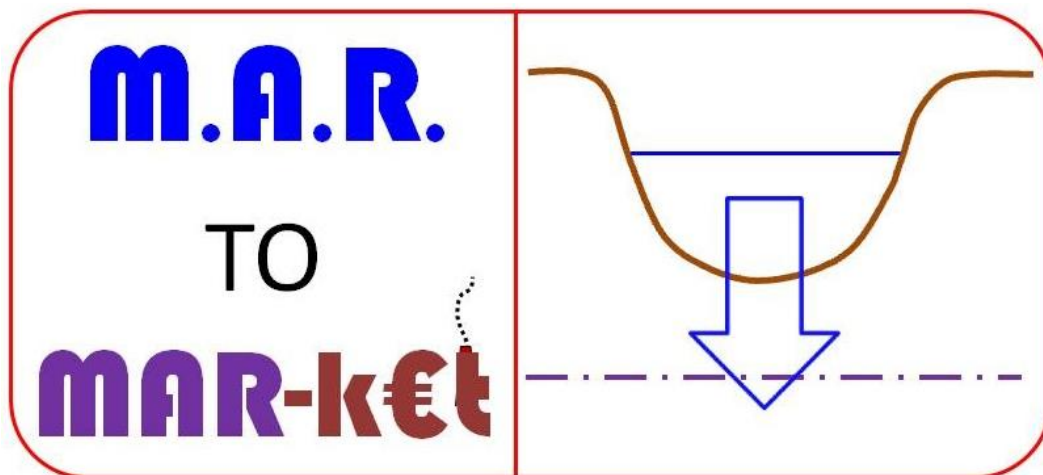




**International Association of Hydrogeologists
Commission on Managing Aquifer Recharge**

MAR to MAR-k€t Working Group

Memory of activities during 2019



The working group aims to identify and communicate effectively with a much wider range of water users and water managers to explain MAR and its benefits than are normally exposed to IAH. This involves engaging with: Agro-industry, Water supply industry, Waste water treatment plants (SAT), Desalination companies, Bottled water companies, Golf courses, Public administration, Balnearies & spas (sallus per aquam), Hotels and tourist facilities.

Main web-site:

www.dina-mar.es/

Mirror site connected to EIP Water Action Group 128 (MAR-solutions):

https://www.eip-water.eu/MAR_Solutions

**By Enrique Fernández Escalante
February 2020**

REPORT OF ACTIVITIES 2019

Collaboration at ISMAR 10 organization

From 2019 May 20th to 24th, the 10th International Symposium on Managed Aquifer Recharge (ISMAR 10) has taken place in Madrid, La N@ve. The conference was organized by Tragsa Group and the Spanish Geological Survey (IGME) under the auspices of the International Association of Hydrogeologists (IAH), UNESCO and ASCE, among others, under the title: “MAR to solve the global water crisis”.



The Symposium was attended by 320 delegates from 62 countries, and counted on 22 technical sessions, 123 oral presentations, 98 posters, 4 round tables, 3 keynote presentations, side events, six first day short courses, two workshops, three technical field trips, and a lot of knowledge recharged. Eight delegates were supported by UNESCO to attend the conference <https://bit.ly/3aDGfrE>. Detailed info is provided at <http://ismar10.net> under the title: “Affection and faith in MAR is noticeable and contagious”.

ISMAR 10. IAH-MAR COMMISSION PLENARY. 2019 May 22th. MAR to MAR-k€t – Enrique Fernández Escalante

This working group is the global channel for an Action Group under the European Innovation Partnership (EIP) named: “Strategies and actions to bring managed aquifer recharge technique to industry (MAR(solutions) to MARket)”.

Activities reported:

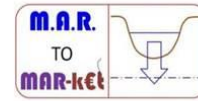
- Published all outputs of MARSOL project, accessible at: <http://www.marsol.eu/35-0-Results.html>
 - A linked-in network of 302 people <https://www.linkedin.com/groups/4690290>
 - More information at : www.dina-mar.es/ or <https://recharge.iah.org/mar-to-market>
- During ISMAR 10 was announced that this group will be disbanded during 2020, with continuity across the [European EIP Water Action Group MAR-solutions](#).

MtoM presentation slides:

5. MAR to MARKET – Enrique Fernández Escalante

widening applications with European Innovation Network (& other communications activities)
Commenced ISMAR8, Beijing 2013.

ACTIVITY AT LOS ARENALES AQUIFER, NORTH MEXICO (M.A. GONZÁLEZ AND C. NAVARRO) AND ICA PERU (R. NAVARRO)



- ✓ Multi-scale **Agro-industry** development, small-medium **at Los Arenales** (**Financial info available and** turnover of about **45 M€**) **to huge exporting agroindustries in Ica.**
- ✓ Stakeholders involved in MAR

**MORE THAN 50 INDUSTRIES INVOLVED AWARE
THEIR FUTURE IS LINKED TO THEIR WATER
AVAILABILITY**

- ✓ **23,8% irrigation water comes from MAR (Los Arenales)**
- ✓ MAR has positive effects on **job creation** and economic growth
- ✓ Improvements **in water irrigation** systems enhance the efficiency **FOR BETTER ECONOMIC RESULTS**
- ✓ MAR techniques provide savings in **energy consumption (12%)** enhancing the energy efficiency and **raising farmer's incomes**



MAR & agroindustry in Arenales aquifer (C y L, Spain)

Industrial scenario to date May 2019

1. **AGRO-INDUSTRY *******
2. **WATER SUPPLY INDUSTRY ***
3. **WASTE WATER TREATMENT PLANTS (SAT-MAR)****
4. ~~DESALINATIONS AGENTS~~
5. ~~BOTTLED COMPANIES~~
6. ~~GOLF COURSES~~
7. ~~PUBLIC ADMINISTRATION BRANCHES~~
8. ~~BALNEARIES & SPAS (SALLUS PER AQUAM)~~
9. ~~HOTELS AND TOURIST FACILITIES (MARKET UPTAKE)*~~

FUTURE ACTIVITY & FUTURE PLANS:

- TREAT DATA COLLECTED FOR SIX YEARS AND PRODUCE A PUBLICATION IN CLOSE RELATION TO MAR ECONOMY WG & EIP WATER AG
- MtoM IAH MAR COMM. WG



Presence at IAEA Course on MAR in Medellin, Colombia

Once again, the International Atomic Energy Agency (IAEA), as part of its training activities, has promoted a 40-hour Managed Aquifer Recharge course under the title: "Initiation and expansion of knowledge in integrated water management techniques, applied hydrogeology and artificial recharge of aquifers".

The course took place from June 17 to 21 at the University of Antioquia, Medellin, Colombia, and was attended by experts from the Colombian Administration (who collaborated in the slots) the University students, practitioners and an external consultant from IAH_MAR, under the direction of the Professor Teresa Betancur.

The course combined theoretical and practical knowledge with videos, books, exercises, debates, a field trip... and a lot of recharged knowledge. [More info \(Antioquia University\)](#)

MtoM member participated in SIAGRO, Ica, Peru

By 2019 August 20th to 22th took place in Ica (Peru) the International event "Hídrica: International water symposium" (SIAGRO). MAR to MAR-k&t advances in the area were exposed by IAH members. More info: <http://siagro.pe/blog4.html> More than 300 attendants.

MARSOLut PROJECT. First capacitation workshop. First capacitation workshop of the MARSOLut Project in Tragsa. Madrid, 2019 November 6th to 8th. More Info: <https://www.marsolut-itn.eu/news-events/network-events/workshop-1/>

MtoM Working Group was presented to all the attendants.

[http://www.dina-mar.es/post/2020/01/15/MARSOLut-ETN-Workshop-1-MAR-Techniques-\(Madrid-Spaiun-2019-Nov-6th-to-8th\).aspx](http://www.dina-mar.es/post/2020/01/15/MARSOLut-ETN-Workshop-1-MAR-Techniques-(Madrid-Spaiun-2019-Nov-6th-to-8th).aspx)

International Symposium on the use of nonconventional waters for achieving food security (FAO & Government of Spain) November 14-15, 2019. Venue: Casa de América, Madrid, Spain

More info at: <http://www.fao.org/land-water/events/ncwsymposium19/en/>

Related publications: <http://www.groundwatergovernance.org/resources/thematic-papers/en/>

IAH/ MtoM participation: <https://bit.ly/37aqYMX>

More than 200 attendants.

UNESCO book on MAR cases (to be released in 2020 World Water Week)

Mar to MAR-k€t has collaborated providing the case-study number 7 at El Carracillo district, Los Arenales Aquifer, Spain.

92 free downloadable books on MAR. DINA-MAR's MAR books repository upgrade

The repository for books on MAR has been enlarged to 92 units during 2019 and it keeps growing up. Contributions very welcome!

MAR books repository access: <https://bit.ly/2TERbz7>

46th IAH Congress, Málaga, Spain, 24-28th Sept 2019.

During the 46 Congress took place a new IAH-MAR Commission plenary (see section 1), September 26th. The agenda was: 1. Welcome and Introductions 2. Objectives of the Commission – Enrique Fdez. Escalante 3. Summary of outcomes from ISMAR 10 and imminent publications meeting 4. Progress reports and plans of Working Groups (PPTs). Possible proposals for a new W.G. 5. ISMAR 11 Announcement and invitation (video) 6. Information Sharing 1. New and on going Projects on MAR. 7. Suggestions for new activities. 8. Volunteers to participate in existing and new activities – anyone e.g. meeting at [EIP conference](#) in Zaragoza, Spain, 2019 December. 9. Information sharing on MAR (not covered elsewhere). 10. Q&A.

MAR to MAR-k€t was presented during the plenary



The minutes of the meeting can be downloaded directly from: <https://bit.ly/2sAkGqE>

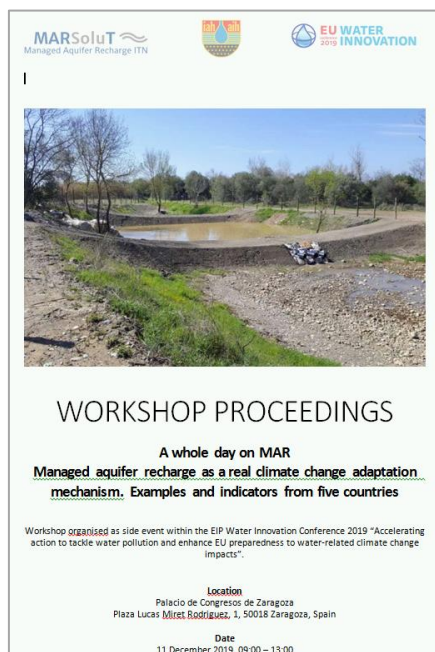
A whole day on MAR workshop. December 11th, 2019, Zaragoza, Spain.

Accelerating action to tackle water pollution and enhance EU preparedness to water-related climate change impacts #EUWIC (see section 1).

CC ISSUES		MAR SOLUTIONS		SITES		INDICATORS	
	Evaporation	↑	Underground water storage	Canal del Guadiana (CLM)		+48 hm ³ /year	
			Temperature decrease	P. de Mallorca (I. Baleares)		-1.5-6°C of air temperature	
	Evapotranspiration	↑	Soil humidity increase	Gomezerracín (CyL)		+15-20% soil moisture	
	Water demand	↑	Reclaimed water infiltration	Alcazarén (CyL)		+0.4 hm ³	
			Punctual infiltration	Canal Isabel II (Madrid)		+5 hm ³ /year	
	Water availability	↓	Self-purification	Santiuste (CyL)		+/-12-53% in water q parameters	
	Run-off	↓	Off-river storage	Santiuste (CyL)		+2.62 hm ³ /year out of Voltoya river	
	Wetlands	↓	Restoration	Santiuste (CyL)		-5% recharge vol. (Alkaline lake)	
	Hydro Electric Power	↓	Gravity flow water distribution	El Carracillo (CyL)		+40.7 km of canals and pipes	
			E savings / Lower emissions	El Carracillo (CyL)		-36% E costs (-10,780 kg CO ₂)	
			Infiltration of extreme flows	Losa del Obispo (Valencia)		+0.05 hm ³ in 14 hours	
	Floods	↑	Forested Watersheds	Neila (CyL)		-15-40% of diverted flood volume	
			Multiannual management	Santiuste (CyL)		Supply for 3 years with no rain	
	Droughts	↑					
	Saltwater intrusion	↑	Intrusion barrier wells	Llobregat (Cataluña)		30 years to regain water table	

Indicators for the success of MAR solutions for mitigations of climate change effects at different locations in Spain. <https://www.mdpi.com/2073-4441/11/9/1943>

The set of conclusions provided by the whole attendants during the final debate are embedded in the final report (mostly written by Catalin Stefan, IAH MAR commission co-chair): <https://bit.ly/2v1RnOI>



<https://bit.ly/2Tzyhtl>

MtoM. Some more related documents:

1-MARTOMARKET-proposal summary [1-MARTOMARKET-proposal.pdf \(1,77 mb\)](#)

2-MARTOMARKET-branches [2-MARTOMARKET-branches.pdf \(1,18 mb\)](#)

3-Dissemination, technology transfer and environmental education criteria applied to hydrogeology, and specially, to managed aquifer recharge: proposal for a strategy to introduce these techniques to the population, and some examples for Spain. *Environ Earth Sci* 70, 2009–2031 (2013).
<https://doi.org/10.1007/s12665-013-2711-6>

More information in the websites:

<https://www.marsolut-itn.eu>,

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

<https://www.ismar10.net/>;

https://www.eip-water.eu/MAR_Solutions

Summary and conclusions

1. Mediterranean climatic conditions require specific schemes for I.W.R.M., aggravated by climate change now
2. For prolonged drought periods, "Storage is key"
3. Prevention of damage from its origin
4. Divide et impera. Multiple retentions of water in the heading of the basins
5. Acting locally, but designing globally
6. Urgent & integrated actions (C.C. is a reality, not a threat)
7. What we didn't manage in the basin, We'll have to manage in the aquifer
8. Reuse will not be an option any longer, but a necessity
9. ISMAR 10 will help transforming any opportunity into an action.

