

BLUE RECHARGE Inter-Regional Conference & Workshop (Rijeka, 26 – 27 January 2026)**1) Context and purpose**

The international pilot conference held in **Rijeka** brought together experts and practitioners from Croatia, Italy, Australia, Spain, and Germany to exchange results and perspectives on **Managed Aquifer Recharge (MAR)** and the development of a new economic mechanism—“**Blue Credits**”—designed to incentivize verified aquifer recharge and sustainable water use. The event combined technical, regulatory, environmental-monitoring, and economic sustainability viewpoints, reflecting the project’s cross-disciplinary nature and its ambition to translate pilot experiences into scalable practice.

A key added value of the Rijeka meeting was the explicit link between:

- **on-the-ground implementation** in coastal karst settings (Southern Istria and selected Italian pilot sites),
- **measurement and verification** of recharge and water-quality safeguards, and
- **economic instruments** capable of mobilizing broader participation by public bodies, utilities, and private actors via credible, transparent crediting mechanisms.

2) Field visit to the Lobarika pilot area (26 January 2026)

The day before the conference, participants visited the pilot area in **Lobarika**, enabling a direct, practical understanding of the local hydrogeological setting and the operational logic of the Croatian MAR pilot. This on-site visit served three functions:



1. **Ground-truthing the pilot narrative:** seeing recharge infrastructure and the surrounding landscape clarifies why MAR is being pursued—namely, to strengthen freshwater availability, reduce vulnerability to drought, and mitigate coastal risks such as salinization.
2. **Connecting monitoring to decision-making:** field observations make technical monitoring topics (tracer testing, turbidity/chemistry tracking, infiltration behavior, residence-time questions) more intuitive and concrete.
3. **Aligning stakeholders:** a shared field experience improves cross-border comparability—participants can better relate the Croatian pilot's constraints and opportunities to Italian nature-based approaches discussed the next day.

This field component effectively framed the conference as a “pilot-to-policy” and “science-to-instrument” event, rather than a purely academic workshop.



Loborika site

3) Conference structure and agenda (27 January 2026)

The event—titled **BLUE RECHARGE Inter-Regional Conference & Workshop**—took place at the **Annex building of the Faculty of Economics and Business, University of Rijeka**. It was organized jointly by the Faculty of Economics and Business and the **Faculty of Physics, University of Rijeka**, underlining the project's integration of economic governance and environmental science.



Agenda overview (high-level):

- Registration (08:30–09:00), opening (09:00)
- Plenary talks (09:15–10:15)
- Session 1: Pilot implementation in Croatia and Italy (10:30–11:30)
- Session 2: Economic sustainability and Blue Credits mechanisms (11:45–12:45)
- Session 3: From pilots to practice (14:00–15:00)
- Discussion (15:00–15:40)

Committee:

- Organizing Committee chaired by Davor Mance, with Mara Trbojević and Zvonko Bumber as researchers on the project.

4) Plenary session: framing MAR as an economic and climate-resilience investment

The plenary segment positioned MAR not simply as a technical “water augmentation” tool, but as a strategic adaptation investment requiring both **cost-benefit clarity** and **policy-enabled scalability**.

4.1 MAR costs and benefits (Australia perspective)

Andrew Ross of the **Australian National University** delivered the plenary talk on “MAR costs and benefits.” The placement of this topic at the start of the day established an important framing: MAR must be evaluated not only through capital and operational costs, but through its broader economic value—risk reduction, drought buffering, and avoided damages to dependent sectors.





4.2 SAT-MAR around the Mediterranean: accelerating implementation

Enrique Fernández Escalante (Tragsa R&D / Universidad Politécnica de Madrid / IAH-MAR Commission) presented **SAT-MAR (Soil Aquifer Treatment + Managed Aquifer Recharge)** as a key technology for climate adaptation in Mediterranean settings. The presentation highlighted how integrated treatment-recharge concepts can deliver dual value: safeguarding water quality while increasing recharge and strengthening system resilience.





5) Session 1: Pilot implementation in Croatia and Italy

Session 1 focused on evidence from pilots, emphasizing cross-border transferability and practical engineering and governance considerations.

5.1 BLUE RECHARGE project overview and pilot action results in Vodnjan

Saša Moharić, representing the lead partner **City of Vodnjan**, presented the project overview and pilot action results. The strategic objective is to safeguard groundwater in the cross-border area by:

- increasing MAR uptake where feasible, and
- introducing Blue Credits to financially reward verified recharge and sustainable water use contributions by public and private actors.

5.2 MAR implementation in Lobarika and Southern Istria

Bojana Hajduk Černeha of **Istrian Waterworks** presented MAR implementation in Lobarika and Southern Istria. The Croatian case study narrative is focused on treating wastewater to a high standard and infiltrating it via recharge wells/fields, supported by drilling, tracer tests, and continuous monitoring.

This part of the program is particularly important because it tackles a real-world constraint common across Europe: aquifers that are **not currently fit for potable abstraction** may still be strategically vital for irrigation/technical water and for preventing salinization, creating a strong rationale for carefully controlled MAR using appropriately treated water.





5.3 Pilot study outcomes in Italy

Francesco Cavazza from **Canale Emiliano Romagnolo** presented the Italian pilot outcomes. The Italian approach is nature-based, including wetland systems that support recharge, mitigate salinization and subsidence, improve water quality, and strengthen the rural economy—an approach that complements the Croatian engineered recharge context and enriches cross-border learning by offering alternative implementation pathways.





6) Session 2: Economic sustainability and Blue Credits mechanisms

Session 2 formalized the bridge between “pilot hydrology” and “deployable incentives,” focusing on valuation logic and on a practical platform for crediting.

6.1 Economic value of Managed Aquifer Recharge

Davor Mance presented the “Economic Value of Managed Aquifer Recharge”: MAR cannot be judged solely by water-sale revenues. It must be understood as **total economic value**, including:

- benefits to households, tourism, agriculture, and industry;
- avoided damages and avoided costs (e.g., salinization, drought losses, emergency supply measures);
- ecosystem services and broader non-market values;
- resilience value (system flexibility under climate stress).

This framing is decisive for bankability: it helps explain why MAR projects can be socially and economically justified even when narrow financial indicators (standing alone) appear marginal.





6.2 Blue Credits schemes: lessons from global practices

Alessandro Bosso presented “Blue Credits Schemes: Lessons from Global Practices and the BLUE RECHARGE Project.” The defining features of the Blue Credits model are:

- **voluntary participation**, but with strict verification;
- conversion of **verified recharge volumes** into credits;
- transparent registry logic, including blockchain-based protections, to prevent double counting and to maintain traceability;
- a buyer side likely anchored in organizations with environmental certification needs or sustainability reporting obligations, while still leaving room for broader participation (including citizens).

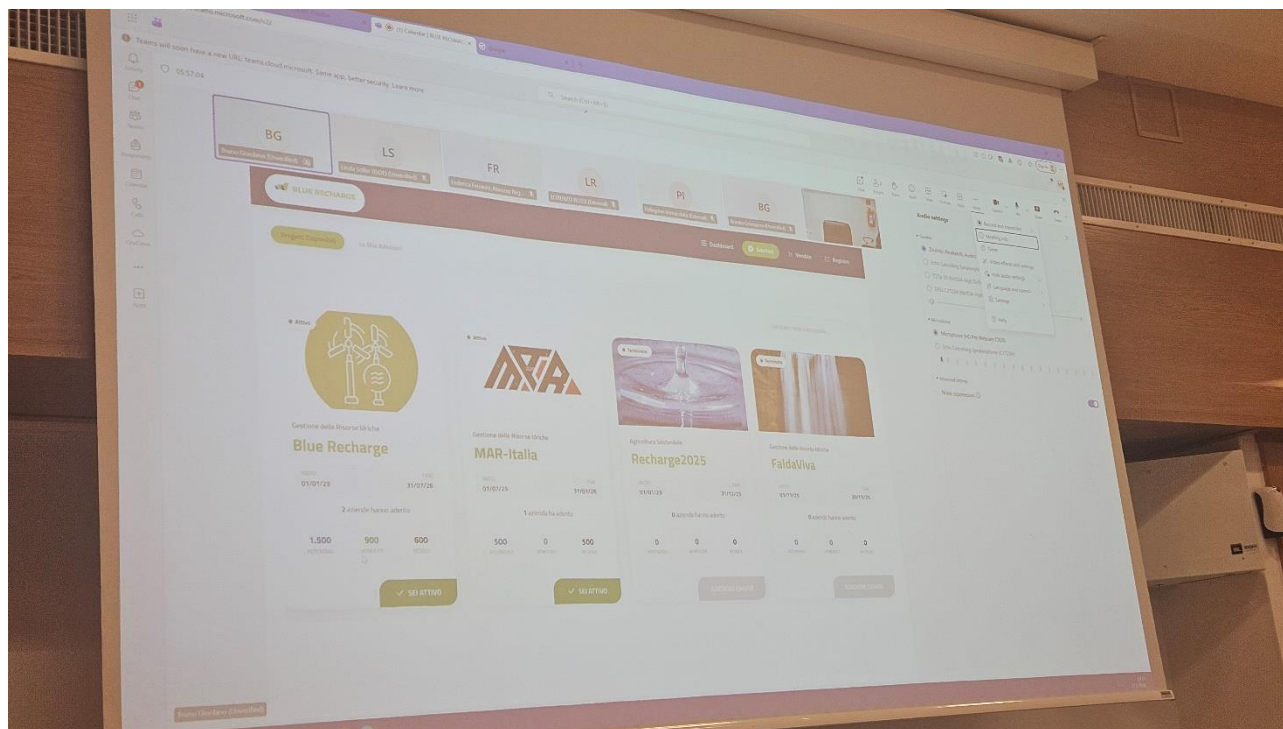




6.3 BLUE RECHARGE platform for Blue Credits

Francesco Cisternino of **EXO** presented the BLUE RECHARGE platform for Blue Credits. This platform dimension is crucial: without a robust system for measurement reporting, verification workflows, and registry integrity, crediting mechanisms risk losing credibility—especially when applied to groundwater systems where impacts must be carefully evidenced.





7) Session 3: From pilots to practice

Session 3 focused on transferability, uncertainty, and the alignment of scientific evidence with legal/regulatory requirements.

7.1 Environmental impact and transferability potential

Diana Mance (**University of Rijeka, Faculty of Physics**) presented the environmental impact and transferability potential of BLUE RECHARGE. Isotope-based monitoring (stable isotopes, d-excess/lc-excess, radon-222) are applied to characterize water sources and flow paths, and to differentiate functional aquifer zones relevant for safe MAR planning. This scientific layer is essential for moving from “pilot feasibility” to “replicable guidelines.”

7.2 Groundwater stress in Europe: uncertainty under abstraction and climate change

Linda Söller of the **Institute for Social-Ecological Research** addressed groundwater stress in Europe and uncertainties in future discharge alterations driven by abstraction and climate change. This perspective provides the broader European baseline: MAR is being explored not as a niche solution, but as part of an emerging resilience toolkit under increasing uncertainty.

7.3 MAR in Croatia: guidelines for sustainable discharge of treated wastewater into the subsurface

Zoran Nakić (Faculty of Mining, Geology and Petroleum Engineering) presented “MAR in Croatia,” focusing on scientific and legal aspects of developing guidelines for sustainable subsurface discharge of treated wastewater. This topic is central to scaling MAR



responsibly: the better defined the technical-legal pathway, the easier it becomes for utilities and municipalities to move from pilots to routine projects.



8) Cross-cutting themes and key takeaways

Across sessions and discussion, several coherent messages emerge:

1. **MAR as climate adaptation and risk management**
MAR should be positioned as a resilience measure: it increases buffering capacity, reduces vulnerability to drought and salinization, and supports continuity for economic sectors dependent on water reliability.
2. **Measurement and verification are non-negotiable**
From tracer tests and continuous water-quality monitoring to isotope methods and site characterization, robust evidence underpins both safety and legitimacy—especially if credits are issued and traded.
3. **Economic logic must include avoided costs and non-market value**
The conference repeatedly reinforced that full valuation is needed to justify investment and to design incentives that reflect real societal benefits.



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4. **Blue Credits as a governance mechanism, not just a market product**
The credibility of Blue Credits depends on additionality, measurability, permanence (or clearly defined durability), transparent registry operations, and independent oversight.
5. **Transferability requires guidance, not just pilots**
The “From pilots to practice” emphasis shows that the endgame is replicable, cross-border guidance: technical standards, legal templates, and educational programs that lower adoption barriers.

9) Closing remarks: a practical pathway for coastal karst groundwater resilience

The Rijeka conference—strengthened by the prior-day Lobarika field visit—demonstrated a realistic pathway toward more secure groundwater in coastal karst regions: combine engineered or nature-based MAR interventions with advanced monitoring, align projects with evolving regulatory expectations, and deploy economic incentives through a credible Blue Credits framework.

By structuring the day from plenary framing (costs/benefits and SAT-MAR acceleration), through pilot evidence, into economic and platform instruments, and finally to transferability and legal/scientific guidance, the event provided a complete narrative arc: from local pilot actions to scalable, cross-border implementation.

