, to better understand various NRW interventions, and share lessons learned.

Practical examples from Denmark, the Netherlands and Romania were presented, discussed, and put into the Mediterranean context. **Case studies from the South-Mediterranean region** were also analysed. In addition, partners from the countries where WES is implementing activities gave an overview of the findings of these activities, and respective recommendations.

The Training included participation from the two on-going WES Demonstration projects:
1. "Gaza H2.0'' Innovation and water efficiency implemented by WeWorld – GVC Onlus (WW-GVC)
2. Support of integrated management of water resources in an oasis environment implemented by the "Association of science and biology teachers of Morocco (AESVT)"
The discussions during the plenary and breakout sessions, on the themes of the day facilitated the exchange of "experiences" amongst the WES demos, the participants and the experts, and the exchange of "information" on relevant activities in the partner countries/region and cross-fertilisation.

Last but not least, **a one-day Study Tour (18/01/2023) to EYDAP water utility in Athens** was organized.
The team of experts of EYDAP presented practices on NRW reduction management. Later, the participants visited an ongoing project relating to the use of Pressure Reducing Valve (PRV) and the operation of District Metered Areas (DMAs).

Peer-to-Peer Process

A total of five virtual P2P Meetings were organized.
The P2P Meetings addressed the priority topics emanating from the results of a questionnaire, which was elaborated 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:

- Calculating Water balance
- Selecting relevant Key performance indicators (KPIs) & Target Setting
- 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) and two groups were formed for the development of SOPs on these shortlisted topics; namely:

- Workgroup on "Calculating a Water Balance";
- 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.

Conclusions

The regional **Training and Study Tour** provided knowledge and insights to the participants on the following topics:

- ✓ Understanding of NRW, its quantification and benefits of NRW management;
- ✓ Tools, techniques for NRW reduction and KPIs for performance tracking;
- ✓ The use of spatial and temporal data, in particular GIS for NRW management, as well as hydraulic modelling;
- ✓ Establishment of Pressure Managed Zones and District Metered Areas;
- ✓ Minimum Night Flow analysis;
- ✓ Practical examples and best practice from different European countries, including on-site example during the technical visit at EYDAP with successful outcomes in NRW management;
- ✓ Case studies from the Southern-Mediterranean region, presented by representatives from the PCs.

The training provided an opportunity to exchange experiences and knowledge on NRW among 39 participants from nine countries. Training modules included a wide variety of demonstrations, along with examples and case studies presented by the speakers and participants from the Partner Countries, as well as roundtable discussions and group exercises.

The Peer-To-Peer Meetings ensured knowledge diffusion throughout the participating countries, and produced tangible outputs from what was learnt during the training.

- As far as the **Workgroup on "Calculating a Water Balance"** is concerned:
  - ✓ The SOP introduced the concept of Water Balance, a Water Audit process which elaborates the importance of the calculation and the components of the balance, after which the data collection step is described. Recommendations included identifying system boundaries, establishing a time frame, determining measurement units, and gathering data. Information about the distribution system's characteristics is required, such as infrastructure and financial data.

- ✓ 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.

- ❖ **The second Workgroup on "Selecting relevant KPIs & Target Setting"** provided a comprehensive SOP on Selecting relevant Key Performance Indicators (KPI) & Target Setting related to Non-Revenue Water reduction in water supply networks.
  - ✓ This SOP facilitates the monitoring of impacts of the chosen interventions that aim at reducing NRW. Actually, the Annual Water Balance establishes the connection with this SOP since the necessary data to determine KPIs, is obtained from the Water Balance. The SOP provides guidance on how to get started in using the indicators and targets.
  - ✓ The document provides an overview of the Standard Annual Water Balance after which it lays out the four basic strategies to control real and apparent losses and showcase the usage of the International Water Association's (IWA) system of Performance Indicators (PI), in a step-by-step approach. The IWA'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 the 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.

Useful Links

https://www.wes-med.eu/activities_type/rw-6-reg-st-training-on-non-revenue-water-including-the-role-of-geographic-information-system-in-facilitating-non-revenu-water-management-in-addition-to-a-study-tour/
https://www.wes-med.eu/activities_type/rw-6-p2p-peer-to-peer-exchange-on-non-revenue-water-including-the-role-of-geographic-information-system-in-facilitating-non-revenue-water-management/

WES Project

The EU funded Water and Environment Support (WES) is a regional project designed to contribute to the implementation of an integrated approach to pollution reduction and prevention, in line with the Union for the Mediterranean agendas and the Barcelona Convention. WES is also meant to contribute to a more efficient management of scarce water resources in the ENI Southern Neighbourhood region.

The project aims to do so by increasing the capacity of stakeholders that are involved in pollution reduction and water management and support them in formulating and implementing the environmental and water policies.
WES supports the shift to a more sustainable consumption and production model, promotes an integrated and efficient management of water, combats plastic pollution and marine litter and fosters dialogue on key environmental and sustainable development issues. In this way, WES also supports mutual understanding, cooperation, and peace in the region.

For any further information on WES project, please visit: www.wes-med.eu

And follow us for all the latest updates via: