



# International Association of Hydrogeologists

the World-wide Groundwater Organisation

## IAH Commission on Managing Aquifer Recharge

<https://recharge.iah.org>

**Enrique Fernández Escalante**

**Catalin Stefan**

**Yan Zheng**

IAH-MAR Commission co-chairs

**Julian Conrad, Seifu Kebede Gurmessa**

IAH Vice-Presidents

**Kevin Pietersen**

IAH-SA President



Catalin Stefan

Yan Zheng

Enrique Fernández Escalante  
Co-chairs of the IAH-MAR Commission



**ISMAR 12 plenary (AGM). 2025 April 30<sup>th</sup>**

# 1- Welcome and Introductions

13:00 - 14:00	LUNCH
Parallel 6	Panel discussion : Aquifer management, the microbiome and biosurveillance – from science to operations BGRM
14:00 - 16:00	Panel discussion <b>AGM</b>
16:30 - 17:30	IAH MAR Commission Annual General Meeting
18:00 - 22:00	Gala Dinner at Root 44 Restaurant in Stellenbosch

## IAH Commission on Managing Aquifer Recharge

### IAH-MAR Commission Plenary at ISMAR12

**16:30-17:30 Wed 2025 April 30<sup>th</sup>**

**ALL WELCOME!**



## AGENDA

1. Presentation of IAH-MAR Commission (Enrique)  
Last memory of activities (2024 Next 2025 report (Enrique & Catalin).
2. Working Groups and Communities of Practise (WG & COPs leaders)
3. Invitation to ISMAR 13, 2028 (ISMAR 13 representative).
4. Election / Re-election of IAH-MAR Co-chairs (Julian Conrad)
5. IAH Certificates of Appreciation (IAH & IAH-MAR representatives)
6. Upcoming events (Catalin & Enrique)
7. Information Sharing: on going or recently finished MAR or MAR-related projects (Catalin & Enrique)
8. Future post-ISMAR 12 Journal. Special issue. Call for action (Catalin)
9. New publications on MAR. Short mention/presentation by authors
10. *In memoriam* (co-chairs)
11. Suggestions for new activities (all)
12. Call for volunteers to participate in existing and new activities (all)
13. Information sharing on MAR (*not covered elsewhere, all*)

# ISMAR 12 IS STREAMING LIVE

- Whether you are in New Zealand, Australia or around the globe, you can now attend the 12<sup>th</sup> International Symposium on Managed Aquifer Recharge (ISMAR12) via live stream for free!

Thanks to sponsors:



## Thanks to exhibitors:



# 1- Objectives of the Commission

## International Association of Hydrogeologists (IAH) Commission on Managing Aquifer Recharge



International Association  
of Hydrogeologists  
the World-wide Groundwater Organisation

IAH Commission on  
Managing Aquifer Recharge



- Promotes the securing and expanding of water resources
- Encourages research, development and adoption of improved practices
- Facilitates international exchange of information among members
- Aligns with UNESCO IHP-IX Strategic plan (2022-2029)

Photo: After the closing ceremony, ISMAR10, Madrid, Spain

# International Association of Hydrogeologists (IAH) Commission on Managing Aquifer Recharge



International Association  
of Hydrogeologists  
the World-wide Groundwater Organisation

IAH Commission on  
Managing Aquifer Recharge

## Current working groups:

- Clogging and its management
- MAR for Sustainable Development
- Economics of MAR
- MAR Regulations
- MAR Suitability Mapping
- Urban MAR
- MAR in Conferences

## MAR Communities of Practice:

Australia, Italy, China, Latin America

## Closed working groups (activities still ongoing)

- Global MAR Inventory
- 60 years History of MAR
- MAR to MARket
- Call to Action on Groundwater Management



# Our website

<https://recharge.iah.org>



International Association  
of Hydrogeologists  
the World-wide Groundwater Organisation


IAH Commission on  
Managing Aquifer Recharge

Last post-ISMAR special issue:

[https://www.mdpi.com/journal/water/special\\_issues/Aquifer\\_Recharge](https://www.mdpi.com/journal/water/special_issues/Aquifer_Recharge)

WELCOME ABOUT THE COMMISSION EVENTS WORKING GROUPS COMMUNITIES COLLABORATIONS RESOURCES ISMAR

## Welcome




Attendance at ISMAR11, Madrid, July 2019 – the latest biennial symposium of IAH-MAR, UNESCO and ABCE

Welcome to the website of the International Association of Hydrogeologists Commission on Managing Aquifer Recharge (IAH-MAR). Here you can discover what our working groups are doing and contribute to their current projects, you can download resources on MAR, connect with people, get information on symposia coming up, and join our email list to stay informed of latest news. We also have sister sites in Spanish and Chinese.

### Managed Aquifer Recharge

Managed aquifer recharge, also called groundwater replenishment, water banking and artificial recharge, is the purposeful recharge of water to aquifers for subsequent recovery or environmental benefit. It embraces methods such as riverbank filtration, stream bed wells, infiltration ponds and injection wells, and uses natural water storage and appropriately treated urban domestic, sewage and other waste waters to increase groundwater storage, protect and improve water quality and secure drought and emergency supplies. Its growing scientific base supports its rapidly increasing use as a vital management tool in the sustainable use of the world's water resources.

### Latest News



#### Time for elections!

Dear IAH-MAR Community,

During the upcoming ISMAR11 in California, USA on 11-15 April 2022 (<https://ismar11.net>), the Commission will hold new elections. A three-year mandate will be validated for the co-chairs, to be again renewed at the ISMAR12 conference in 2025. The elections will take place on 12 April 2022 during the IAH-MAR Plenary Session (see ISMAR11 Agenda [here](#)).

#### CURRENT PROJECTS THAT YOU CAN JOIN

- New working group: MAR in Conferences. Coordinator: Danielle Benedictis van Daele
- New working group: Urban MAR. Coordinator: Niels Harberg
- LatinMAR Community of Practice – a new initiative to advance MAR in Latin America. Coordinator: Adriana Palma
- MAR Sustainability Mapping Working Group. Coordinator: Javie Barrios
- Contributors to a second monograph on planning, focusing on its management – Changing Working Group. Coordinator: Rafael Martín
- Groundwater Solutions Initiative for Policy and Practice (GWSIP) – a Collaborative International Project. Coordinator: Karen Wilhelm

#### JOIN OUR MAILING LIST

Register with our large email group to share information, ideas and news concerning recharge enhancement.

Join IAH-MAR email community

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Journals > Water > Special Issues > Managed Aquifer Recharge: A Key to Sustainability

## Managed Aquifer Recharge: A key to Sustainability


- View Special Issue Page
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- Published Papers

A special issue of *Water* (ISSN 2073-4441). This special issue belongs to the section Water Resources Management, Policy and Governance.


Deadline for manuscript submissions: closed (10 November 2021) / closed by MDPI

### Share This Special Issue


### Special Issue Editors



Dr. Enrique Fernández Fernández: E-Mail: [enrique@water.com](#)  
Guest Editor  
Frago-RAE: UPM-Laburam 198 Consultor, C/Chav de San Blas, Madrid, Spain  
Interests: IAHM hydrogeology, technical solutions for water management, design and construction criteria (special issues, Collections and Topics in MDPI journals)



Dr. Edoardo Belleri: E-Mail: [eduardo@water.com](#)  
Guest Editor  
Research Group: R20002, Department of Hydrogeology, Technische Universität Dresden, R2000 Dresden, Germany  
Interests: soil aquifer treatment (SAT), managed aquifer recharge (MAR)



Dr. Christophe J. Belleri: E-Mail: [eduardo@water.com](#)  
Guest Editor  
School of Engineering, University of North Florida, Jacksonville, FL, USA  
Interests: groundwater hydrology, surface water hydrology, geotechnical engineering, earth safety

### Journal Browser

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# Newsletters

IAH Commission on  
Managing Aquifer Recharge



WELCOME ABOUT THE COMMISSION EVENTS WORKING GROUPS COMMUNITIES COLLABORATIONS RESOURCES ISMAR

## Newsletters

49<sup>th</sup> issue...

Stay updated with the latest news on managed aquifer recharge collected in our (almost) monthly newsletters.



2025

- 02-2025-IAH-MAR-newsletter
- 12-01-2025-IAH-MAR-newsletter

<https://recharge.iah.org/newsletters>

Please, keep reporting info:

[dinamar@tragsa.es](mailto:dinamar@tragsa.es)



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## JOIN OUR MAILING LIST

Register with our large email group to share information, ideas and news concerning recharge enhancement.

Join IAH-MAR email community

<https://lists.flinders.edu.au/mailman/listinfo/iah-mar.listcgs>



# Recent Annual Reports

<https://recharge.iah.org/recent-annual-reports>



## Recent Annual Reports

The Commission provides annual reports each calendar year to the executive of IAH.

These are a snapshot of all the activities of the commission and are intended to be useful for all interested in managing aquifer recharge.

[IAH-MAR-2024 Annual Report \(summarized\)](#)

[IAH-MAR-2023 Annual Report \(summarized\)](#)

[IAH-MAR-2022 Annual Report \(summarized\)](#)

[IAH-MAR-2021 Annual Report](#)

[IAH-MAR-2020 Annual Report](#)

[IAH-MAR-2019 Annual Report](#)

[IAH-MAR-2018 Annual Report](#)

[IAH-MAR 2017 Annual Report](#)

[IAH-MAR 2016 Annual Report](#)

International Association of Hydrogeologists  
Commission on Managing Aquifer Recharge



## IAH-MAR MEMORY OF ACTIVITIES IN 2021

### CO-CHAIRS

Enrique Fernández Escalante (Spain)

Email: [efernan@ingma.es](mailto:efernan@ingma.es)

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Yan Zhang (China)

Email: [yan.zhang@waterchina.cn](mailto:yan.zhang@waterchina.cn)

### Website:

<https://recharge.iah.org/>

### Other Websites:

Spanish: [www.iahmarr.org](http://www.iahmarr.org)

Chinese: <http://china.iahmarr.org.cn/>

## JOIN OUR MAILING LIST

Register with our large email group to share information, ideas and news concerning recharge enhancement.

Join IAH-MAR email community

Stay informed!

# COMMUNICATION

367 members today

<https://recharge.iah.org/ismar>

## ISMARs photo album

Sections to share a gallery of photographs taken during the whole ISMAR series, classified for each symposium, and open to contributions. Please, check the IPRs and disclaimer texts inside each collection.

### Photo-album of the whole ISMAR series. IPRs.

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IAH Commission on  
Managing Aquifer Recharge



WELCOME ABOUT THE COMMISSION EVENTS WORKING GROUPS COMMITTEES COLLABORATIONS RESOURCES ISMAR

## ISMAR Symposia

The International Symposium on Managed Aquifer Recharge (ISMAR) is the premier international event on MAR research and practice, held every 2 or 4 years under the auspices of the International Association of Hydrogeologists (IAH), the American Society of Civil Engineers (ASCE), and the United Nations Educational, Scientific and Cultural Organization (UNESCO). This series of conferences advances the goals of IAH's Commission on MAR "to expand water resources and improve water quality in ways that are appropriate, environmentally sustainable, technically viable, economical and socially desirable."

Symposia attract attendance of national and international regulators, researchers and practitioners in all facets of MAR, including hydrogeology, geophysics, hydrology, modeling, economics, and water resources management. Themes covered include water quality design and construction, operation and maintenance, economics, monitoring and modeling, regulations and management, adaptation to climate change, land subsidence prevention and remediation, and thermal energy storage.

This dedicated page provides an overview of past ISMAR symposia and serves as an online repository for conference materials such as books of proceedings, abstracts etc. We warmly recommend also the collection of Proceedings of the Special Symposium on Managed Aquifer Recharge (ISMAR) organized in the US by the Groundwater Resources Association of California and Arizona Hydrological Society.

### ISMAR11

#### 11<sup>th</sup> International Symposium on Managed Aquifer Recharge

"Managed aquifer recharge: a key to sustainability"

11-15 April 2022, Long Beach, California, USA



### ISMAR10

#### 10<sup>th</sup> International Symposium on Managed Aquifer Recharge

"MAR to solve the global water crisis"

20-24 May 2018, Madrid, SPAIN

### ISMAR PROCEEDINGS BOOKS



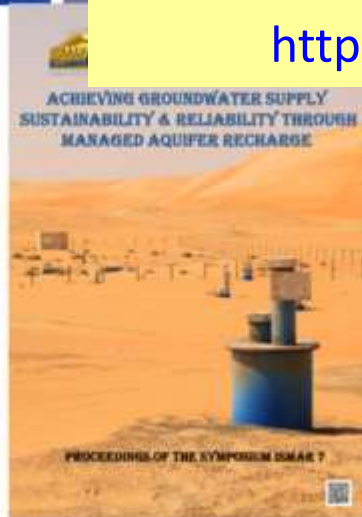
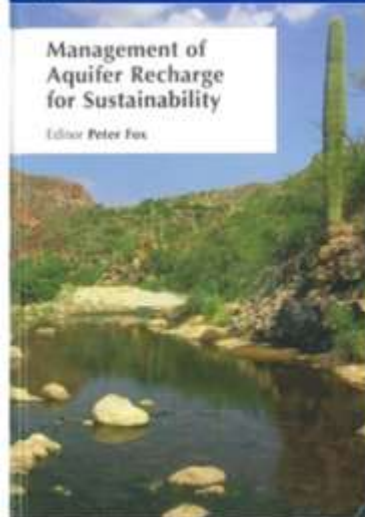
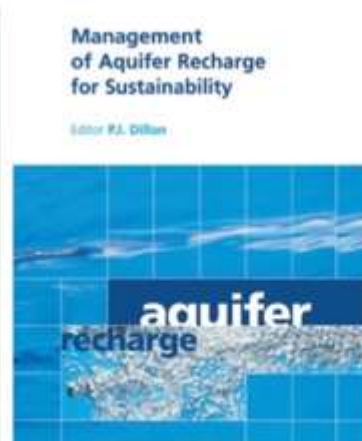
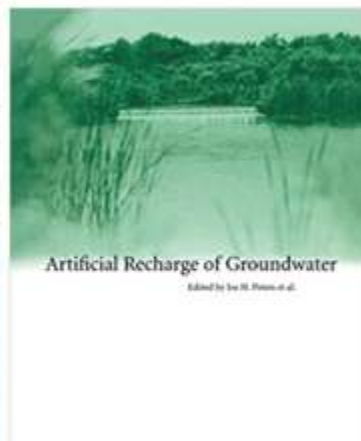
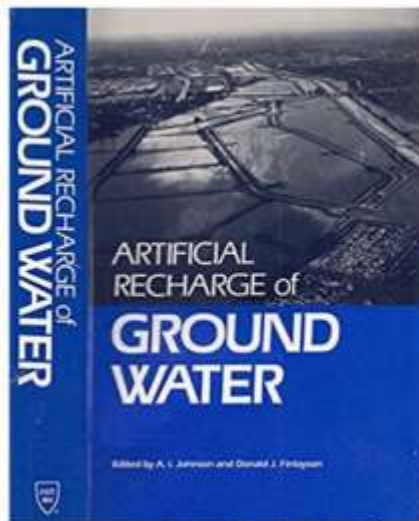
Proceedings of ISMAR10



Abstract book of ISMAR11



Abstract book of ISMAR10



**ISMAR Materials**  
<https://recharge.iah.org/ismar>



<https://twitter.com/IAHMARCom>



**IAH MAR Commission**

@IAHMARCom

IAH Commission on Managing Aquifer Recharge (MAR). Co-chairs: Enrique Fernández Escalante /-ef, Catalin Stefan /-cs, Yan Zheng /-yz

[recharge.iah.org](https://recharge.iah.org) Joined February 2020

11 Following 63 Followers

Edit profile



IAH MAR Commission @IAHMARCom · Sep 5

The 48th @iahgroundwater Congress #InspiringGroundwater just kicked off in #Brussels. Thank you @MarjkeHuysmans and the entire team for making this event possible!



IAH MAR Commission @IAHMARCom · Sep 2

Join us next week in #Brussels for the 48th @iahgroundwater Congress and attend our multi-session on managed aquifer recharge on Mon/ Tue / and Thu. Also don't miss our Plenary Commission Meeting on Thu evening. Check conference programme for details [iah2021belgium.org/programme/details](https://iah2021belgium.org/programme/details) /-cs



IAH MAR Commission @IAHMARCom · Aug 31

If you are NOT in Belgium next week: sign up to participate in the online @iahgroundwater General Assembly



IAH MAR Commission @IAHMARCom · Aug 31

Featured research: Identification of suitable sites for managed aquifer recharge under semi-arid conditions employing a combination of numerical and analytical techniques. Read more: [rdcu.be/cwpEe](https://rdcu.be/cwpEe) /-cs



IAH MAR Commission @IAHMARCom · Aug 25

New book on "Managed Aquifer recharge: Southern Africa" written by Eberhard Braune and Sumaya Israel for The Groundwater Project @groundwaterproj. Download for free: [gw-project.org/books/managed-...](https://gw-project.org/books/managed-...) /-cs



# WhatsApp Group

## *Aquifer Recharge Management*

- Initiated by 47<sup>th</sup> IAH Congress in Brazil, still very active!



<https://chat.whatsapp.com/EaXBxtWglLrKpPF1hQGXd8>

- MAR books repository:  
>120 books to be  
downloaded freely.

Contributions welcome:  
[dinamar@tragsa.es](mailto:dinamar@tragsa.es)

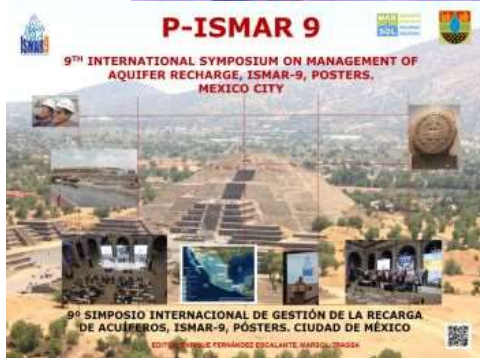
2024 Oct. last update

<https://dinamar.tragsa.es/post/actualizacion-update-libros-sobre-la-tecnica-mar-repositorio-mas-de-120-libros>



# P-ISMAR series

<https://dinamar.tragsa.es/post/p-ismar-11-book>



## 2- Working Groups and Communities of Practise

<https://recharge.iah.org/working-groups>

1. ~~Global MAR Inventory—Catalin Stefan~~
2. MAR for Sustainable Development – Yan Zheng
3. Economics of MAR – Andrew Ross
4. ~~60 years history of MAR—Peter Dillon and Pieter Stuyfzand~~
5. Management of clogging— Russell Martin
6. - ~~MAR to MARket—Enrique Fernández Escalante~~
7. MAR Regulations and Guidelines – Manuel Sapiano
8. MAR opportunity mapping - Catalin Stefan
9. Urban MAR – Niels Hartog
10. ~~MAR in Conferences. Daniela Benedicto~~
11. Italian Community of Practise slot. Rudy Rossetto (slides)
12. Latin-MAR Community of Practise slot. Adriana Palma
13. Australian / Chinese Communities of Practise slot?
14. Future WG / CoPs

# Working Group: MAR Suitability Mapping

## Leaders

Dr. Catalin Stefan (Research Group  
INOWAS at TU Dresden, Germany –  
[catalin.stefan@tu-dresden.de](mailto:catalin.stefan@tu-dresden.de))

## Aims

- Review available studies on GIS-based selection of sites suitable for MAR application and publish the results in an open access paper - **DONE**
- Initiate a network of scientists and stakeholders to share experience on MAR suitability maps (criteria, scales, objectives, applications, etc.) - **ongoing**
- Establish common GIS-based suitability mapping language and methodologies - **ongoing**

## Review paper:

Sallwey et al. 2019 (<https://doi.org/10.1139/er-2018-0069>)

Update in preparation (+proposal for guiding principles for MAR mapping)

## Mapping methodology

- Comprehensive criteria database (>150 criteria)
- Co-participative methodology centered on stakeholders engagement



<https://www.agreemar.inowas.com>

## Networking

- Side-workshop on MAR suitability mapping at ISMAR12 (and also one dedicated session)





# Working Group: MAR Feasibility Mapping

<https://recharge.iah.org/working-groups/mar-feasibility-mapping>

## Leaders

Dr. Catalin Stefan (Research Group INOWAS at TU Dresden, Germany – [catalin.stefan@tu-dresden.de](mailto:catalin.stefan@tu-dresden.de))

## Aims of the working group

- done... Review available studies on GIS-based selection of sites suitable for MAR application and publish the results in an open access paper (DONE)
- doing... Initiate a network of scientists and stakeholders to share experience on MAR suitability maps (criteria, scales, objectives, applications, etc.)
- to do... Harmonize GIS-based suitability mapping language and methodologies

## Suitability maps for managed aquifer recharge: a review of multi-criteria decision analysis studies

Jana Sallwey, José Pablo Bonilla Valverde, Felipe Vásquez López, Ralf Jürgmanns, and Catalin Stefan

**Abstract:** Suitability maps for managed aquifer recharge (MAR) sites hold a strong potential for integration into sustainable groundwater management plans. An existing method to identify sites suitable for MAR implementation is geographic information system (GIS)-based multi-criteria decision analysis (MCDA). There are no guidelines or a consensus understanding on how suitability mapping should be conducted, and there is considerable variability as to what factors are assessed and how they are weighted. To increase knowledge on GIS-MCDA, a database has been built based on 63 studies applying GIS-MCDA in the context of MAR site selection. Information on the criteria, assigned weights, and methodologies has been retrieved from the documents. Statistical analysis of the database depicts the current state of art for suitability mapping methodologies as well as specific information for the different recharge methods. We further incorporated the compiled information into a web-based query tool that makes the information easily accessible and the utilization of the database more user friendly. This review as well as the created web-tool will help planners of MAR sites to engage in the MCDA in a more structured way by referring to previously conducted studies and by finding information suitable for their specific project. The application potential of suitability maps is discussed along with the shortcomings of this methodology.

**Key words:** managed aquifer recharge, artificial groundwater recharge, geographic information system, multi-criteria decision analysis, site selection, suitability analysis, suitability maps, potential recharge sites.

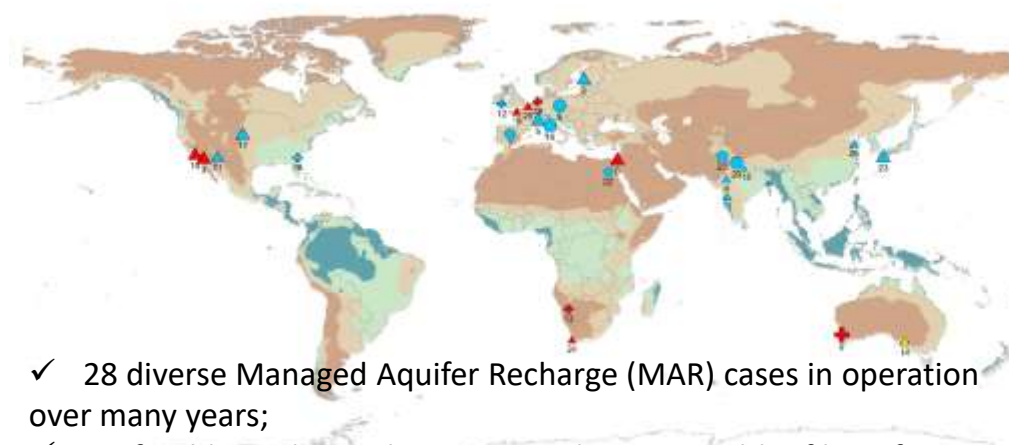
**Résumé:** Les cartes d'aptitude de sites d'immersion en eau souterraine gérée (AESG) ont potentiellement une intégration dans les plans de gestion d'eau souterraine durables. Une méthode émergente pour déterminer les sites aptes à la mise en œuvre de l'AESG est l'analyse décisionnelle multicritères (ADM) à l'aide de systèmes d'information géographique (SIG). Il n'y a aucune directive ni d'interpolation commune à savoir comment tracer les cartes d'aptitude, et il y a une variabilité importante quant aux facteurs à évaluer et comment les pondérer. Dans le but d'augmenter les connaissances de l'ADM à l'aide de SIG, une base de données a été construite à partir de 63 études employant des informations portant sur les critères utilisés, les pondérations des documents. L'analyse statistique de la base de données d'aptitude ainsi que des informations précieuses quant aux décisions comprises dans un outil d'interrogation sur le Web. Une base de données plus conviviale. Cette revue ainsi que l'information appropriée pour leur projet spécifique. La présente lacune de cette méthodologie. (Traduit par la Rédaction)



Sallwey et al., 2018  
<https://doi.org/10.1139/er-2018-0069>

### 3. MAR sites updates/new entries

- Express your interest to submit updates and new entries of sustainable MAR sites/projects that have been in operation to [yan.zheng@sustech.edu.cn](mailto:yan.zheng@sustech.edu.cn)
- Selected entries for posting on IAH-MAR website / MAR Portal
- Selected entries, after editing, can form a collection of a new book

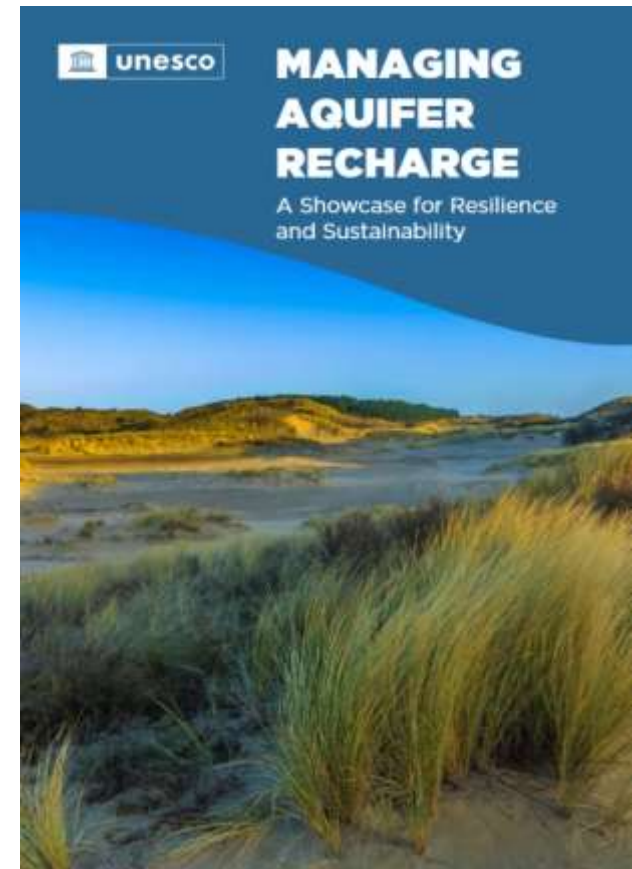


- ✓ 28 diverse Managed Aquifer Recharge (MAR) cases in operation over many years;
- ✓ Irrefutable evidence that MAR produces a wealth of benefits.

<https://recharge.iah.org/unesco-iah-mar-publications>

## 4. Economics of MAR – Andrew Ross

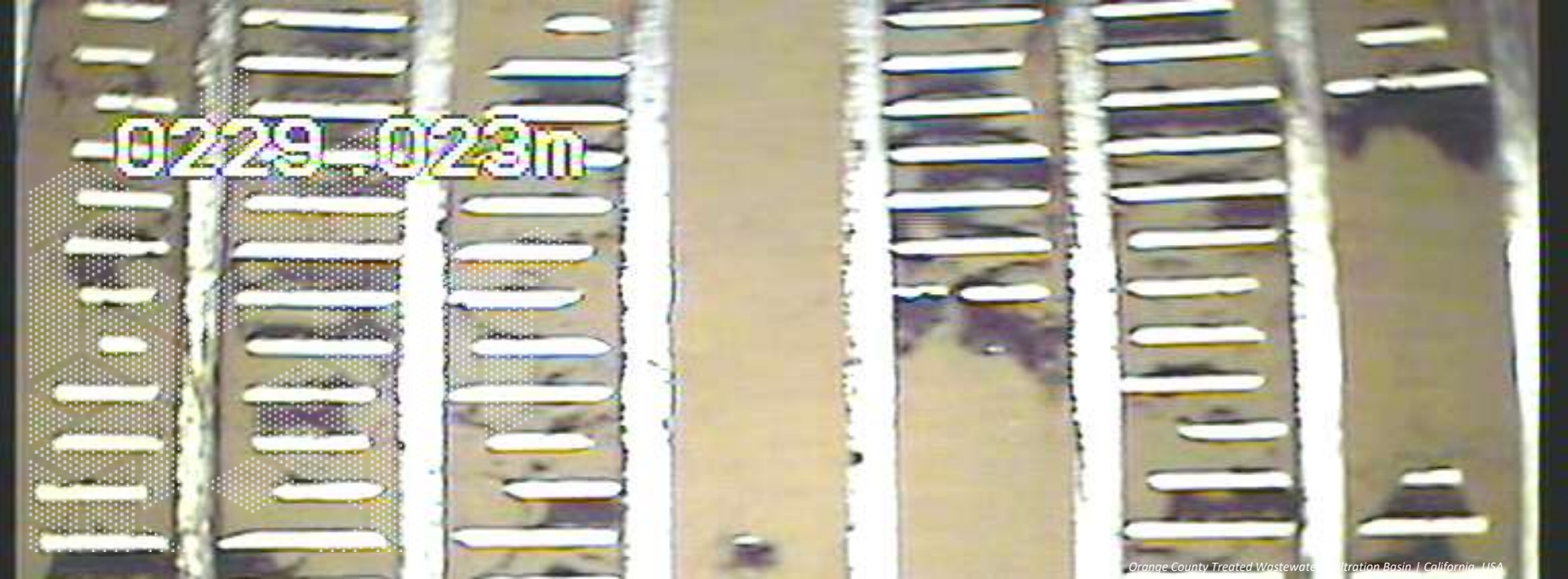
- The output from the “Economics” and “MAR for Sustainable Development”
- Aim to collect & assess financial & economic information about costs & benefits of MAR schemes
- **Assessment of costs & benefits of 28 MAR schemes** in UNESCO-IAH-GRIPP 2021 publication "Managing Aquifer Recharge: A Showcase for Resilience and Sustainability" - Chapter 4



<https://unesdoc.unesco.org/ark:/48223/pf0000379962>

## 5. Management of clogging— Russell Martin





**WGA**

ISMAR Clogging Working Group

Russell Martin | Rev 3.0 | April 2025



# Why is Understanding Clogging Important?

- Clogging causes impaired injectivity restricting the volume of water that can infiltrate or be injected into the target aquifer.
- Severe clogging may lead to infiltration basins or recharge bores having to be replaced.
- It is the **biggest risk** to the successful and sustainable operation of any MAR system.

**Clogging Will Happen!**

**Clogging can be Managed!**



# Activities

Only Minor progress on Clogging monograph Version 2  
(4 additional studies @ 80% complete by yours truly)

Declan Page (CSIRO) has agreed to assist with the review and compilation of Version 2

Call to action for anyone wishing to contribute to Version 2 of the Clogging Monograph

Aim is to release version 2 at ISMAR13

Contact Details for authors which to contribute:

[rmartin@wga.com.au](mailto:rmartin@wga.com.au)

[declan.page@csiro.au](mailto:declan.page@csiro.au)



## 7. MAR Regulations and Guidelines – Manuel Sapiano

- Overall aim of developing a **comparative assessment of the regulatory frameworks for MAR as applied in different regions**. Assessment of different approaches to address similar concerns will enable the identification of key issues for strengthening of existing regulatory frameworks.
- **Current work has focused on supporting the development of a common understanding of the EU Regulatory Framework for MAR – within the EU Common Implementation Strategy for the EU Water Framework Directive. Guidance Document to be finalized by Q2 2022.**

# European Guidance document on MAR

Aim: To increase the understanding of the general principles of Managed Aquifer Recharge (MAR) and outline the requirements of EU legislation with respect to the application of MAR techniques.

Support from IAH MAR Commission in the drafting of the document.

Download Link:

<https://op.europa.eu/en/publication-detail/-/publication/e827bbe4-fe33-11ef-b7db-01aa75ed71a1/language-en>



### ***Call for Action***

Undertaking benchmarking exercise of MAR Regulatory Frameworks in different regions.

- Review of Policies, Legislation and Guidelines
- Review of Existing Publications
- Analysis of common approaches and opportunities for synergies

Call for volunteers to represent different regions. Please contact:

[manuel.Sapiano@gov.mt](mailto:manuel.Sapiano@gov.mt)



MAR guidelines. International comparison:

<https://www.acquesotteranee.net/index.php/acque/article/view/462>



## 9. Urban MAR - Working group. Niels Hartog

[recharge.iah.org/working-groups/urban-mar](https://recharge.iah.org/working-groups/urban-mar)

### Working Group: Urban MAR

Working group initiated at the 46th IAH Congress in Malaga, Spain (September, 2019)

#### Leader

Dr. Niels Hartog (KWR, the Netherlands) [niels.hartog@kwrwater.nl](mailto:niels.hartog@kwrwater.nl)

#### Questions:

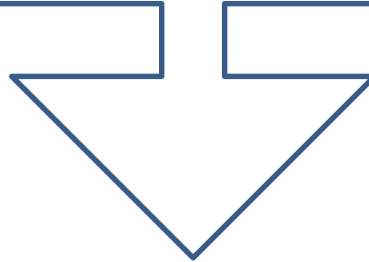
- our experiences with introducing MAR in urban environments?
- Potential, development and bottle necks?
- Ideas?
  - For promoting Urban MAR applications?
  - Collaborations with non-hydrogeological professionals (urban planners, architects etc)
  - ...



## 10. MAR in Conferences. Daniela Benedicto / Tine te Winkel.



- Aims at assist conference organizers with the integration of MAR into the conference programmes.
- Also, to disseminate the principles of MAR in seminars or webinars.
- Started in 2020 – possibility of a training during the 47<sup>th</sup> IAH congress in São Paulo-BR.



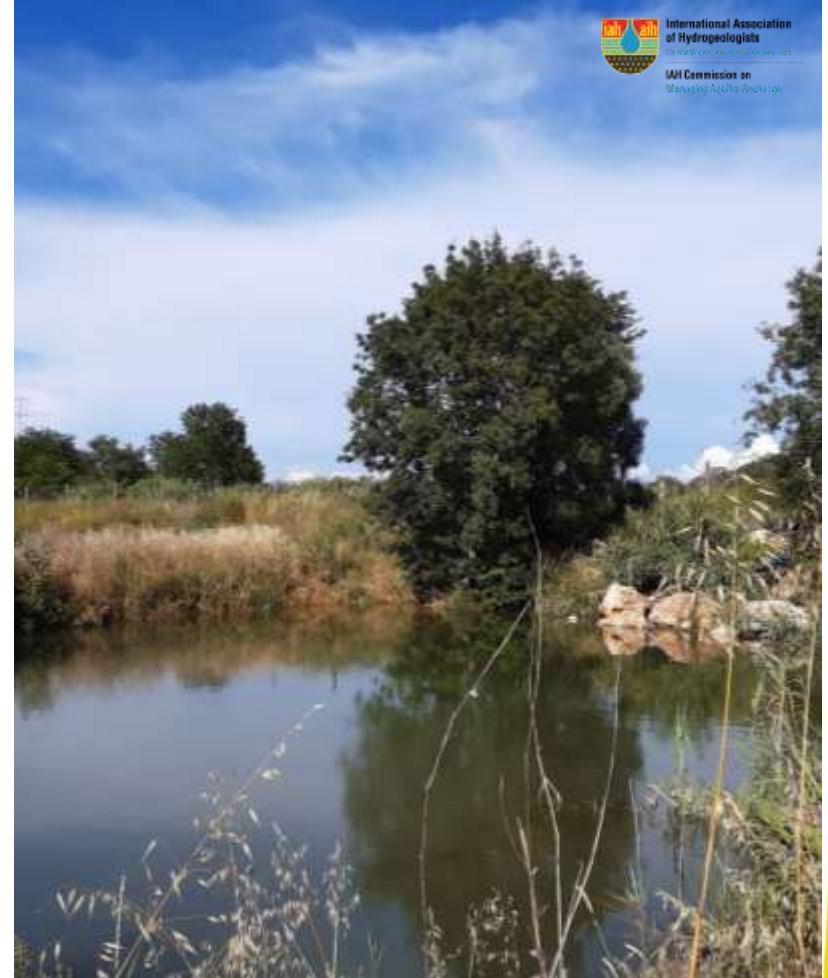
**>>IAH-MAR co-chairs**

# 11. Italian Network on MAR (CoP)

Rudy Rossetto (slides)

## Activities 2020/2022

- 1-day course in 2020 (pre-covid) on **Design and operating a Managed Aquifer Recharge scheme** (60 participants)
- Online course (16 hours) in 2021 on MAR scheme design was given (within the EU LIFE REWAT project, 40 participants) to technicians of water authorities in REGIONE TOSCANA (Italy) along with water utilities and practitioners. **Participants developed 6 preliminary projects**  
*One of this project entered now in tier two design phase.*
- A Video** for SUPERQUARK scientific programme was shooted in March and broadcasted in July 2021 on RAI 1 prime time (approx 2 M persons visualising it).



# MAR in Italy (2024)

## Growing activities on MAR in Italy:

- mainly driven by innovation projects (new projects in Piemonte and Emilia Romagna);
- still slow uptake by authorities;
- few multi-national companies aiming at water neutrality in their business.

Training and dissemination activities, by this year with the support of the



**National Chartered Order of Geologists**

Also research is ongoing at the LIFE REWAT MAR scheme.

The LIFE REWAT MAR scheme is fully equipped with multi-level piezometers and several sensors (h, T EC, pH, redox, ...).

**It is open to international groups for performing joint research activities.**

*(please contact*

*[rudy.rossetto@santannapisa.it](mailto:rudy.rossetto@santannapisa.it))*



Understanding and predicting physical clogging at managed aquifer recharge systems: A field-based modeling approach

Maria Chiara Lippert<sup>1,2,3,\*</sup>, Ulrike Werhan<sup>1</sup>, Rudy Rossetto<sup>1</sup>, Thomas Vismann<sup>1,4</sup>

<sup>1</sup> Technical University of Munich, TUM Campus Disting for Sustainability and Environmental Engineering, Germany

<sup>2</sup> Karlsruhe Institute of Technology, Institute for Environmental Research, Germany

<sup>3</sup> Karlsruhe Institute of Technology, Institute for Environmental Research, Germany

<sup>4</sup> TUM - Institute for Environmental Research, Germany

# Latin American MAR Community of Practice (LatinMAR)



Where we are, next steps



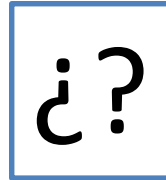


# Six months program

ACTION	NAME	DATE
Webinar	MAR: challenges in its implementation	19 May
Workshop	Integrated groundwater management for MAR	20-22 May
Webinar	MAR Womens in Latinamerica	To be defined
Transfer	José Bonilla will be on charge	October, 2025



# 13. Australian Community of Practise?



## MAR Community of Practice China

Leader: Weiping Wang

Activities:

Workshop – 17-21 Sept 2018 – *Development of MAR on North China Plain*

led by **Simon Stisen** and **Yan Zheng**

The Denmark Ministry of Foreign Affairs approved a project entitled MAR in the North China Plain and this involves the Geological Survey of Denmark and a number of Chinese partners (all involved in the MAR Network China) including Southern University of Science and Technology, University of Jinan, Beijing Water Science and Technology Institute and Chinese Geological Survey. The kick-off workshop for this project was held in Beijing and included visits to field sites in Beijing and Jinan and a seminar in Shenzhen.

Workshop- Sept 2015 – *MAR Guidelines for China*

Yan Zheng (MAR for Development Working Group Leader and Weiping Wang (Commission Co-Chair, and Leader of the China MAR Network) coordinated a workshop in Beijing on 7 Sept 2015 to discuss the formation of MAR Guidelines for China and upscaling of demonstration projects. This workshop resolved that this was essential and collaboratively determined a pathway to progress this work with the National Government.

ISMAR8 Symposium, Beijing 2013 – evolved from the establishment of the concept of a National MAR networks that were an outcome of a UNESCO hosted workshop at the Thailand Groundwater Conference, Bangkok, early 2009.

# Any future WG or CoP?

**NbSs and MAR**

**MAR & Governance?**

**Benchmarking on MAR cases?**

**MAR dissemination Materials?**

...

- Contact co-chairs

**Enrique Fernández Escalante** [efernan6@tragsa.es](mailto:efernan6@tragsa.es)

**Catalin Stefan** [catalin.stefan@tu-dresden.de](mailto:catalin.stefan@tu-dresden.de)

**Yan Zheng** [yan.zheng@sustech.edu.cn](mailto:yan.zheng@sustech.edu.cn)

<https://recharge.iah.org/contact-us>



## Cop - COMMUNITY OF PRACTICE ON MAR AND NATURE-BASED SOLUTIONS (NBS)



- **Rationale**

Cross-disciplinary collaboration

Knowledge sharing and capacity building

Policy advocacy

- **Objectives**

Promote exchange of knowledge

Develop new strategies for MAR-benefits and NBS

Strengthen the global network



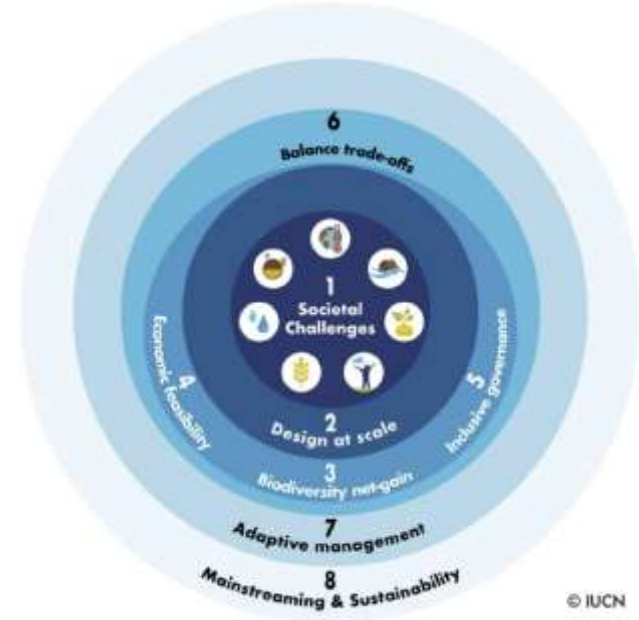




## Cop - COMMUNITY OF PRACTICE ON MAR AND NATURE-BASED SOLUTIONS (NBS)



- Kick off @ISMAR 12
- Recruiting new members
- Define vision and mission statement
- Set list of activities/collaborations
- Online webinar(s)
- Publication(s) ?
- Annual IAH congress – special session?
- Annual operational note MAR comission



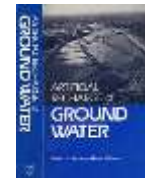
The 8 integrated criteria according to  
IUCN Global standards for NBS

### 3- Invitation to ISMAR 13, 2027.

Finally, the hosting country will be revealed!!

International Symposia on MAR

1. 1988 Anaheim California, USA (ASCE)
2. 1994 Orlando, Florida, USA (ASCE)
3. 1998 Amsterdam, Netherlands (IAH, ASCE & UNESCO)
4. 2002 Adelaide, Australia “
5. 2005 Berlin, Germany “
6. 2007 Phoenix, Arizona, USA “
7. 2010 Abu Dhabi, UAE “
8. 2013 Beijing, P.R. China “
9. 2016 Mexico City, Mexico “
10. 2019 Madrid, Spain
11. 2022 Long Beach California, USA
12. 2025 Stellenbosch, SA...
13. ...



International Association  
of Hydrogeologists  
the World-wide Groundwater Organisation  
IAH Commission on  
Managing Aquifer Recharge



have you considered hosting an ISMAR??





# Indian National Chapter <sup>of</sup> International Association of Hydrogeologists (INC-IAH)

Proudly Announces the Hosting of

**ISMAR-13**  
(2027-2028)

**REQUEST YOUR VALUED PARTICIPATION AND  
SPONSORSHIP**

**Prof A K Sinha,**  
**Vice-President, Asia (IAH Council )**  
**President, Indian National Chapter of IAH**

# Dear Esteemed Colleagues and Valued Sponsors

*I am happy to bring to your kind attention that the Indian National chapter of International Association of Hydrogeologists (INC-IAH). is committed to organize ISMAR 13 during 2027-2028 in India with your valued cooperation and support*

*The INC-IAH extend*

***WARMEST INVITATION TO YOU ALL***

*for participation and sponsorship opportunities at the upcoming  
"International Symposium on Managed Aquifer Recharge-13"  
(ISMAR 13).*

ISMAR is a pivotal platform for professionals, researchers, and organizations involved in the management and sustainable use of groundwater resources through innovative aquifer recharge techniques. This symposium will gather leading experts, policymakers, and industry stakeholders from around the world, fostering dialogue, collaboration, and advancements in hydrogeological practices.







# Namaste, world.

Rediscover the incredible you in India.  
Let our nature and culture, arts and crafts,  
flavours and festivals, faiths and beliefs  
make you come alive again.

India welcomes you.

Incredible!ndia



## 4- Election / Re-election of IAH-MAR Co-chairs

**Conducted by IAH Vice President, Dr. Julian Conrad**

## 5- IAH Certificates of Appreciation

- a) current ISMAR organisers, as they obviously invest a huge amount of personal effort in promoting MAR
- b) people at (or close to) the end of their MAR career as there might not be a further chance to ‘appreciate’ them later
- c) people with outstanding commitment to MAR promotion, regardless of above
- d) people with strong commitment to MAR in the past but who got somehow ‘forgotten’ by previous appreciations

# Alice Aureli

- Alice has promoted MAR and supported the activities of the Commission for many years through the UNESCO IHP Programme.

ISMARs.  
Developer



# Declan Page

MAR activist worldwide

- Declan has had an active role in different projects related to MAR. His dissemination of the findings of some projects has impressed us deeply.





## Fanus Fourie & ISMAR 12 TEAM

- Fanus and his team have initiated and led ISMAR12 in Stellenbosch, South Africa and fostered the SA network on MAR.



ISMAR 12 team

# Petri Jokela

- Petri has been an active member in the IAH-MAR Commission, taking care of most of the activities and intensely participating in the different lines of action.



Entire career to MAR development

# Roberto Navarro

Intense MAR developer in Peru

- Roberto has been the life and soul of the MAR in Ica aquifer, Peru, tirelessly since 2010, having implemented more than 800 infiltration ponds in Ica and Villacurí areas, helping to develop one of the biggest MAR areas in the world.



# Student poster award

ISMAR 12 BEST POSTER

ISMAR 12 BEST POSTER

ISMAR 12 BEST POSTER

*We certify that*  
*(Insert Name Here)*  
*has been honoured with the Best Poster Prize at the ISMAR12 Congress*  
*held in Stellenbosch (SA) from 28th April to May 2<sup>nd</sup> 2025*

*Title of the poster:*  
*(Poster Title here)*

**WGA**



**Fanus Fourie.**  
**ISMAR 12 Chairman**  
**Stellenbosch (SA) 2025 April 30<sup>th</sup>**

# General poster award

ISMAR 12 BEST POSTER

ISMAR 12 BEST POSTER

ISMAR 12 BEST POSTER

*We certify that*  
*(Insert Name Here)*  
*has been honoured with the Best Poster Prize at the ISMAR12 Congress*  
*held in Stellenbosch (SA) from 28th April to May 2<sup>nd</sup> 2025*

*Title of the poster:*  
*(Poster Title here)*

**WGA**



**Fanus Fourie.**  
**ISMAR 12 Chairman**  
*Stellenbosch (SA) 2025 April 30<sup>th</sup>*



## 6- Upcoming events

Networking opportunities

# UPCOMING EVENTS

## 7- Information Sharing: On going or recently finished MAR or MAR-related projects

Ongoing research activities

# RESEARCH & COOPERATION PROJECTS

# AGREEMAR

Adaptive agreements on benefits sharing for managed aquifer recharge in the Mediterranean region”

**Project (also) on MAR feasibility mapping**

**WG MAR mapping-related**

**Project duration:** July 2022 - May 2025 (36 months)

**Partners from**  
Germany, Cyprus,  
Tunisia, Portugal,  
Spain

1. Integrated feasibility mapping
2. Participatory governance framework
3. Validation through numerical modelling
4. Aquifer agreements for MAR
5. Participative stakeholders' engagement

[www.agreemar.inowas.com](http://www.agreemar.inowas.com)



Depuis 1898  
**INSTITUT NATIONAL AGRONOMIQUE DE TUNISIE**  
UN PÔLE D'EXCELLENCE



# MARCLAIMED

## Main Objective

Integrate managed aquifer recharge (**MAR**) with alternative water resources (**AWR**) into River Basin and Drought Management Plans as a structural measure to provide systems with greater adaptive capacity and resilience against Climate Change.

## Expected Results (3 pillars)



- Tools development for quality control, water resources availability forecasting, risk management, Water Footprint, economic value of water security and novel tariff models.

- MARCLAIMED IDST



- To achieve a better understanding of the societal response to the use of AWR in MAR systems
- To fill the gaps in the regulatory framework at EU level.



Partners: 13 Budget: 3.731.820,0 € Duration: 02/2024-01/2027



# MAR2PROTECT

**Coordinator:**  
Cetaqua Andalucía

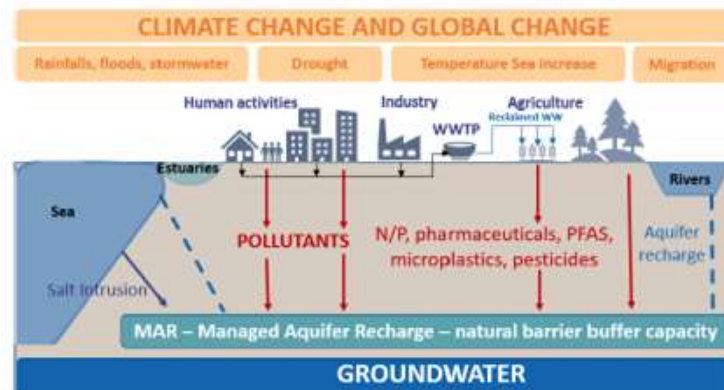
**Duration:** Dec 2022 - Nov 2026

**Partners:** 11 partners: 1 Affiliated partner, 4 EU countries, 2 African countries  
Cetaqua Andalucía WP4 Leader

**Financing:** HORIZON EUROPE

**Preventing groundwater contamination related to global and climate change through a holistic approach based on MAR**

MAR2PROTECT will provide a holistic approach to prevent GW contamination from the impacts of GC and CC based on a new-generation MAR. The core of this innovative MAR is M-AI-R DSS that will incorporate technological and societal engagement information using an AI-based approach to improve GW quality and quantity. To ensure a high replication potential, M-AI-R DSS will collect information from 5 demos sites in EU countries (PT, IT, ES, NL) and 2 in non-EU countries (TN, ZA) which were carefully chosen by their degree of maturity from previous successfully projects and a wide range of settings in terms of climatic conditions, water sources, type of pollution, MAR scheme and political / societal context.





# LIFE Matrix



**Coordinator:**  
Cetaqua Andalucía

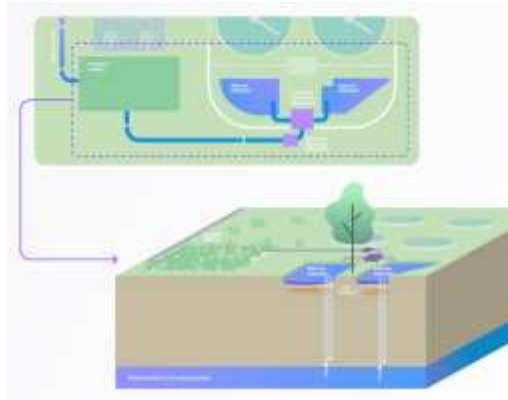
**Duration:** Oct 2021 - Apr 2027

**Financing:** LIFE Programme

**Partners:** 4 partners from Spain

**CETAQUA**  
ANDALUCÍA

**CETAQUA**  
BARCELONA



**Safe water reuse in Managed Aquifer Recharge: innovative solution combining physical, digital and governance aspects**

The main objective of LIFE Matrix is to demonstrate the technical, environmental, and health feasibility of MAR with reclaimed water to increase the availability of groundwater resources.

## Specific Objectives

- To validate a technical solution based on the combination of a reactive wetland + infiltration pond with a reactive permeable layer + monitoring network.
- To integrate all the resulting information into a Decision Support System for managing the risk associated with this type of recharge.
- To develop methodological guidelines that contribute to standardizing this recharge system under a legal or regulatory framework at the national and European levels.

## **MARSOLUT** Managed Aquifer Recharge Solutions Training Network (Mar 2019 – Feb 2023)

[www.marsolut-itn.eu](http://www.marsolut-itn.eu)

**Coordinator:** Christoph Schüth, Darmstadt Technical University, Germany. [schueth@geo.tu-darmstadt.de](mailto:schueth@geo.tu-darmstadt.de).

**Project website:** <https://www.marsolut-itn.eu>.

MARSoluT is a four-year Marie Skłodowska-Curie Actions (MSCA) Innovative Training Network (ITN) funded by the European Commission. MARSoluT intends to tackle specific technical challenges in the operation of Managed Aquifer Recharge (MAR) sites on a scientific basis, specifically: a) chemical, biological and hydraulic processes resulting in clogging and reduction of infiltration rates; b) hydrogeochemical processes affecting the water quality, with special focus on micropollutants; c) performance monitoring and modelling, including reactive transport models to predict the fate of pathogens and emerging pollutants, and d) implications of the processes mentioned above on the technical design of MAR projects in the frame of regional flow models and water management plans. MARSoluT intends, at the same time, to train a significant number (12) of Early Stage Researchers (ESRs) to become experts in the application of MAR in the frame of an Integrated Water Resources Management.

### **7 new doctorates on MAR**

The research leading to these results has received funding from the European Union's Horizon 2020 research and innovation programme under The Marie Skłodowska-Curie grant agreement no. 814066

## Inventory and characterization of ancestral systems of Water Sowing and Harvesting as NbS for climate change adaptation (WaSHa Project).



Financed by Biodiversity Foundation-Ministry of Ecological Transition and Spanish Climate Change Office

## Forestry bioeconomy and water management as a revulsive for the reactivation of the northeastern regions of Granada (REVIERTE Project).



Financed by Biodiversity Foundation-Ministry of Ecological Transition and EUROPEAN UNION -NEXTGENERATIONEU

## Infiltration channels as Nature-Based Solutions for Ecological Transition (INCHA Project)

Financed by the Ministry of Science and Innovation and European Union FEDER funds.



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## 8. Future post-ISMAR 12 Journal. Special issue. Call for action

### Special Issue resulted from ISMAR 11.



an Open Access Journal by MDPI

**IMPACT FACTOR 3.103** **CITESCORE 3.7 SCOPUS**

**Managed Aquifer Recharge: A key to Sustainability**

**Guest Editors**  
Dr. Enrique Fernández Escalante, Dr. Catalin Stefan, Dr. Christopher J. Brown, Dr. June Mirecki

**Deadline**  
18 September 2022

**Special Issue**  
Invitation to submit

[mdpi.com/si/98836](https://www.mdpi.com/si/98836)

#### Share This Special Issue



#### Special Issue Editors

**Dr. Enrique Fernández Escalante** | E-Mail | Website | ScProfiles  
Guest Editor  
Tragua R&D, UPM Luchana, IRY Consultant, Co-Chair IAH MAR Commission, Madrid, Spain  
**Interests:** MAR; hydrogeology; technical solutions for water management; design and construction criteria; Special Issues, Collections and Topics in MDPI journals



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**Interests:** groundwater geochemistry; geotechnical modeling; groundwater quality; water-rock interactions



#### Special Issue Information

[https://www.mdpi.com/journal/water/special\\_issues/Aquifer\\_Recharge](https://www.mdpi.com/journal/water/special_issues/Aquifer_Recharge)

## 8. Future post-ISMAR 12 Journal. Special issue. Call for action

Special Issue resulted from ISMAR 12 in preparation.  
The Call for Papers following soon...

### Editorial Board:



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Innovation (Pty) Ltd  
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**Enrique Fernandez Escalante**  
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## 9. New publications on MAR. Short mention/presentation by authors

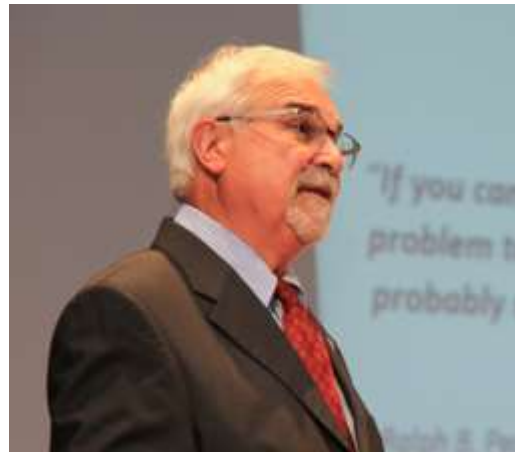
\*Most of them are in the IAH-MAR memories of activities and newsletters



## 10. *In memoriam*

### José Martins Carvalho

**Post-mortem recognition for the Professor Emérito do P.PORTO e Professor Jubilado pelo ISEP era uma referência para a comunidade técnica e científica**



# *In memoriam*

## Óscar Escolero

**Post-mortem recognition for the  
coordination of the book on  
MAR in Latin-America and  
implementation of Mexican  
demo-sites**



## 10. *In memoriam*

### Emilio Custodio

**Post-mortem recognition  
for the trajectory of the  
professor, one of the  
fathers of the  
hydrogeology in Spain,  
and former IAH President.**



# *In memoriam*

## Joel Carrillo

**Post-mortem recognition  
for the outstanding  
professor and researcher,  
who left an indelible  
mark on the field of  
hydrogeology in Mexico.**

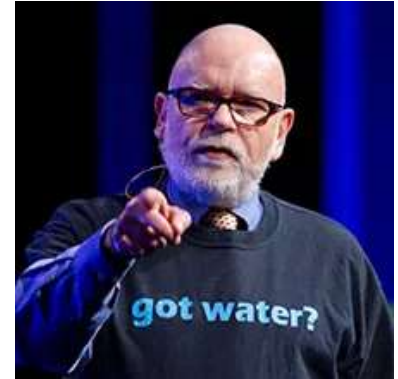




# *In memoriam*

## Michael Campana

**Michael's research interests included transboundary groundwater resources; integrated and sustainable water resources management; water, sanitation and hygiene (WaSH)**



**11. Suggestions for new activities**

**12. Call for volunteers to participate in existing and new activities**

**13. Information sharing on MAR**

**(not covered elsewhere)**



# International Association of Hydrogeologists

the World-wide Groundwater Organisation

## IAH Commission on Managing Aquifer Recharge



**QR codes for delegates:**  
download the programme  
download the abstracts

QR code for  
<https://recharge.iah.org>



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