



Newsletters

Newsletter

1

January 2023

Highlights

- Draft strategy and plan for stakeholders' engagement and needs assessment missions in Spain, Portugal and Tunisia
- New participative research methodology for mapping the geospatial feasibility of managed aquifer recharge
- Contributions to two international conferences in Greece and Morocco
- Publication of eight deliverables, one peer-reviewed article, various press articles

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PRIMA
Partnership for Research and Innovation
in the Mediterranean Area



What is AGREEMAR?

AGREEMAR (*"Adaptive agreements on benefits sharing for managed aquifer recharge in the Mediterranean region"*) is a project funded under the PRIMA 2021 program for three years (Jun 2022 – May 2025).

Work plan

AGREEMAR includes six work packages that cover stakeholders' engagement, feasibility mapping, groundwater modelling, governance frameworks and agreements, and project management.

About the project

AGREEMAR will develop an adaptive governance framework integrated with a set of management tools that will assist water policy makers and water managers to reach sustainable water resources management.

Demo sites

AGREEMAR approach will be validated at four case studies from Cyprus, Portugal, Spain and Tunisia, which will enable its integration into a larger context in the Mediterranean basin and worldwide.

Objectives

AGREEMAR aims to optimize the hydrological balance by developing governance models, management strategies, technical specifications and simulation tools.

Partners

AGREEMAR includes universities, public companies and national research centres from Germany, Spain, Cyprus, Portugal and Tunisia, together with stakeholders from four Mediterranean regions.



Discover more...

Events

Attending the national meeting on managed recharge of aquifers in Spain, 24-25 May 2022

On 24-25 May 2022, the Spanish partner of the University of Valencia (UPV) attended a national meeting on managed aquifer recharge (MAR), where numerous members of river basin agencies, private companies and different scientific institutions exchanged opinions and experiences about the technical, legal, social and economic challenges related to managed aquifer recharge of aquifers and joint use of surface and groundwater resources.



National meeting on managed aquifer recharge in Spain, 24-25 May 2022 (photo: Rafael Bergillos)

One of the main outcomes of the meeting was the selection of the most suitable river basin districts to perform MAR interventions. The [Júcar Water District](#), one of the case studies of the AGREEMAR project, was identified as one of the two best basins in Spain for potential MAR activities.

The meeting was an excellent opportunity for networking and introducing the AGREEMAR project to many attendees, who showed great interest in the project. Finally, it was agreed to prepare during the next months a document of conclusions of the meeting that summarizes the current state of MAR in Spain.

Events

First meeting between LNEC and general and regional stakeholders in Portugal, 27 June 2022

On 27 June 2022, the Portuguese partner Laboratório Nacional de Engenharia Civil (LNEC) had its first meeting with one general stakeholder (ARH-Alentejo: River Basin District Administration of Alentejo) and two regional stakeholders of the region (EDIA: Empresa de Desenvolvimento e Infra-estruturas do Alqueva and AgdA: Águas Públicas do Alentejo (Public Water Works of Alentejo)).



*Meeting between LNEC and representatives of general and regional stakeholders in Portugal on 27 June 2022
(photo: Manuel M. Oliveira)*

The meeting took place in Beja, in EDIA's headquarters and was used to introduce the project to a group of relevant stakeholders and to identify local stakeholders for the project implementation. During the meeting, the project objectives were presented, resulting in a great interest from all involved parts. The talks concentrated on discussing the scarcity problem in the region and the benefits of MAR as possible solution. The main outcome of the meeting was the identification of two main local MAR sites (one

being a potential site to be built) with two different recharge water sources (secondary treated wastewater and flash flood water) and use two different MAR techniques (infiltration basins and surface/underground dam). These local sites are likely to be validation areas (numerically modelled), while the whole Alentejo region will be considered for MAR feasibility mapping. The participant stakeholders showed great interest in AGREEMAR outputs.

Events

Project kick-off workshop in Dresden, 5-8 September 2022

Between 5-8 September 2022, representatives from all six partners of the AGREEMAR project met in Dresden for their first official consultations in presence. The meeting was organised by the project coordinator at the main campus of the Technische Universität Dresden, Germany.



Group photo of AGREEMAR project consortium and the representative of German Funding Agency PTKA during the kick-off meeting in Dresden, 5-8 September 2022 (photo: INOWAS)

The main scope of the kick-off meeting was to create a common understanding of the project objectives and aims, to foster cohesion between the project work packages and to promote the development of a detailed work plan. We achieved:

- clear understanding of the purpose, structure and outputs resulting from each work package;
- identification of adequate research methodologies to meet the project objectives;
- validation and adjustment of the overall project timeline, especially regarding joint activities at demo sites and stakeholders' engagement;
- strengthening the collaboration between partners and development of the AGREEMAR team spirit.

In order to achieve these goals, the activities of the kick-off meeting were organized in different formats: bi-lateral meetings between work package partners, presentation of project work plan in plenary session, detailed research approach introduced by work package leaders and interactive workshops, and a field trip aimed at team building and follow up activities.

Overall, the meeting was very important for the successful start of the project. The team engaged in detailed discussions on the objectives, case study sites and methodologies which will be applied during the next three years.

Download the report of the meeting:

<https://bit.ly/3GQOMs4>.

Events

International Conference on “Integrated Groundwater Management of Mediterranean Coastal Aquifers”, Chania, Greece, 27-30 September 2022

Our project partner Dr. Constantinos Panagiotou from the ERATOSTHENES Centre of Excellence in Cyprus attended remotely the International Conference on “Integrated Groundwater Management of Mediterranean Coastal Aquifers”, from 27 to 30 September 2022.



The International Conference on Integrated Groundwater Management of Mediterranean Coastal Aquifers took place between 27-30 September 2022 in Chania, Greece (photo: pixabay.com)

The conference was jointly organised by two other PRIMA projects, **Sustain-COAST** (<https://www.sustain-coast.tuc.gr>) and **MEDSAL** (<https://medsal.eu>) and took place in Chania, on the Crete island of Greece. The general scope and the research approach of AGREEMAR project was successfully presented through an oral presentation

with the title: “Identification of suitable regions for intentional recharge of aquifers through multi-criteria decision analysis and stakeholders’ involvement”.

Download the presentation:
<https://bit.ly/3kotZEK>.

Events

Needs assessment workshop and meetings with stakeholders from the Júcar Water District in Spain, 3 November 2022

On 3 November 2022, the team from the University of Valencia (UPV) of the AGREEMAR project organised a workshop with the main stakeholders of the Spanish demo region.



Group photo of participants to the AGREEMAR stakeholders' workshop in Valencia, 3 November 2022 (photo: UPV)

On 3 November 2022, the UPV team of the AGREEMAR project organised a workshop with the main stakeholders of the Spanish demo region to discuss the possibilities and limitations of managed aquifer recharge (and conjunctive use of surface water, groundwater and non-conventional resources) in the Júcar Water District.

During the following days, the colleagues from adelphi research gGmbH conducted bilateral meetings with different stakeholders to learn more about the needs, experiences and opinions on MAR in the two local demo sites (Belcaire pond and Algar reservoir). In addition, an online questionnaire was sent to all attendees to ponder different criteria for MAR feasibility mapping.

Read more: <https://bit.ly/3kn20oV>.

Events

Stakeholder meetings to assess their needs at the project demo region in Portugal, 18-21 November 2022

Between 18-21 November 2022, AGREEMAR project partners LNEC and adelphi held bilateral meetings with key stakeholders of the project demo sites in Portugal including the regional office of the Portuguese Environmental Agency in Alentejo (APA), regional water utilities (EDIA and AgdA-AdP) and a farmer union (the Confederation of Portuguese Farmers, CAP).



Meeting between the AGREEMAR team and the representatives of the Confederation of Portuguese Farmers (photo: LNEC)

After the project was introduced in a stakeholder workshop in June, the project partners discussed with the stakeholders their role and engagement during the project and beyond, as well as how to best adapt the project objectives to their needs and local circumstances. A main component of the meetings was a participatory exercise in which stakeholders shared their views and rates of criteria for MAR planning.

The results of the meetings have once again shown the importance of engaging stakeholders from the

beginning of the project to ensure the development of tailor-made project results and to promote their sustainable use beyond project end. In addition, the personal interaction with the stakeholders generated trust and ownership among them and encouraged for upcoming cooperation. The results will further inform the development of a stakeholder engagement strategy and plan that will be published in January 2023.

Read more: <https://bit.ly/3RrogdJ>.

Events

Second Annual Meeting of the Mediterranean Geosciences Union (MedGU-22) in Marrakech, Morocco, 27-30 November 2022

The AGREEMAR project was represented at the 2nd Annual Meeting of the Mediterranean Geosciences Union by Dr. Constantinos Panagiotou with an ePoster entitled: “Multi-sectorial approach for mapping the feasibility of managed aquifer recharge in the Mediterranean region”.



Dr. Constantinos Panagiotou from the ERATOSTHENES Centre of Excellence in Cyprus attended the 2nd Annual Meeting of the Mediterranean Geosciences Union in Marrakesh, Morocco (photo: Constantinos Panagiotou)

Although it is not yet officially inaugurated, the Mediterranean Geosciences Union is already very visible in the Mediterranean region by bringing together experts from Earth, planetary and space sciences and related studies.

During its second Annual Meeting in November 2022, the conference included 18 thematic tracks organised in “hybrid” format, allowing the participants to attend online and in-person. For AGREEMAR, the most relevant was Track 10 dedicated to hydrology, hydrogeology and hydrochemistry. The topics covered were very diverse, from hydro-meteorological

characterisation, floods management, saltwater intrusion in coastal aquifers, water quality characterisation using stable isotopes, groundwater mapping, hydrological modelling and artificial intelligence for decision support systems in water resources management.

The AGREEMAR poster introduced the general participatory research approach of the project, highlighting the role of stakeholders’ engagement in mapping the feasibility of managed aquifer recharge in the Mediterranean region.

Download the poster: <https://bit.ly/3wdjt5R>.

Events

Assessing the stakeholders' needs and the requirements of the demo sites in Tunisia, 12-16 December 2022

After having successfully conducted needs assessment missions to Spain and Portugal in November, Tunisia was next on the list from 12-16 December 2022. The project team, consisting of INAT, adelphi and TU Dresden met with general (national), regional as well as local stakeholders and visited the demo sites in the Chiba basin on the Cap Bon Peninsula.



Besides various bi-lateral meetings with representative stakeholders, the project team visited the local demo sites in the Cap Bon peninsula: the Korba MAR site and the Chiba dam (photo: Ronjon Heim)

The meetings were organized by *Institut National Agronomique de Tunisie* (INAT) with the most important stakeholders for all three feasibility thematics:

- for intrinsic MAR site suitability: the Water Research and Technologies Centre (CERTe) and the General Directorate for Water Resources (DGRE)
- for water availability assessment: the National Environmental Agency (ANPE), the Directorate of Environment and Life Quality at the Ministry of Environment Ministry of Environment and the Regional Department for Agricultural Development in Nabeul (CRDA)
- for water demand assessment: the Office of Planning and Hydraulic Balances at the Ministry of Agriculture, Hydraulic Resources and Fisheries (BPEH), the Tunisian Union of Agriculture and Fisheries (UTAP) and the local farmers association in Chiba (GDA).

The stakeholders informed the project team on the Tunisian approach for water resource management in general and the specific role and experience with MAR for sustainably managing groundwater resources. Site assessment of the existing MAR site in Korba and potential MAR system at the Chiba dam showed up the potential for grounding the project results.

Read more: <https://bit.ly/3GSf799>.

Research

Participative research methodology for mapping the geospatial feasibility of managed aquifer recharge

The quality and robustness of MAR feasibility maps are highly dependent on the parameters chosen for the multi-criteria decision analysis process. The compilation of these maps is very much biased by the expertise of the author and data availability. The AGREEMAR project aims to contribute to the improvement of the methodology for geo-spatial feasibility mapping by developing a comprehensive database with feasibility criteria that include a multitude of biophysical, technological, social, economic, environmental, hydrological, institutional and financial parameters.

Read more: <https://agreemar.inowas.com/feasibility-criteria/>.

Step 1. Compilation of a comprehensive database for MAR feasibility criteria

A primary set of feasibility criteria has been collected by reviewing journal articles and technical reports on site feasibility mapping. The draft collection was then discussed within the consortium in several iterative sessions and its content was classified using a four-level hierarchical structure: thematic > topic > category > criteria. Short descriptions are provided for each criterion.

Download database: <https://bit.ly/3ZMG4Ut>.

Step 2. Participative methodology for criteria weighting in MAR feasibility mapping

The method addresses limitations of current mapping practices and aims to contribute to reducing the bias associated with them. The novelty is represented by positioning MAR in the framework of integrated water resources management (IWRM), by pondering several thematic clusters, increasing the importance of problem definition and, most importantly, integrating a participative process with active stakeholders' engagement.

Read more: <https://bit.ly/3iRR7eq>.

Step 3. Improving the preliminary database with contributions from scientific community

To validate and improve the existing draft developed by the AGREEMAR consortium, we rely on contributions from the wider MAR community. An online survey was used to introduce the methodology and collect feedback on the proposed approach, especially regarding the set of criteria proposed. The survey is available in English, French, Portuguese and Spanish and will remain online during the entire duration of the project.

Online survey:

- English: <https://bit.ly/3wsSdjX>
- French: <https://bit.ly/3RhjvU7>
- Portuguese: <https://bit.ly/3jgNqiu>
- Spanish: <https://bit.ly/3wFXpAX>

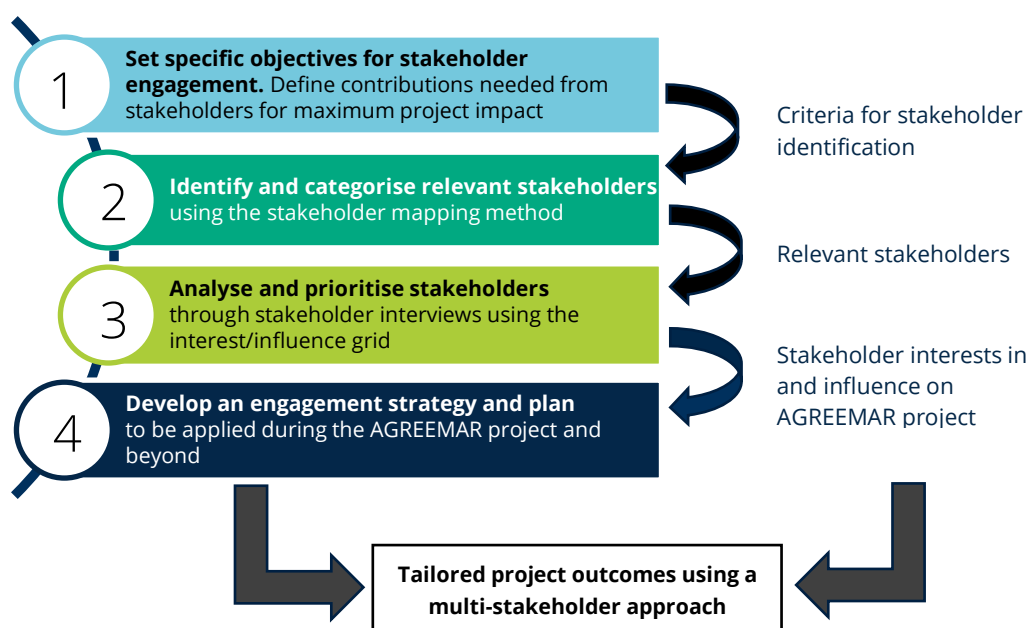
Step 4. Method validation and improvements through interviews with MAR experts

To validate the research methodology and further improve the structure and content of criteria database, a number of interviews were conducted with experts selected from MAR scientific community. The outcomes of the interviews contributed to the validation and extension of the current lists of criteria, the exploration of options to include additional dimensions and further development of the general methodological approach and scope.

Research

Four-step approach for active stakeholders' engagement in project activities and beyond

In order to develop an appropriate stakeholder engagement strategy and plan at the four project demo sites, a four-step approach was developed by adelphi and proposed to be carried out together with the demo-site coordinators and project-task leaders. This approach will enable the selection of relevant stakeholders for tailored engagement formats. The aim is to define who should and can be involved, how, when and on which topic to best-achieve the project objectives and ensure the sustainable use of the project outcomes.



Step 1. Objectives for stakeholders' engagement

During the first phase, the AGREEMAR consortium defined in detail what contributions are needed from stakeholders and what outcomes are expected through stakeholder engagement. The list includes the identification of specific project tasks where stakeholder engagement is relevant (see also Table 2 from project deliverable D6.2: <https://bit.ly/3kHKLPP>). For each task, the desired outcomes with contributions expected from stakeholders were correlated for each project activity, together with the partners responsible for implementation, the target audience and stakeholder groups, the level of engagement (informing, involving, consulting, collaborating), as well as suggestions for the format of the engagement (i.e., direct dialogues, interviews, online surveys, workshops, etc.). A list of key performance indicators (KPI) will be updated each six months, with short summaries published in future newsletters.

Step 2. Identification and categorisation of relevant stakeholders

Based on the results of Step 1, criteria were established to screen and categorise the stakeholder landscape for relevant stakeholders for the project. Three layers were used for stakeholder mapping:

- **thematic interest/influence:** intrinsic site suitability, water demand and water availability;
- **spheres of influence:** general (national level), regional (basin-level) and local (MAR system);
- **societal sectors:** policy/decision maker, practitioners/civil, science.



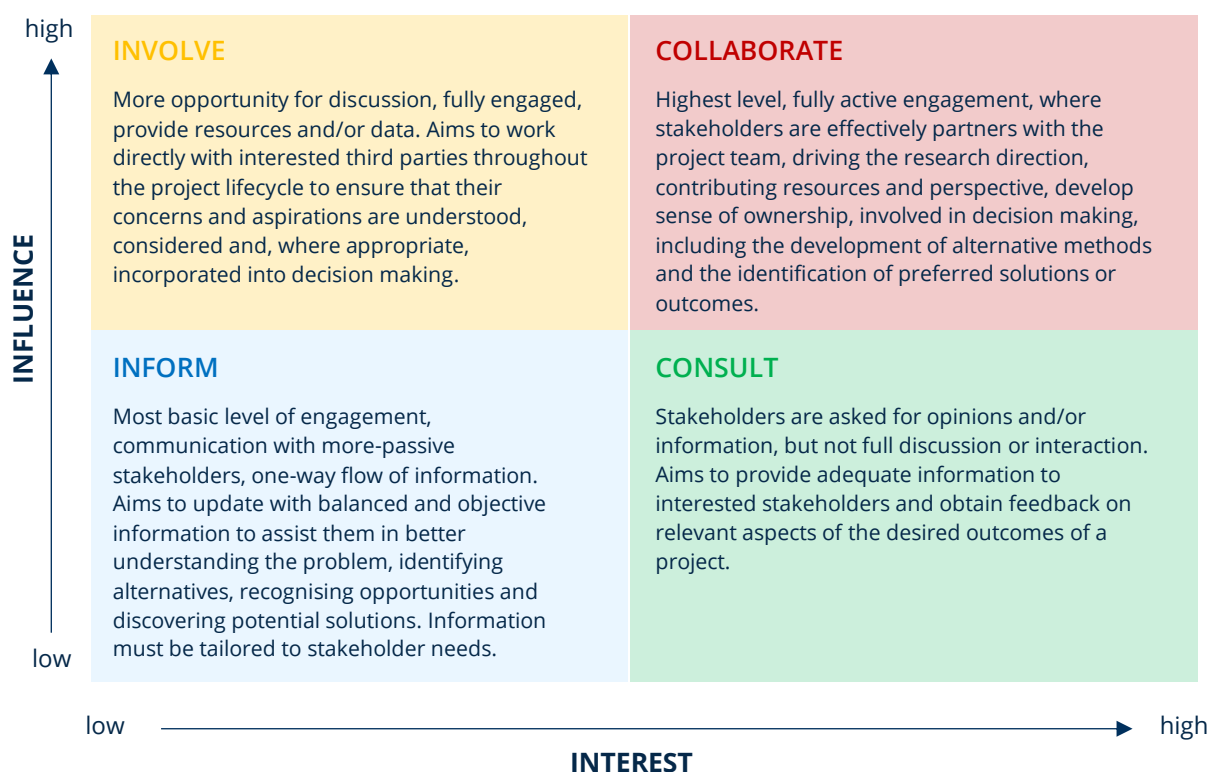
Download report: <https://bit.ly/3IUVLD4>.

Relevant stakeholders are considered those who have an influence on, interest in, or are affected by the specific expected project outcomes. In Step 3, identified stakeholders from each demo region are analysed in more detail and divided into four groups according to the level of their influence on and interest in the project outcomes: involve, inform, consult and collaborate (see diagram below for more details).

For this, missions to three out of four project demo sites (in Spain, Portugal and Tunisia, with Cyprus planned for March 2023) were conducted consisting of bilateral meetings in interview form with identified key stakeholders. In addition to the aim of building a better understanding of the stakeholders, the first stakeholder interactions introducing the project also helped to assess the specific needs of the stakeholders in relation to the project outcomes.

The general concept of these missions can be found in Annex 1 of deliverable D1.1 while a summary of the key findings of each mission can be found in the section Events of this newsletter and on the project website at the links below:

- Spain: <https://bit.ly/3XXZljW>
- Portugal: <https://bit.ly/3Ddvjhj>
- Tunisia: <https://bit.ly/3R7ftNK>



Template on four levels of engagement used for the analysis and prioritisation of selected stakeholders from all AGREEMAR demo regions

(Adapted from: Durham, E.; Baker H.; Smith, M.; Moore, E.; Morgan, V. (2014): The BiodivERSA Stakeholder Engagement Handbook. BiodivERSA. Paris.)

Step 4. Development of an engagement strategy and plan

Based on the defined engagement level, capacities and willingness of the stakeholder for engagement, as well as available project resources, appropriate means and formats of engagement were defined, including: project website, social media, newsletters, brochures and leaflets, videos, training courses, capacity development activities, conferences, symposia, dialogues, online surveys, consultations and interviews, local civil assemblies, roundtable discussions, project steering committees etc.

A first draft of the stakeholders' engagement strategy and plan of the AGREEMAR project is available in deliverable D1.1. **Download report:** <https://bit.ly/3wrjjbl>.

Publications

Journal articles

- Sahuquillo, A., Cassiraga, E., Gómez-Hernández, J.J., Andreu, J., Pulido-Velazquez, M., Pulido-Velazquez, D., Álvarez-Villa, O.D., Estrela, T. (2022) **Management Alternatives of Aquifer Storage, Distribution, and Simulation in Conjunctive Use**. *Water*, 14(15), 2332. <https://doi.org/10.3390/w14152332>

Conference contributions

- Chkirbene, A., Conrad, A., Leitão, T.A., Loulli, E., Martins, T.N., Oliveira, M.M., Panagiotou, C.F., Stefan, C. (2022) **Multi-sectorial approach for mapping the feasibility of managed aquifer recharge in the Mediterranean region**. e-Poster presentation at the 2nd Annual Meeting of the Mediterranean Geosciences Union (MedGU2022), Marrakesh, Morocco, 27-30 November 2022. <https://bit.ly/3wdjt5R>
- Panagiotou, C.F., Chkirbane, A., Stefan, C., Loulli, E., Conrad, A. (2022) **Identification of suitable regions for intentional recharge of aquifers through multi-criteria decision analysis and stakeholders' involvement**. Presentation at the Common International Conference on "Integrated Groundwater Management of Mediterranean Coastal Aquifers", Chania, Greece, 27-30 September 2022. <https://bit.ly/3kotZEK>

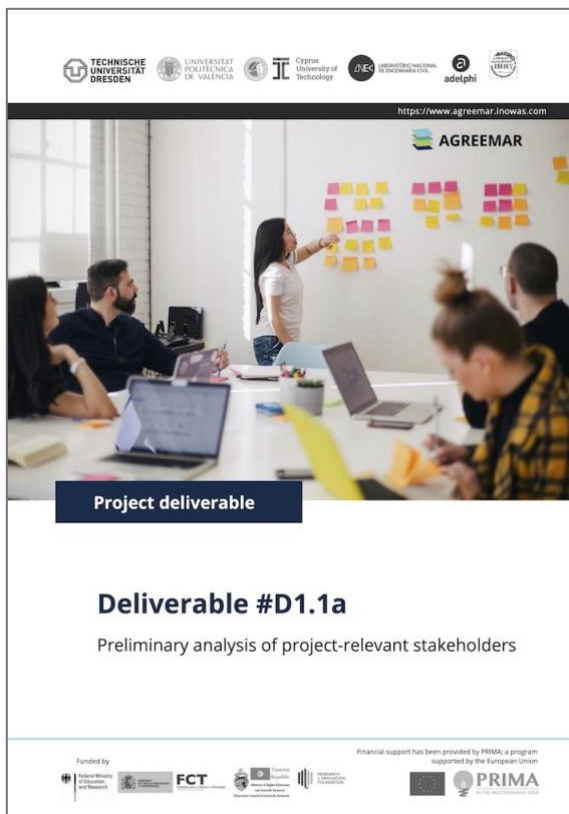
Press articles

- Projeto PRIMA AgreeMAR: Questionário sobre Gestão da Recarga de Aquíferos (MAR). Newsletter n. 207. *APRH*, 25.11.2022. <https://bit.ly/3XM0pbe>
- Projeto agreeMAR visita a ETAR da Comporta. *Agda - Águas Públicas do Alentejo*, 22.11.2022. <https://bit.ly/3j8WaqQ>
- Arranca el proyecto europeo AgreeMAR sobre recarga gestionada de acuíferos. *TECNOAQUA*, 17.10.2022. <https://bit.ly/3R6iXAn>
- PRIMA - Kooperationsprojekt AGREEMAR: Anpassungsfähige Vereinbarungen über die gemeinschaftlichen Vorteile von künstlicher Grundwasseranreicherung im Mittelmeerraum, Teilprojekt 1. *Kooperation International*. <https://bit.ly/3j7qfHn>
- IIAMA participa en un proyecto para impulsar la recarga gestionada de acuíferos. *Revista Técnica de Medio Ambiente (RETEMA)*, 22.09.2022. <https://bit.ly/3HdAZMD>
- El IIAMA participa en un proyecto para impulsar la recarga gestionada de acuíferos. *iAqua*, 28.09.2022. <https://bit.ly/3XrPJyi>
- Κέντρο Αριστείας ΕΡΑΤΟΣΘΕΝΗΣ: Χρηματοδότηση ερευνητικού έργου AGREEMAR - PRIMA. *ELEMESOS*, 16.12.2021. <https://bit.ly/3HyxYHV>
- ΕΡΑΤΟΣΘΕΝΗΣ: Χρηματοδότηση ερευνητικού έργου AGREEMAR - PRIMA. *PaideaNews*, 15.12.2021. <https://bit.ly/40hNCyX>

Reports

Project deliverables

Since the project start in June 2022, the consortium published seven reports representing deliverables resulting from activities conducted in different work packages.



D1.1a. Preliminary analysis of project-relevant stakeholders

Deliverable D1.1a identifies for each project demo site the key stakeholders that are significant for the joint development of an overall governance agenda for MAR and its implementation. Initial assumptions are made about the needs and competences in relation to MAR.

Download report: <https://bit.ly/3IUULD4>.



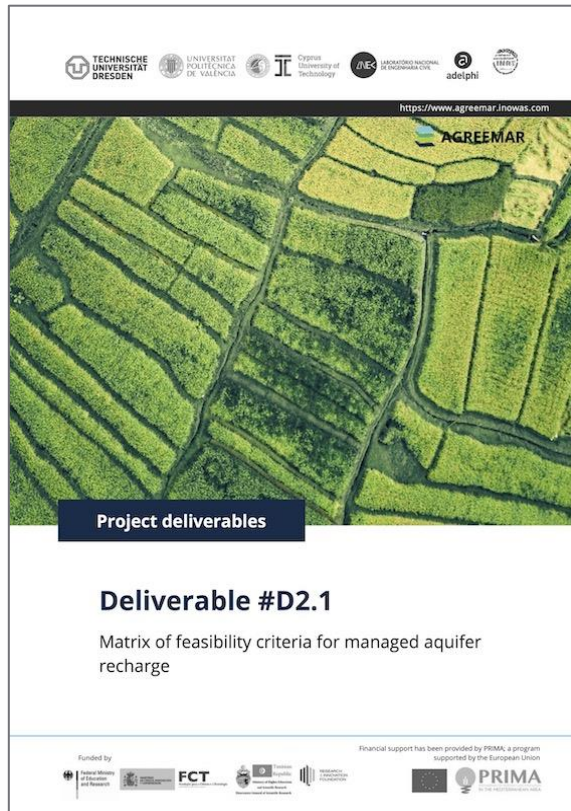
D1.1. Stakeholder engagement strategy and plan

This deliverable serves as a guide for decision-making on various aspects of communication, awareness raising and stakeholder engagement during the AGREEMAR project and beyond.

Download report: <https://bit.ly/3DIwwQW>.

Reports

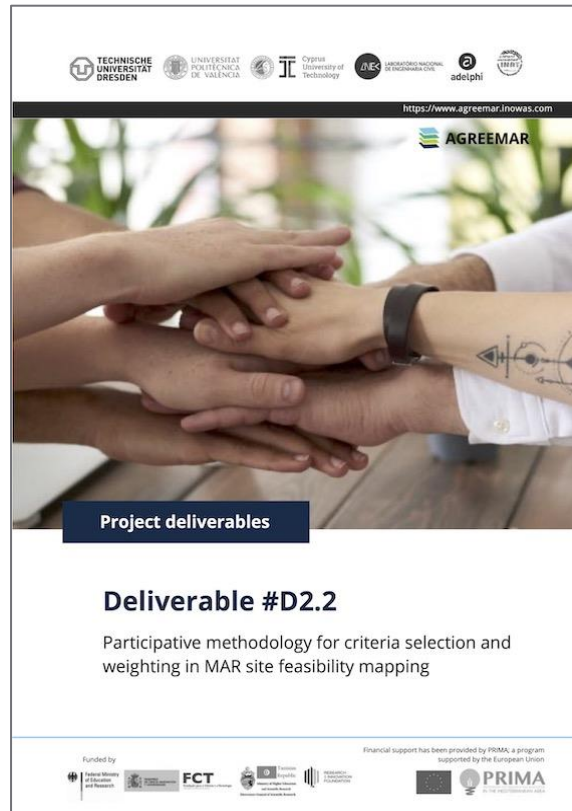
Project deliverables



D2.1. Matrix of feasibility criteria for managed aquifer recharge

Deliverable D2.1 is dedicated to the compilation of an extensive database containing hydrogeological, geochemical, biophysical, environmental, social, economic feasibility criteria for managed aquifer recharge. The current version of the database can be downloaded from the project website.

Download report: <https://bit.ly/3QSKISf>.



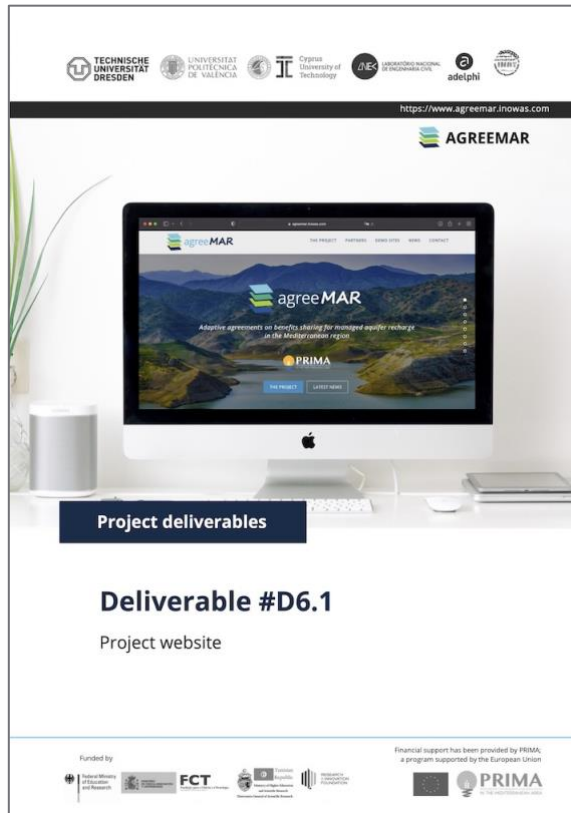
D2.2. Participative methodology for criteria selection and weighting in MAR feasibility mapping

Deliverable D2.2 is dedicated to the development of a new methodological approach for mapping the geospatial feasibility of managed aquifer recharge applications. The report focuses on the selection and weighting of feasibility criteria and their integration into a GIS-based multi-criteria decision analysis.

Download report: <https://bit.ly/3iRR7eq>.

Reports

Project deliverables



Project deliverables

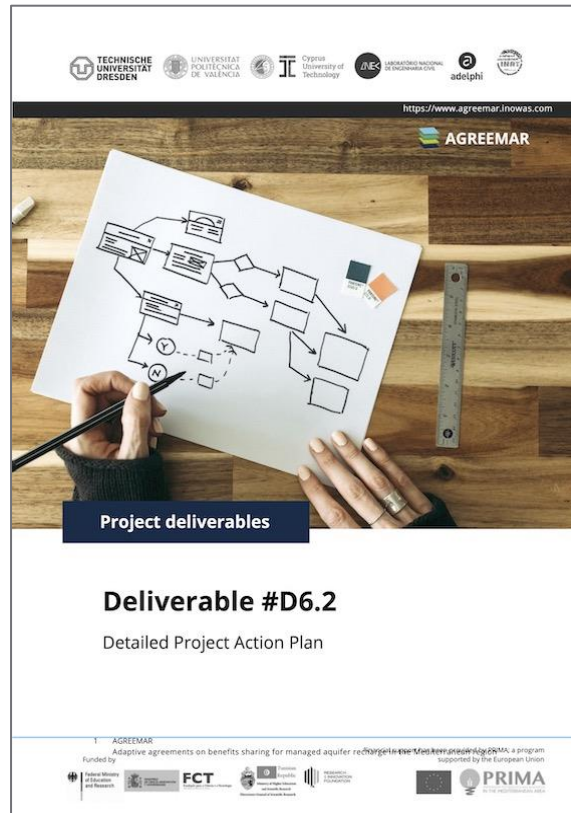
Deliverable #D6.1

Project website

D6.1 Project website

This report describes the website of the AGREEMAR project. The website was developed by the Research Group INOWAS at Technische Universität Dresden and launched in July 2022. The website serves as central tool for dissemination of project results and external communication. The URL is: <https://www.agreemar.inowas.com>.

Download report: <https://bit.ly/3QYUYTx>.



Project deliverables

Deliverable #D6.2

Detailed Project Action Plan

D6.2 Detailed Project Action Plan

This report describes the detailed Project Action Plan (PAP) of the AGREEMAR project. It includes the detailed planning of project tasks including sub-tasks, responsible institutions, the table of deliverables and the GANTT chart.

Download report: <https://bit.ly/3kjptXY>.

Reports

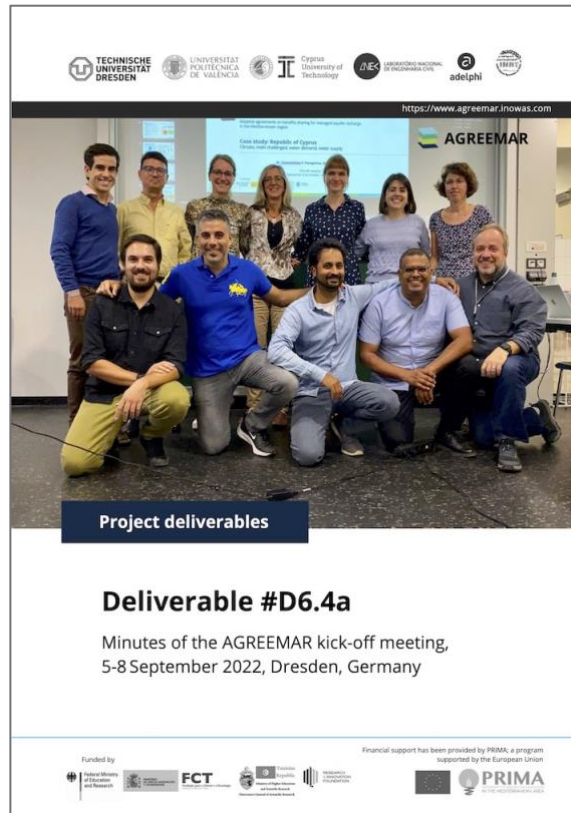
Project deliverables



D6.3 Data Management Plan (DMP)

This document contains the Data Management Plan (DMP) of the AGREEMAR project. The DMP describes the practices adopted for data management according to general guidelines set by the European Commission and in compliance with the Cooperation Agreement.

Download report: <https://bit.ly/3YrVU5w>.



D6.4a Minutes of the AGREEMAR kick-off meeting, 5-8 September 2022, Dresden, Germany

This report summarizes the AGREEMAR kick-off meeting that took place between 5-8 September 2022 at the main Campus of Technische Universität Dresden, Germany.

Download report: <https://bit.ly/3wdHQ3d>.



Acknowledgement

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- Tunisia: Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (MESRSI), grant no. PRIMA/TN/21/07.

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