



Clepsydra

Interreg
Euro-MED



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CLEPSYDRA NEWSLETTER #3

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GROUNDWATER OPEN DAYS IN MURCIA, SPAIN

As part of the **Geology Olympics** held on **February 21, 2025**, the **Clepsydra project** hosted a **Groundwater Open Day** in **Murcia**, Spain. The event was organized by **IGME (Geological and Mining Institute of Spain)** and **CRCC (Comunidad de Regantes del Campo de Cartagena)**, in collaboration with the **UPTC University of Cartagena**. The day was dedicated to raising awareness about the **importance of groundwater monitoring** and its critical role in **environmental sustainability**, with a special focus on the **Campo de Cartagena aquifer**, one of Clepsydra's key pilot sites.

The event attracted **over 200 participants**, including high school students and teachers. Their enthusiasm was palpable, highlighting a growing curiosity among young people about **geology and hydrogeology**—fields that are vital to the sustainable future of our natural resources.

Students were introduced to a wide range of **groundwater monitoring instruments**, with experts from IGME and CRCC providing clear explanations on how each tool works and its relevance in real-world applications—particularly in tracking the status of the **Campo de Cartagena aquifer**.

To bring the science to life, the organizers offered **hands-on demonstrations**, giving students a chance to interact with the equipment and witness it in action. These activities sparked lively engagement, with students asking thoughtful questions and showing genuine interest in how technology is used to monitor aquifer health, both in terms of water **quality** and **availability**.



By blending education with interactive experiences, the **Murcia Groundwater Open Day** successfully encouraged young minds to take a closer look at **groundwater science**. The event not only supported Clepsydra's mission of **community engagement** and **awareness-raising**, but also planted seeds for the next generation of **environmental scientists and water resource managers**.

INNOVATIVE SUSTAINABLE ECONOMY COMMUNITY OF PRACTICE #3 IN SARAJEVO

The Clepsydra team joined the third Innovative Sustainable Economy (ISE) Community of Practice (CoP) that took place on April 2025 in Sarajevo, Bosnia-Herzegovina.

The **ISE CoP** plays a vital role in strengthening the ISE Mission's network and amplifying project impact. The ISE Community of Practice (CoP) brings together the **14 thematic projects** and **2 Governance Projects** developed under the umbrella of the mission. The CoP aims to create a community space among the projects to share information and support each other in order to improve the impact of the projects.

ISE mission in a figures:

- **158 organisations**
- **18 countries**
- **4 focus areas**

Project leader José Luis Garcia Arostegui presented Clepsydra project to partners from Interreg Euro-MED program as they were able to connect, share, and collaborate together to work on creating synergies and build together a brighter future Europe and the Mediterranean region. Workshops on focused areas were also organized to share knowledge on different topics such as projects targeting and monitoring. Here are the partners involved in Clepsydra project Interreg Euro-MED

Programme:

- Institute of Geology and Mineral Exploration (IGME) – CRCC – CUADLL
- INSTITUT DE RECHERCHE POUR LE DEVELOPPEMENT – AQUA-VALLEY
- Instituto Superior de Agronomia
- Università degli Studi di Cassino e del Lazio Meridionale
- The Energy and Water Agency
- Institute of Chemical and Engineering Sciences



GROUNDWATER OPEN DAY IN MALTA

The Energy and Water Agency (EWA – Malta) hosted the 6th edition of the annual **Open Day** at the **Għajn National Water Conservation Awareness Centre** on **13-14 September 2025**, welcoming families.

This year's event focused on **water conservation** and **sustainability**, offering a variety of family-friendly activities, including children's games, interactive shows, and educational animations.

It provided a platform for the community to learn about sustainable practices in an engaging and interactive environment.

As part of the event, an EWA project exhibition was created, showcasing several ongoing initiatives, including the **Clepsydra project**, funded by the Interreg Euro-MED Program.

The exhibition aimed to **engage the public** and **raise awareness** about the project's mission to **protect water resources** and **promote sustainability**, with a focus on the sustainable management of aquifers.



TRANSNATIONAL MEETING IN LISBON

The third plenary meeting of the Clepsydra project was held in Lisbon on 15 and 16 July 2025.

The first day was devoted to a visit to João Coimbra's farm in the Quinta Da Cholda region. Located in the Tagus alluvial plain, water for agricultural use is drawn from the shallow aquifer. They do not have quantitative problems, but they do have water quality challenges due to contamination by certain elements such as nitrates. Water for human consumption is also drawn from deep aquifers in order to collect better quality water.

In order to balance productivity and resilience, João has successfully implemented numerous solutions combining high-tech and nature-based solutions on his agricultural exploitation. This approach allows him to maintain the necessary irrigation adapted to the needs of the crops while aiming for energy neutrality (energy consumption related to pumping) and respect for the soil, particularly biodiversity:

- Plot instrumentation: sensors to monitor soil moisture, weather stations (temperatures), soil conductivity, etc., irrigation control system to meet the precise needs of plants for more efficient management of water and energy resources.
- Mapping using satellite or drone images to optimise soil fertilisation (particularly in terms of organic matter, as the water and soil are sufficiently rich in nitrogen and phosphorus) and thus limit the use of unnecessary inputs.
- Study of the profitability of plots to understand and identify loss-making plots. Some plots are returned to nature by promoting honey plant species to attract pollinators.
- Installation of solar panels to achieve energy neutrality.



The Instituto Superior de Agronomia (ISA-LEAF) presented the results from their pilot site, which was installed as part of the project and is located on the farm. They presented their system for monitoring soil moisture at different levels (quantitative aspect: monitoring of water levels in the superficial aquifer throughout the seasons) as well as their tools for characterising the qualitative aspects of this superficial aquifer (monitoring of nutrients, particularly nitrate, and other contaminants). The farm visit was followed by a convivial gathering that showcased Portugal's culinary expertise.



The second day of these meetings was very productive for the project partners. Topics relating to all the work carried out in the various activities were addressed and discussed.

The partners alternated between technical and scientific presentations and brainstorming workshops in order to make progress on the outreach tools that we hope to be able to share with you in the coming months.

We have also set the date for the next transnational meeting which will take place in Montpellier from 3 to 5 February 2025. The event will include the Steering Committee meeting and the Training of Trainers session.



CLEPSYDRA GENERAL ASSEMBLY – ONE WORD FROM PARTNERS

During last General Assembly of the Clepsydra project that took place on July 16-17 2025 in Lisbon, Portugal, we asked our partners to describe the project in just one word. The answers, captured in this video, reflect the enthusiasm, diversity, and shared vision that drive CLEPSYDRA forward.



>><https://clepsydra.interreg-euro-med.eu/2025/09/29/clepsydra-general-assembly-one-word-from-partners/>

This simple exercise shows how each partner sees a **unique value** in the project, while together we are building something greater, a **collaborative initiative** that fosters **innovation**, strengthens **connections**, and creates lasting impact on **groundwater monitoring**.

DEMO SITE | TAGUS ALLUVIAL AQUIFER

Located in the centre of Portugal, the Tagus Alluvial Aquifer (Aluviões do Tejo) extends along the Tagus River valley, covering an area of approximately 1,200 km² and encompassing agricultural zones of high productive potential. This region illustrates how agricultural development, through intensive groundwater abstraction, can significantly alter the hydrological behaviour of an alluvial aquifer system.

The Tagus basin includes large floodplain zones with fertile soils that have historically supported irrigation agriculture. Since the mid-20th century, irrigation expansion, increasingly dependent on groundwater, has played a key role in sustaining agricultural production under Mediterranean climate conditions, characterised by marked summer droughts.

The Tagus Alluvial Aquifer is a shallow unconfined aquifer composed mainly of sand and gravel layers deposited by the river over time. These materials allow for

must face the scarcity of water resources, serious seasonal and interannual variations and deficiencies in the quality of the sources. A large part of these water resources is found in the middle and lower basin of the Llobregat River and its aquifers.

The most important aquifers in the Llobregat River basin are found in its lower part, that is, the Baix Llobregat Aquifer System. The intensive development of groundwater since the end of the 19th century and mainly after the 1950s has drastically changed its hydrological functioning. The quality of groundwater has suffered from the increase in salinity due to the potash extraction area in the center of the basin and the seawater intrusion.

A groundwater user community was created that plays an important role on the path towards sustainable use.

More careful management is reversing and improving the situation, thus preserving the role of aquifers as a crucial factor for the water supply in the Barcelona Metropolitan Area. In addition to managing groundwater quantity through stricter models and standards designed to protect water quality, further measures include artificial recharge and the installation of a hydraulic barrier to prevent seawater intrusion by injecting highly treated reclaimed wastewater.

In drought episodes, the aquifer becomes an important source of supply, to the detriment of its quality, especially regarding chlorides. In this sense, the challenge posed is to define a decision support tool based on the decrease in the level and its consequences with respect to quality in order to manage groundwater resources more effectively.



FIELD VISIT | EWA'S GROUNDWATER FIELD VISIT

On Saturday 18th October, around 200 visitors gathered for the [Groundwater Field Visit](#) at Misraħ Suffara, located in Dingli, once again hosted by the **Energy and Water Agency**. A one-of-a-kind experience that offered underground explorers the opportunity to delve into one of Malta's most important natural resources — water.

This exclusive event provided a fascinating insight into the underground water springs that play a crucial role in sustaining life on the island. The day featured guided tours every 30 minutes, where attendees were led through an underground spring, a key part of Malta's groundwater monitoring network. Experts in the field shared valuable insights into the geology and aquifer systems that ensure the island's water supply.

Each session was designed for small groups, allowing for an intimate and educational experience, followed by a Q&A with the experts. Participants learned not only about the geological structure of the spring but also about the importance of groundwater to Malta's ecosystem and daily life. Talks from groundwater specialists provided a deeper understanding of how aquifer systems develop and function, highlighting why groundwater is such a vital resource for the island. Interestingly, these springs date back to the time when Malta was under Arab rule. This unique event gave attendees a rare chance to connect with Malta's natural landscape in a way few have experienced before. Whether passionate about the environment or simply intrigued by the island's hidden treasures, participants left with a deeper appreciation for the world beneath their feet.

The event forms part of the [Clepsydra Project](#), co-funded by the **European Union** under the [Interreg Euro-Med Programme](#). The Clepsydra project aims to improve the monitoring of underground water sources by using smart technology to better understand the data collected, benefitting professionals working in water management and agriculture. Through collaboration with various stakeholders, Clepsydra strives to ensure that water resources are managed efficiently and sustainably.

Stay tuned for future events as we continue to explore and appreciate **Malta's natural wonders**.



DEMO SITE | MALTA

Overview of groundwater issues in Malta: technical challenges, economic and territorial issues

The extent of groundwater nitrate contamination in Malta is influenced by agricultural practices, and improving our understanding of recharge in agricultural fields is important for sustainable management. To support this, EWA is piloting the installation of rain gauges across representative agricultural land uses, as part of the CLEPSYDRA project. These rain gauges will provide site-specific data on rainfall, which would help to quantify recharge and assess how water moving through the vadose zone may carry nitrate to the underlying aquifers.

PILOTS 1, 2 & 3: SANT'ANTNIN – GĦAMMIERI – ISQOF WHEAT

Wheat fields can receive frequent manure applications, which increase the risk of nitrate leaching into groundwater. As rainfall is the only water input, precise onsite measurements from the rain gauge (with data logger) are essential. This rainfall data links directly to water content and chemical data from the Vadose Zone Monitoring system, improving recharge and nitrate transport assessments.



PILOTE 4: QRENDI

Potato cultivation is an important cash crop in Maltese agriculture. While potatoes are irrigated, precise measurement of rainfall input remains essential to determine the total water balance. Installing a rain gauge with a data logger ensures accurate rainfall data, which, combined with the Vadose Zone Monitoring system, improves assessments of water input, nitrate transport, and groundwater impacts.



PILOTE 5: BURMARRAD

This vineyard site was selected due to its shallow unsaturated zone thickness, which makes the groundwater below highly sensitive to rainfall and nitrate leaching. Installing a rain gauge with a data logger provides precise rainfall measurements. Combined with data from the Vadose Zone Monitoring system, this allows accurate assessment of water input, nitrate transport, and potential groundwater impacts.



OVERVIEW – PERSPECTIVE

Installing rain gauges across key agricultural land uses in Malta will provide site-specific rainfall data required to refine recharge estimates and nitrate transport, strengthening evidence-based groundwater management.

WORKSHOP | ARID AND CLEPSYDRA

From October 21 to 23, 2025, the IGME-CSIC headquarters in Murcia hosted the ARID-Clepsydra Workshop on Groundwater Monitoring Networks. International experts from Morocco, Tunisia, Brazil, France, and Spain gathered to exchange experiences on water quality control and management in arid and semi-arid regions.

This event was organized within the framework of the Clepsydra project (InterregEuro-MED), led by the IGME-CSIC, and in collaboration with the ARID scientific network, funded by the French Research Institute for Development (IRD). The meeting included a technical visit to the Campo de Cartagena and the Mar Menor lagoon, where participants—sociologists, economists, agronomists, hydrologists, hydrogeologists, and experts in integrated water resources management—learned about the area’s advanced groundwater monitoring infrastructure. Specifically, a visit was made to the Campo de Cartagena Irrigation Community, a partner in the CLEPSYDRA project, to learn about water distribution and the agronomic and aquifer monitoring networks.



At the Tomás Ferro Experimental Farm of the UPCT (Polytechnic University of Cartagena), explanations were received from MITECO (Ministry for Ecological Transition and the Demographic Challenge) and TRAGSATEC (Technical Agency for the Development of the Campo de Cartagena Irrigation System) regarding the recent results of the continuous monitoring systems for nitrate content in groundwater, and the mini-laboratory that has been put into operation. Likewise, the agronomic probes and piezometers deployed by the Directorate General for Water of the Region of Murcia (CARM), implemented by the company WHIDOC and managed by the CRCC (Regional Consortium of the Campo de Cartagena Irrigation Community), were showcased. The final stop of the study visit focused on the Mar Menor coastal piezometer network, with explanations provided by the Directorate General for the Mar Menor and IMIDA (the Valencian Institute for

Agricultural and Food Research and Development), and particular attention paid to observations of groundwater discharge following the DANA storm “Alice.” The discussions held during the three-day workshop highlighted the scientific challenges and national and regional initiatives related to monitoring and protecting groundwater quality. The importance of ongoing scientific and technical cooperation between researchers and local stakeholders, based on reliable data for the sustainable management of water resources in anticipated scenarios of increasing scarcity, was also emphasized.

TRANSNATIONAL MEETING IN MONTPELLIER

The fourth General Assembly of the CLEPSYDRA Project was held in Montpellier from 3 to 5 February 2026, bringing together project partners for three days of collaborative work and exchanges.

The first day focused on “training the trainers”, with discussions on methods, tools and local implementation approaches across the pilot sites. This session aimed to strengthen partners’ capacity for groundwater monitoring within the Interreg Euro-MED Programme.

In parallel, the CLEPSYDRA serious game currently under development was presented to members of Aqua-Valley, allowing partners to gather initial feedback to further refine this innovative outreach tool. The day concluded with a networking session fostering dialogue and future synergies between partners and regional stakeholders.



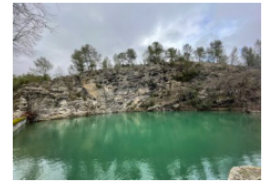
The second day was dedicated to a technical journey, offering partners a concrete immersion into regional groundwater management practices. Participants visited the Lez spring and the Jacques Vials intake system, a strategic water resource for the Montpellier metropolitan area. In the afternoon, the visit continued at the Terrieu experimental site, where partners discovered an innovative monitoring system dedicated to karst hydrogeology.

These visits highlighted the importance of long-term observation and research-driven approaches to support sustainable groundwater management.

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The third day focused on internal coordination among project partners. Discussions allowed participants to review project progress, align ongoing activities and define the next steps, strengthening coordination as the project moves into its next phases.

STAY CONNECTED!

To support the project, don't hesitate to follow future news and relay information.

Website: <https://clepsydra.interreg-euro-med.eu/>

YouTube Channel: <https://www.youtube.com/@ClepsydraProject-InterregMed>

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