

# Action Groups

## Search Terms

## Filter by Topic

- ☐ Natural Waters
- ☐ Sustainability
- ☐ Water Policy and Administration
- ☐ Water Services and Water Use
- ☐ Water Technology

## Filter by Priority Area

- ☐ Water reuse and recycling
- ☐ Water and wastewater treatment, including recovery of resources
- ☐ Water-energy nexus
- ☐ Flood and drought risk management
- ☐ Ecosystem services
- ☐ Water governance
- ☐ Decision support systems and monitoring
- ☐ Financing for innovation
- ☐ Smart technologies
- ☐ All or several ...



Here, the Marketplace presents the current activities of the 29 EIP Water Action Groups (AGs). To receive up-to-date information or join these groups, please browse the sections below.

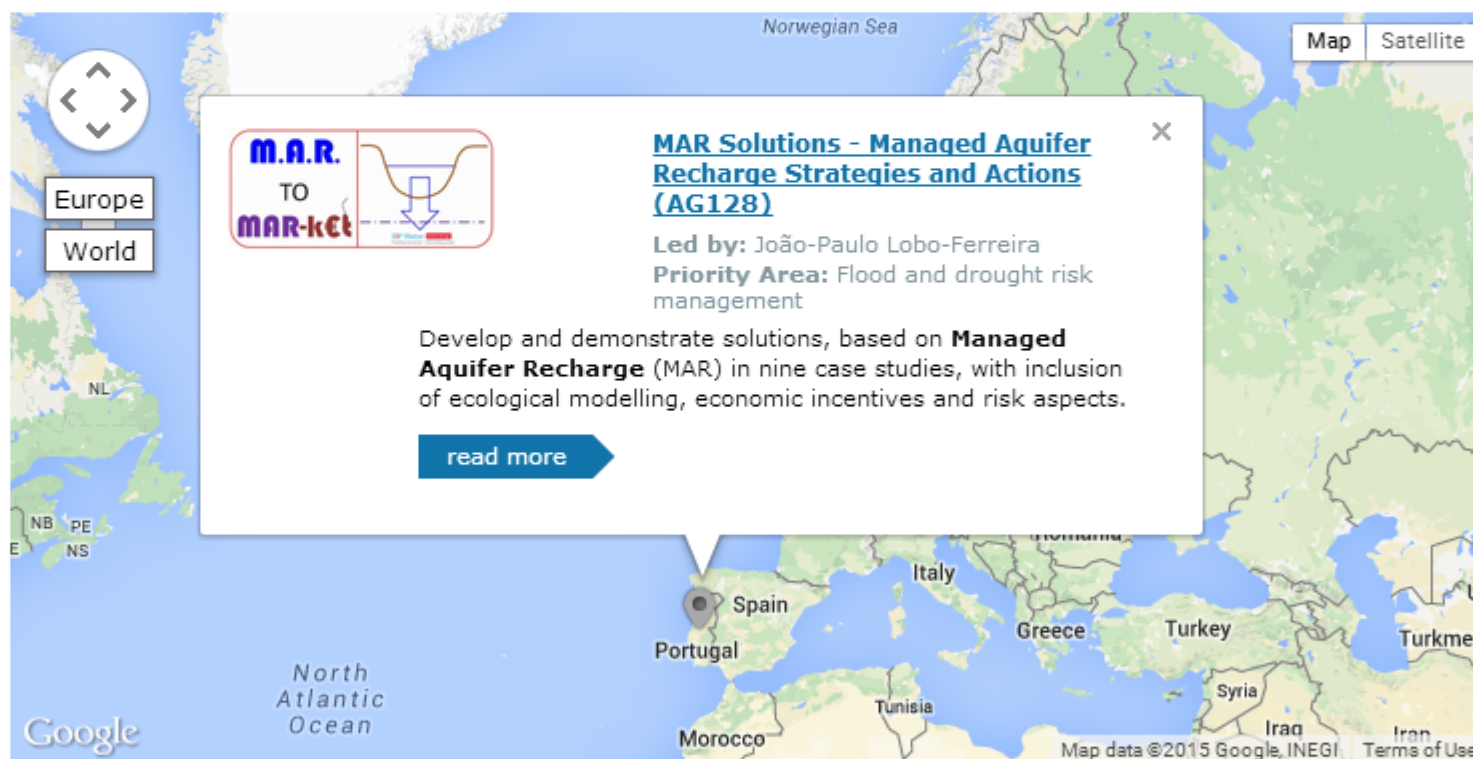
EIP Water's voluntary, multi-stakeholder Action Groups are at...

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## Action Groups

list view

map view



Type

- ☒ Event
- ☒ Organisation
- ☒ Products and Services
- ☒ Project
- ☒ User
- ☒ Weblog
- ☒ Working Group

Filter by Topic

- ☒ Natural Waters
  - ☐ Coastal Waters
  - ☐ Groundwater
  - ☐ Lakes
  - ☐ Marine Waters
  - ☐ Rain and Precipitation
  - ☐ Rivers
  - ☐ Scarcity, Floods, Droughts (Extreme Events)
  - ☐ Transitional Waters
  - ☐ Wetlands
- ☒ Sustainability
- ☒ Water Policy and Administration
- ☒ Water Services and Water Use
- ☒ Water Technology

Filter by Country

- Afrika
- Antarctica
- Asia
- Europe
  - ☐ Albania
  - ☐ Andorra

Weblog

## MARtoMARKET open meeting during the EIP Water conference in Barcelona

Country: Portugal

Objective:

Demonstrating the feasibility and efficiency of MAR in combating future water scarcity threats in the Circum-Mediterranean area.

read more

Weblog

## M. Salvetti (WaterReg) @ International Water Regulators' Forum

Country: Portugal

Maria Salvetti (Coordinator of the WaterReg project within the Water Area at the...

read more

### M. Salvetti (WaterReg) @ International Water Regulators' Forum

Maria Salvetti (Coordinator of the WaterReg project within the Water Area at the Florence School of Regulation) has been invited to moderate a session on "Progressive models for economic regulation" at the International Water Regulators' Forum on 22 September 2014 in Lisbon, Portugal.

The International Water Regulators' Forum is jointly organised by the International Water Association (IWA) and the Portuguese Water and Waste Services Regulation Authority (ERSAR) and it brings together regulators to discuss the role of regulation, its current status and future trends on water services provision, as well as the different interactions between regulatory bodies, with the aim of contributing to the dissemination of good practices and allowing for a harmonization of regulatory practices.

The International Water Regulators' Forum is part of the IWA World Water Congress & Exhibition 2014, which will be held on 21-26 September in Lisbon, Portugal.



Weblog

## Managed Aquifer Recharge - Knowledge basis III

Country: Portugal

TRAGSA contributes a new publication on...

read more

Weblog

## Managed Aquifer Recharge - Knowledge basis II

Country: Portugal

Two GABARDINE (Groundwater artificial recharge based on alternative sources of water) project reports are available on Portuguese and Spanish (Catalonia) Case-studies.

read more

Weblog

## Managed Aquifer Recharge Sites - Knowledge Basis I

Country: Portugal

Under the related DEMEAU FP7 project an analysis of European MAR sites has been performed and a corresponding report has been published. You may access this publication, prepared by the authors S...

read more

# ARTIFICIAL RECHARGE ENHANCEMENT TO PREVENT SEAWATER INTRUSION, KORBA (TUNISIA)

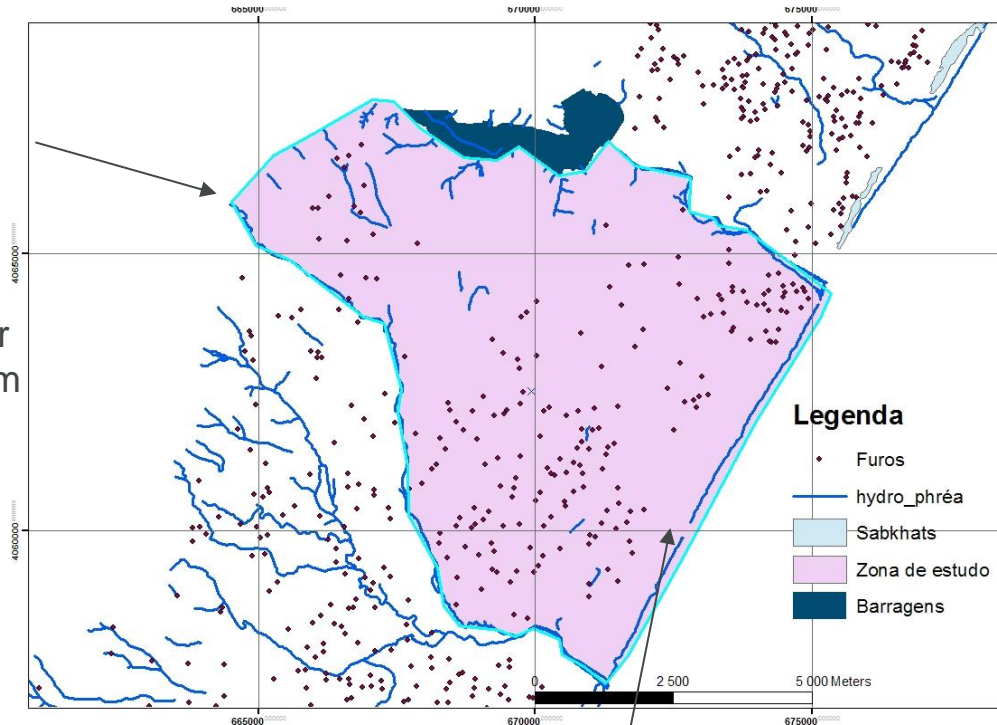
## Results and conclusions

Conceptual model; Modflow

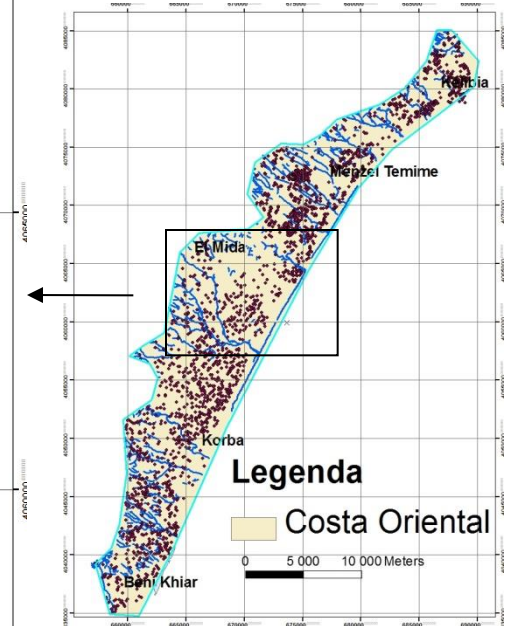
Wells – constant level

Area = 57,3 km<sup>2</sup>

Average depth for abstraction = 20 m



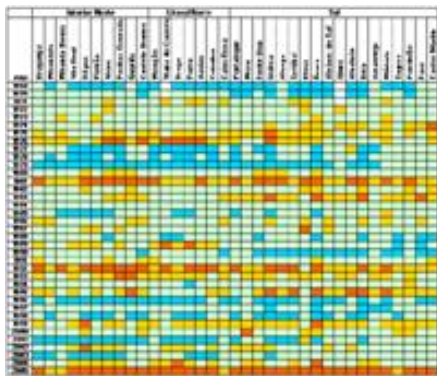
Mediterranean sea – constant level



(Data from I.N.R.G.R.E.F.)

- Existing material: limestone and marl
- Constant hydraulic conductivity = 3 m/d
- Average annual recharge = 56 mm
- Abstractions = 6200 m<sup>3</sup>/d

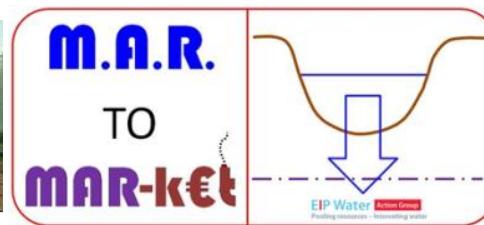




Project of the Water Research Institute (LNEC) for the development of a water management system in the context of the National Laboratory of Civil Engineering (LNEC).



LABORATÓRIO NACIONAL  
DE ENGENHARIA CIVIL



# MAR Solutions - Managed Aquifer Recharge Strategies and Actions (EIP WATER AG128)

Dr.-Ing. Habil. J.P. LOBO-FERREIRA, EIP Water AG 128 leader

Laboratório Nacional de Engenharia Civil, LNEC, Portugal

Dr. Enrique ESCALANTE, EIP Water AG 128 co-leader

TRAGSA, Spain

Prof. Christoph SCHÜTH, MARSOL Project leader

TU-Darmstadt, Institut für Angewandte Geowissenschaften, Darmstadt, Germany



MANAGED  
AQUIFER  
RECHARGE  
SOLUTIONS



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GrupoTragsa  
Garantía Profesional Servicio Público



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DE ENGENHARIA CIVIL

## INTRODUCTION

Managed Aquifer Recharge technique, or simply MAR, has become, perhaps, the best technique within the Integrated Water Resources Management (IWRM) framework, to palliate Climate Change adverse effects. As some impacts are increasing rapidly in scale and intensity, permanent "technological solutions" are required as a "water innovation in action" line. It is worth mentioning that FP7 INNO-DEMO MARSOL project, that started Dec. 1st 2013, is supporting this AG making available 8 demo sites to show the suitability of MAR techniques.

Involving the principal stakeholders and SMEs in this action group and transferring the results of this action into guidelines/policy will ensure MAR transferability to other locations. This will allow a major social advance (in Europe and worldwide) and can clearly contribute to improving living standards and job creation, as it increases the water availability to important economic sectors, improves human health and well-being, and sustains ecosystem functions and biodiversity.

Perhaps the biggest sector directly affected by MAR technique implementation will be agro-industry. In some Mediterranean countries, farmers are grouped in irrigation communities, what involves individuals, SMEs and even big industries. Their success, most of the times, is affected by water availability, and aquifers are the best way to store water as its capacity overweight traditional damming and decreases water supply transportation costs. Successful experiences are becoming more and more popular and farmers have become a sector who claims for the implementation of new MAR facilities and opportunities, waste water treatment plants and desalination agents, public bodies related to water management at care of the quality, etc. the eco-innovation label might be include in some of their processes thanks to water quality improvements by means of MAR technique.





## MAR Solutions - Managed Aquifer Recharge Strategies and Actions (AG128)

Managed Aquifer Recharge technique, or simply MAR, has become, perhaps, the best technique within the Integrated Water Resources Management (IWRM) framework, to palliate Climate Change adverse effects. As some impacts are increasing rapidly in scale and intensity, permanent "technological solutions" are required as a "water innovation in action" line. It is worth mentioning that FP7 INNO-DEMO MARSOL project, that started Dec. 1st 2013, is supporting this AG making available 8 demo sites to show the suitability of MAR techniques.



### RECENT NEWS OF THIS GROUP

19th May 2015

**MARsolutions participates in workshop on cooperation between Innovation partnerships**

19th May 2015

**Close cooperation between EIP MARsolutions and FP7 MARSOL Inno-Demo project**

27th April 2015

**MARenales training workshop aimed at end-users. A pure "MAR to MARk€t" activity.**

### UPCOMING GROUP EVENTS

26th May 2015

**Training for AG participants and Marketplace users**

2nd June 2015

**Training for AG participants and Marketplace users II**

24th June 2015  
to 26th June 2015

**Water Quality Workshop Algarve Demonstration Site**



## Close cooperation between EIP MARSolutions and FP7 MARSOL Inno-Demo project

The report presents a descriptive analysis of the responses to a survey about protection and preservation of groundwater conducted with a sample of Portuguese farmers of the Algarve region.

This survey was developed in the context of the project MARSOL – Managed Aquifer Recharge Solutions (European Union Seventh Framework Programme For Research, Technological Development and Demonstration – Grant Agreement nr. 619120).

Download the report

### Documents:

 Rel 101\_15.pdf

## Add new response

Your name

João-Paulo Lobo...

Comment \*

Formatar

**B** *I* U ~~S~~  $x_2$   $x^2$

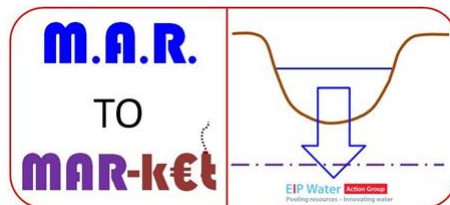
    







TECHNISCHE  
UNIVERSITÄT  
DARMSTADT



■ **TUE 4<sup>th</sup> November, time 16:00-18:00. MARToMARKet EIP Water Action Group OPEN MEETING**

Objective: Demonstrating the feasibility and efficiency of MAR in combating future water scarcity threats in the Circum-Mediterranean area.

Tentative Agenda:

- Introduction and objectives of MARToMARKet Action Group 128, by J.P. Lobo Ferreira (Leader of AG 128, LNEC, Portugal) / Nikolaus Fleischmann (EIP Water Secretariat)
- A Knowledge Basis on Managed Aquifer Recharge Sites in Europe, by Christoph Sprenger (KWB, Germany)
- Developments of FP7 INNO DEMO MARSOL project & Executive summary / conclusions of MAR Modelling Workshop in Lisbon, July 2014, by Annette Wefer-Roehl / Karl-Ernst Roehl (MARSOL Project Coordination, TUD, Germany) and J.P. Lobo Ferreira (WP 12 Modelling leader, LNEC, Portugal)
- Executive summary / conclusions of Geofluid MAR Workshop in Piacenza, Italy, by Giancarlo Gusmaroli (LIFE AQUOR PROJECT Technical-Scientific Coordinator, Studio Ecoingegno, Italy)
- Executive summary / conclusions of MAR4FARM Workshop in Arenales and Santiuste, Spain by Enrique Escalante (TRAGSA, Spain).
- MAR activities in Italy, and the importance of MAR for Italian stakeholders, by Vincenzo Marsala (SGI Studio Galli Ingegneria S.p.A., Italy)
- MtoM business and project opportunities in Eastern Europe countries (Ciprian Nanu, MATES nZEB Project, Romania)
- Discussion & networking coffee with representatives of UPC and AgBar, Barcelona (Xavier Sanchez Vila, UPC, Spain).

If you are interested to join, please contact: [lferreira@lnec.pt](mailto:lferreira@lnec.pt) or [nikolaus.fleischmann@fresh-thoughts.eu](mailto:nikolaus.fleischmann@fresh-thoughts.eu).



# MANAGEMENT OF AGRICULTURE LAND USE BASED ON GROUNDWATER SUSTAINABILITY SCENARIOS A Case-Study in Portugal



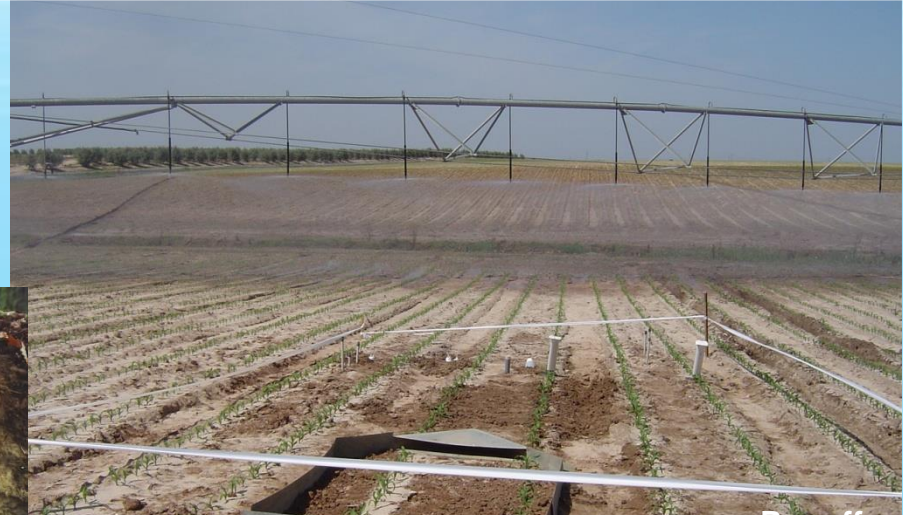
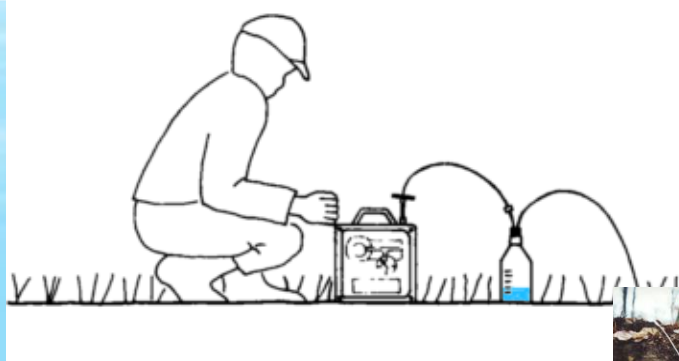
Framework

Objectives

Tasks

Development

Results



Runoff

**FCT** Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Vadose zone

[www.asemwater.net.org](http://www.asemwater.net.org)





# MANAGEMENT OF AGRICULTURE LAND USE BASED ON GROUNDWATER SUSTAINABILITY SCENARIOS A Case-Study in Portugal



Framework

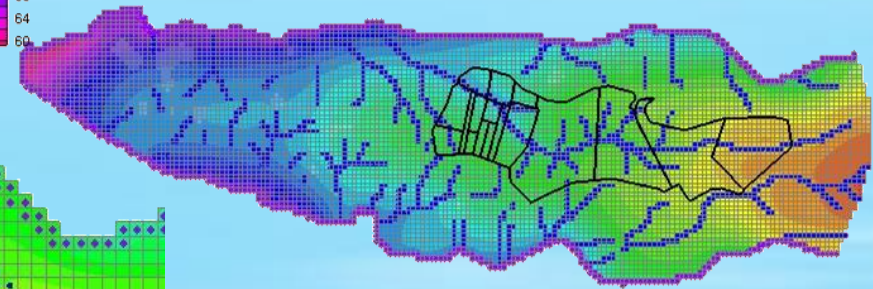
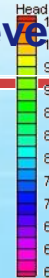
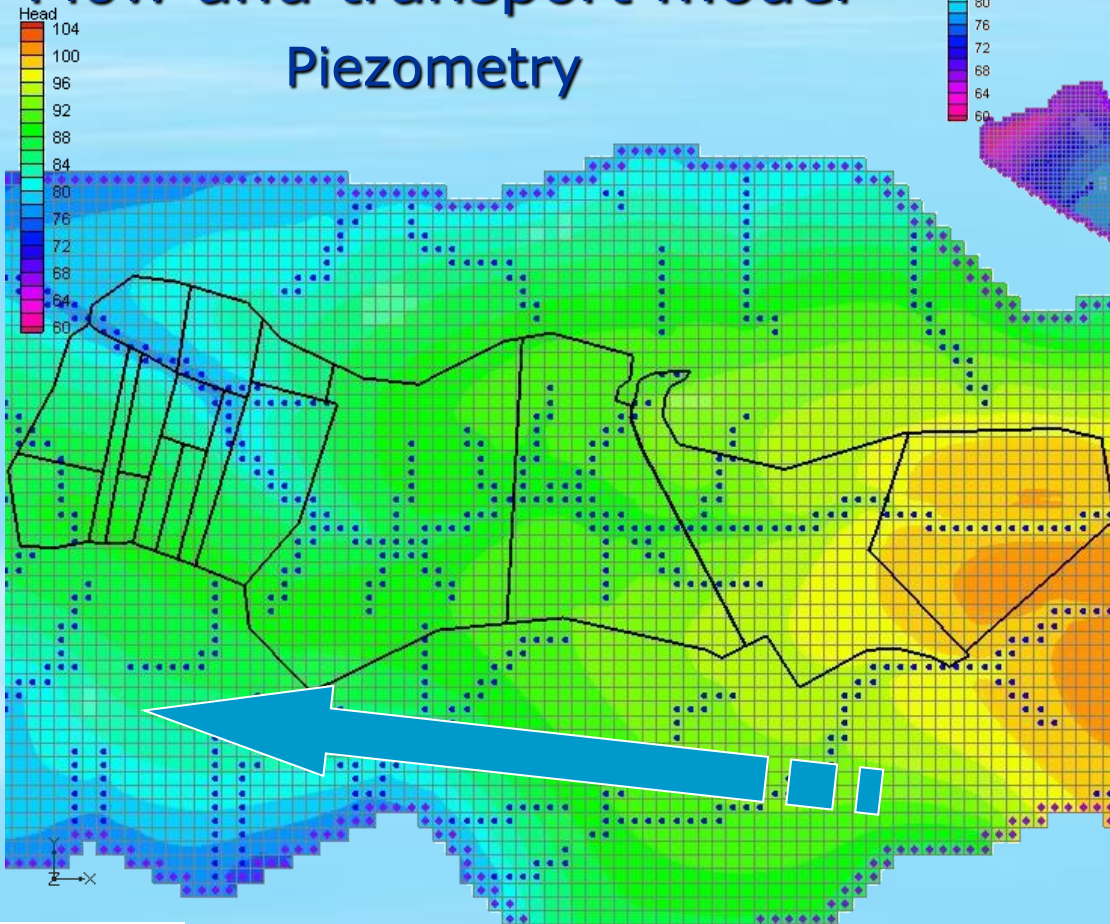
Objectives

Tasks

Development

Results

## Flow and transport model Piezometry



Regional model  
18,6 km<sup>2</sup>

3 layers, 67 row e  
192 column  
50 x 50 m mesh

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# MANAGEMENT OF AGRICULTURE LAND USE BASED ON GROUNDWATER SUSTAINABILITY SCENARIOS A Case-Study in Portugal



Framework

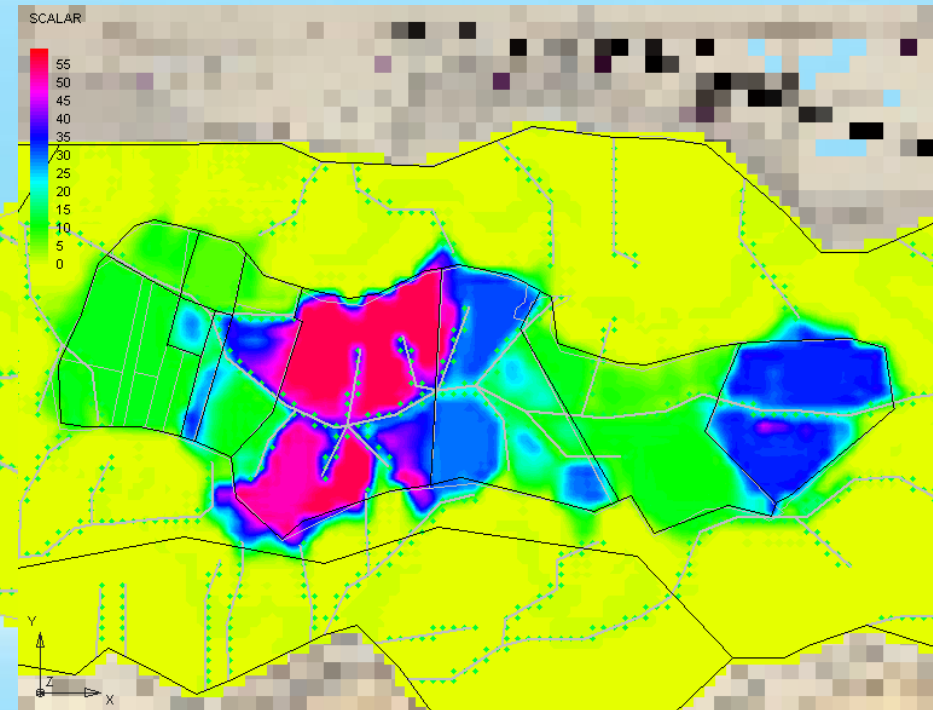
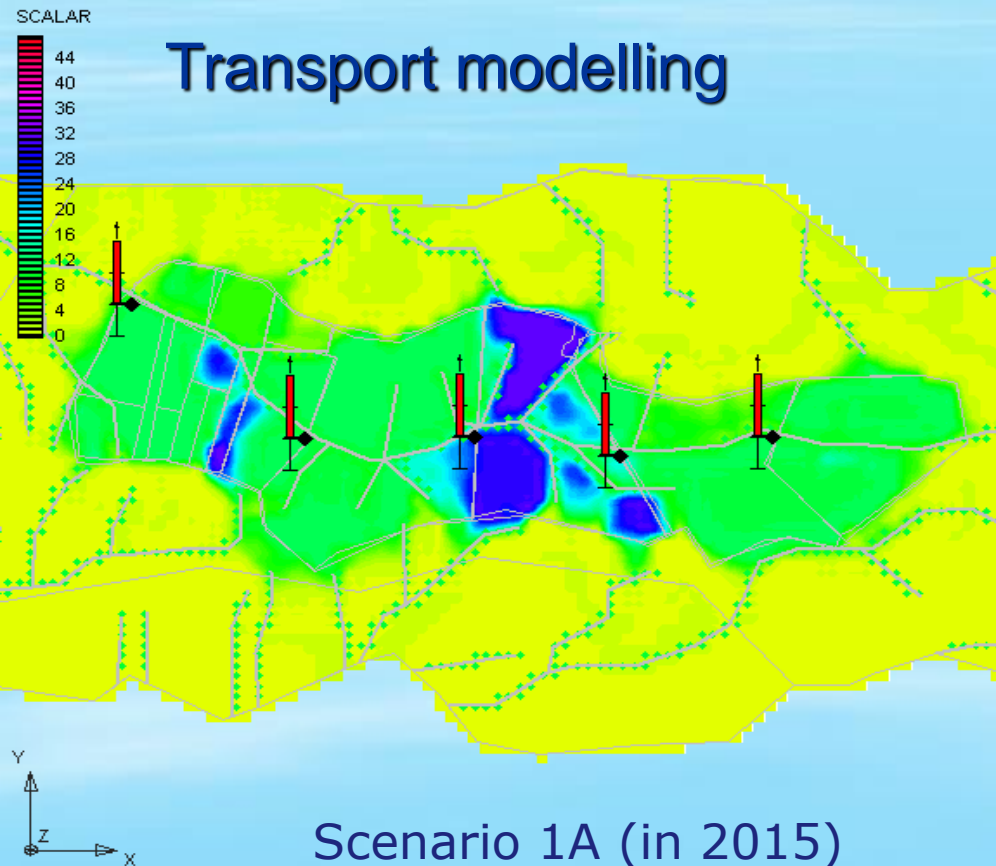
Objectives

Tasks

Development

Results

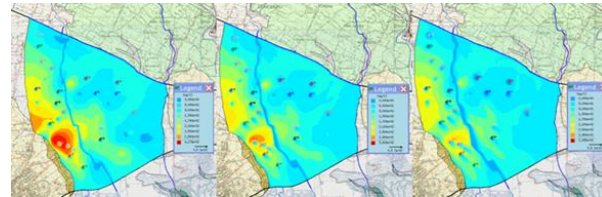
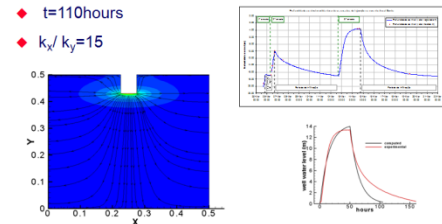
## Transport modelling



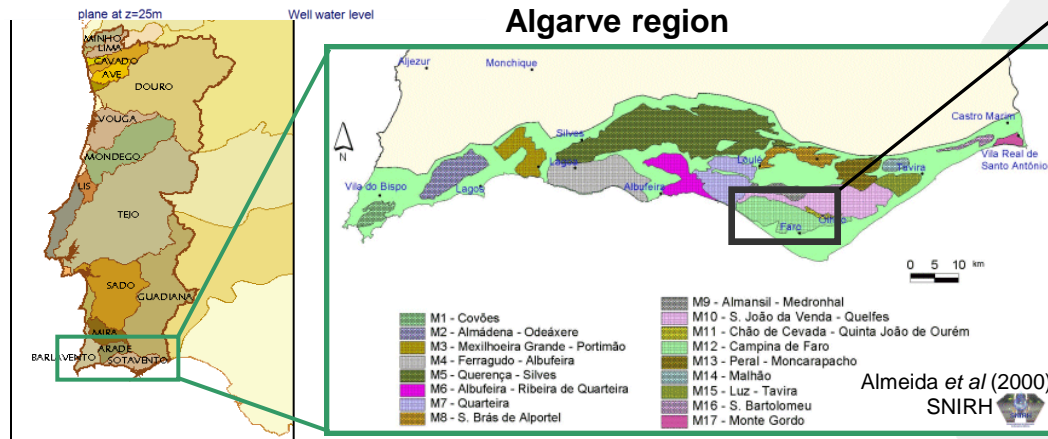
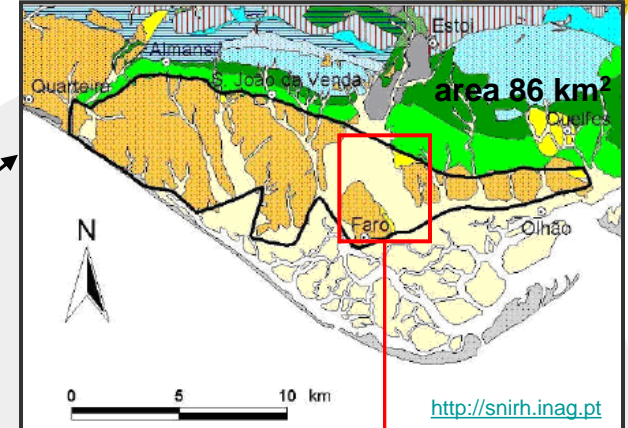
# ARTIFICIAL AQUIFER RECHARGE EXPERIMENTS IN THE PORTUGUESE CAMPINA DE FARO CASE-STUDY AREA, DEVELOPED IN THE FRAMEWORK OF GABARDINE PROJECT

- Flow and transport groundwater modeling for different artificial recharge scenarios in Campina de Faro

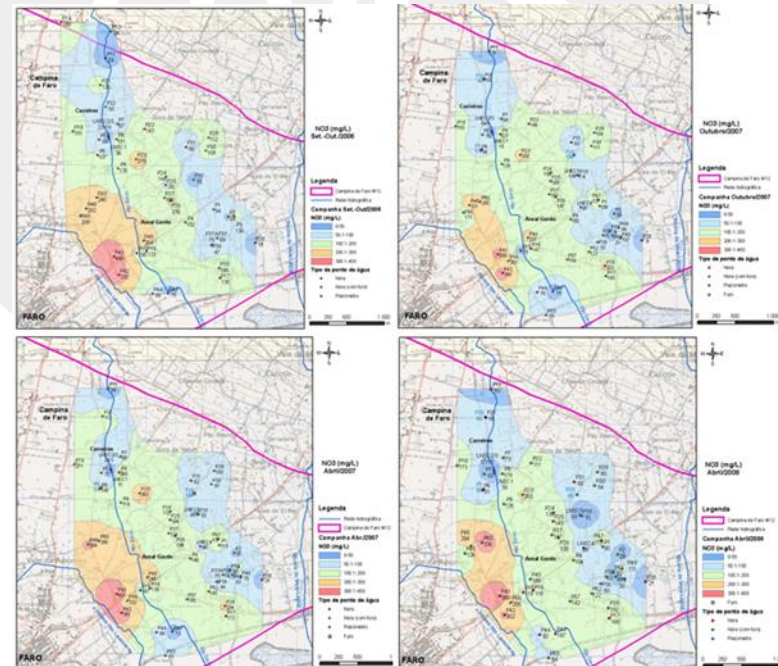
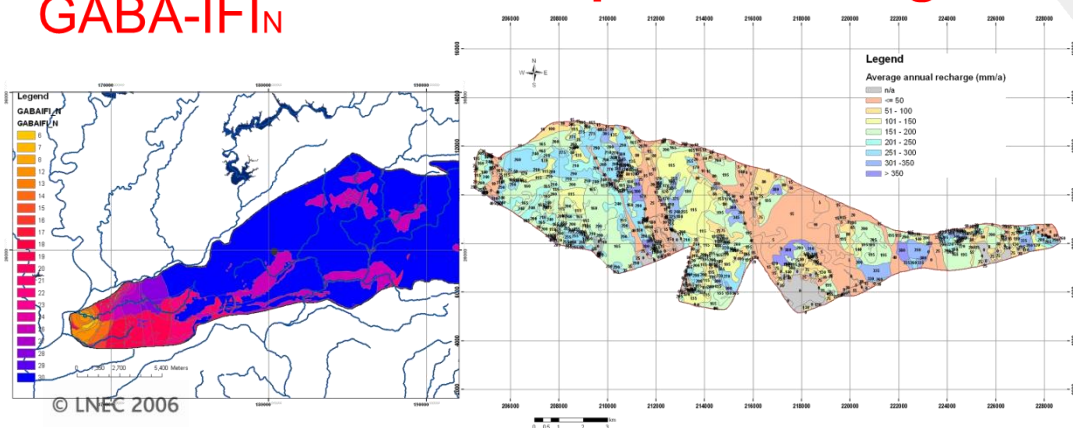
## Portuguese Infiltration well



## Aquifer system of Campina de Faro



## GABA-IFI<sub>N</sub> Aquifer recharge

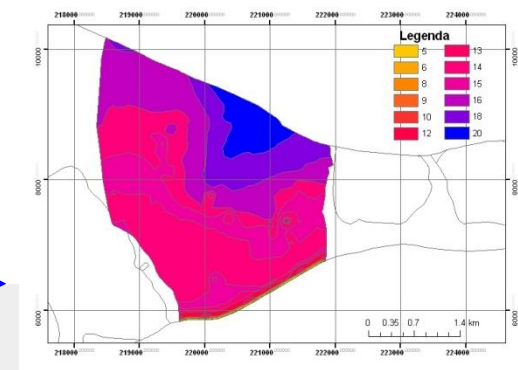




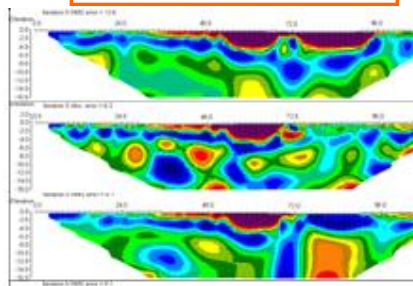
# Main Results/Conclusions

- Methodology to identify preliminary candidate areas to implement artificial recharge (GABA-IFI Index)

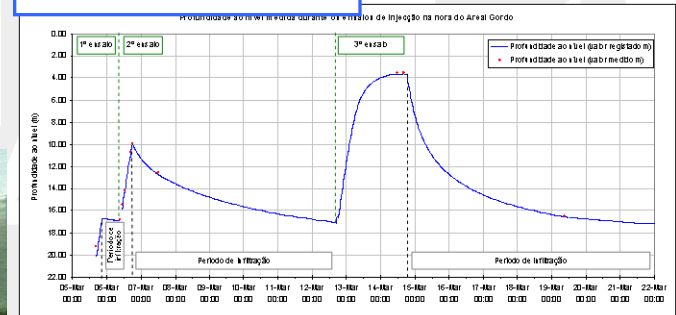
- Artificial recharge infiltration and tracer tests in Campina de Faro



## 1) Areal Gordo test site 3 Infiltration basins



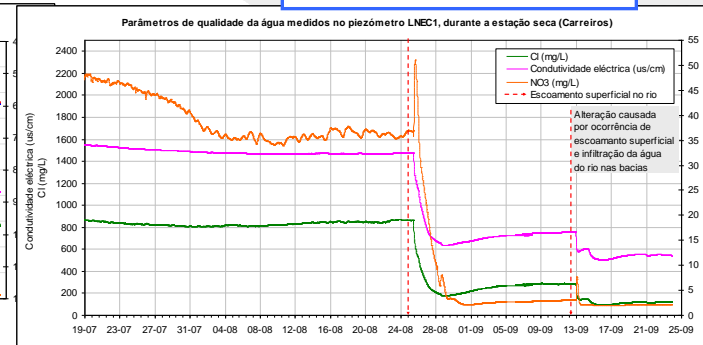
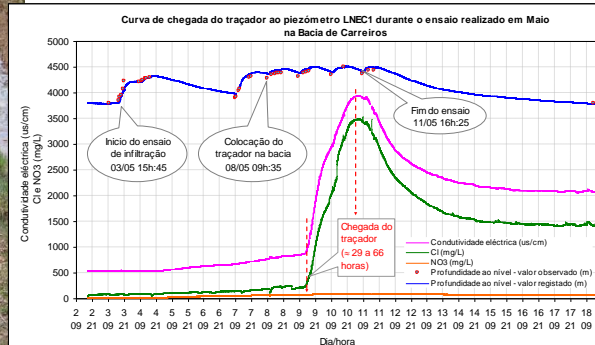
## 2A) Areal Gordo test site Injection tests in large diameter well "nora"



## 3) Carreiros test site 2 Infiltration basins in the river bed



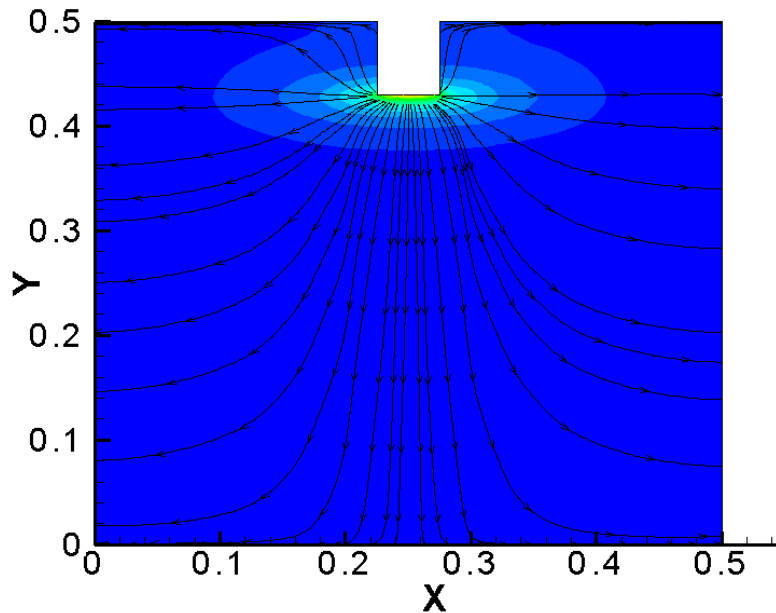
## 2B) Areal Gordo test site Injection test in medium diameter well



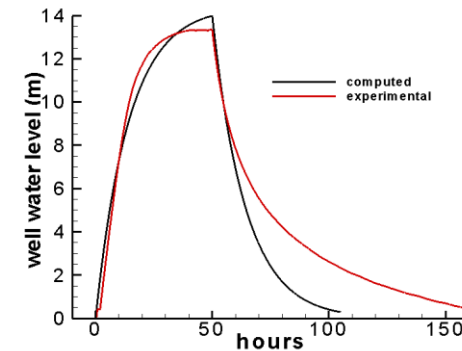
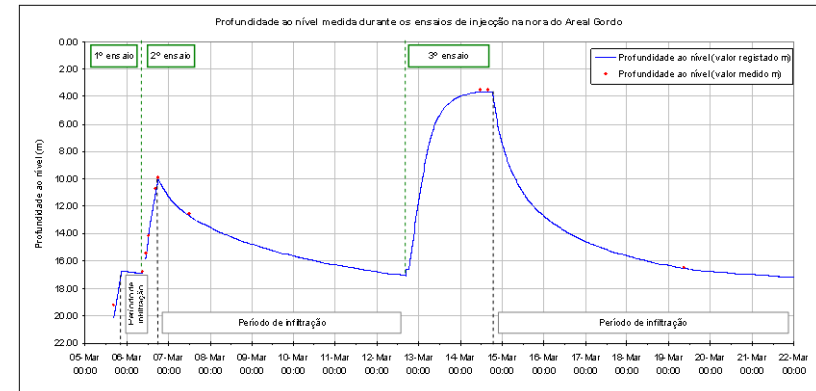
# Portuguese Infiltration well

♦  $t=110\text{hours}$

♦  $k_x/k_y=15$



plane at  $z=25\text{m}$



Well water level





LABORATÓRIO NACIONAL  
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\*\*\*João Paulo Lobo Ferreira (lferreira@lnec.pt)

**Task 1d: River basin management**

**Task leader: LNEC; Involved partners**

**EU: ISPRA, DTU, EWA**

**Task 1e: Water for energy**

**Task leader: LNEC; Involved partners**

**EU: DTU, EWA, EDP/Labelec**



**Task 1d: River basin management**

**Task leader: LNEC; Involved partners EU:**

**ISPRA, DTU, EWA**



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# Innovative groundwater artificial recharge techniques and experiments. Schemes to solve WR problems in EU and China semi arid regions\*\*\*\*



\*\*\*João Paulo Lobo Ferreira (lferreira@lnec.pt)



\*<http://www.marsol.eu>



## Task 1a: Agricultural Water Management

Task leader: ISPRA; Involved partners EU:  
LNEC, DTU, EWA

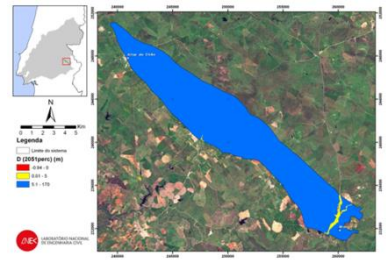
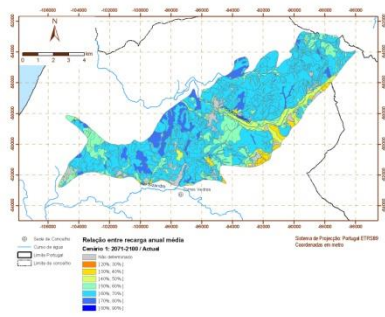
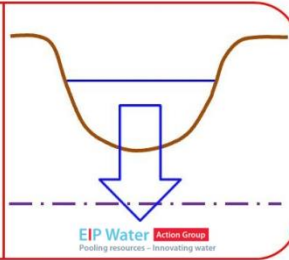


**In the scope of LNEC investigations on diffuse pollution prevention and monitoring, the main goals have been to:**

- Implement the measures necessary to prevent or limit the input of pollutants into groundwater and to prevent the deterioration of the status of all bodies of groundwater ....
- Contribute to support future decisions in terms of more adequate policies regarding rural land use planning (type of crops and associated fertilizers and treatment techniques), taking into consideration the protection of the environment based on vulnerability and risk concepts and a sustainable and integrated water management.



**M.A.R.**  
TO  
**MAR-k€t**



## ACTIVITIES TO BE ADDRESSED

**1.Activity 1 KNOWLEDGE BASE OF EXISTING MAR FIELD APPLICATIONS:** Development of MAR knowledge-base of existing field applications for addressing different societal challenges related to water availability.

**2.Activity 2. MAR to MAR-ket:** Permanent demonstration activity to show industry that they can rely on hydrogeology techniques by involving nine different industrial branches as demo cases. Industry will realise the benefits and will feel more identified with the activities developed in MARSOL project and the expertise from other previous EU founded projects. Provide technical solution for their water supply guarantee and the feasibility to maintain their livelihood.

**3.Activity 3 BLUE PRINT IMPACT, INDICATORS, RISK ASSESSMENT TECHNICAL SOLUTIONS FOR INDUSTRY:** Development of a methodology for probabilistic risk evaluation linked to MAR activities.

**4.Activity 4 TECHNICAL SOLUTIONS FOR INDUSTRY:** Development of design and construction criteria, and testing protocols for different exemplary MAR schemes and their benchmarking. Developing and testing appropriate engineering solutions, e.g. underground dams and wastewater hydraulic barriers, to convert karst aquifers into large groundwater storage reservoirs. The pros and cons of each technology will be assessed systematically, and compared to alternative solutions. Economic costs and benefits of MAR options for the various.

**5.Activity 5 MODELLING (incl. water balance, water availability, climate change):** Mathematical models to simulate the impact of MAR on aquifer hydrology and hydro geochemistry.

**6.Activity 6 TRANSFERING KNOWLEDGE INTO PRACTICE:** A complex and Specific Dissemination & Technology Transfer (D&TT) Plan will be designed based in the product previous analysis, business and development plans as well as target users. The Plan will contain several programs specially dedicated to the industrial branches, beneficiaries of the technology improvements. Different activities & materials will be developed to achieve an impact on the entire industrial driven sector.

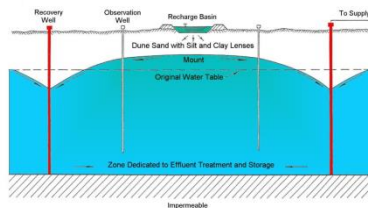
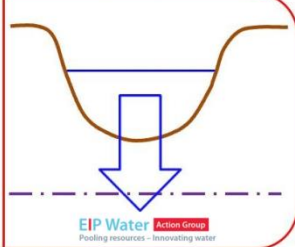
## PARTNERS

The list of the proposer partners of AG 128 is as follows:

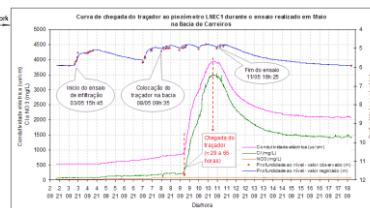
- Laboratório Nacional de Engenharia Civil (AG 128 lead organization)
- Grupo Tragsa (Tragsa and Tragsatec)
- Technische Universität Darmstadt, Dept. of Applied Geosciences
- IWW Rheinisch-Westfälisches Institut für Wasserforschung gemeinnützige GMBH
- National Technical University of Athens
- Lavrion Technological & Cultural Park
- Universitat Politècnica de Catalunya-BarcelonaTech
- Helmholtz-Zentrum für Umweltforschung GmbH
- Universidade do Algarve
- Malta Resources Authority
- Paragon Europe
- Scuola Superiore Sant'Anna, SSSA
- Amphos 21
- Mekorot Water Company Israel
- SGI Studio Galli Ingegneria
- Carracillo Region Irrigation community
- Comunidad de Usuarios de Aguas del Valle Bajo y Delta del río Llobregat
- Terra, Ambiente e Recursos Hídricos
- Águas do Algarve, S.A.
- Santiuste Basin Irrigation community
- Autorità di Bacino dei Fiumi Isonzo Tagliamento Livenza Piave Brenta Bacchiglione (AAWA)
- Agência Portuguesa do Ambiente
- Athens Water Supply and Sewerage Company
- Agricultural Research Organization - the Volcani Center
- Water Services Corporation
- Spanish Water Technology Platform
- Institute of Communications and Computer Systems
- International Groundwater Resources Assessment Centre (IGRAC)
- Aquifer Storage And Recovery Systems
- Korean Institute of Geoscience and Mineral Resources (KIGAM)
- Regional governing body of Regione Toscana
- Local authority of Provincia di Lucca
- TEA Sistemi SPA
- Ingegnerie Toscane
- Kompetenz Zentrum Wasser Berlin (KWB)
- Federal University of Pernambuco (UFPE) , Brazil







Recharge - Recovery Scheme



## ACHIEVEMENTS

### EIP Water AG 128 MARToMARKet achievements:

#### Site:

- AG 128 MARToMARKet EIP site available (<http://www.eip-water.eu/working-groups/mar-solutions-managed-aquifer-recharge-strategies-and-actions-ag128/>)

#### Conferences, workshops, summer school:

- MAR at the Water R&D workshop; MAR Action Group was represented by TRAGSA, April 2014.
- MAR Modelling Workshop in Lisbon, July 2014
- MAR component of IWA 2014 *Inspiring Change*, session on "Adaptation to climate change impacts: urban resiliency", September 2014
- WARBO summer school, Lisbon, October 2014
- Geofluid MAR Workshop in Piacenza, Italy, October 2014
- MAR4FARM Workshop in Arenales and Santiuste, Spain, November 2014

#### DEMO Sites:

- Infiltration (Set 2014), tracer (Out 2014) and clogging (July 2014) experiments in Campina de Faro aquifer, Algarve, Portugal aiming data gathering for groundwater rehabilitation through artificial recharge using rain/river water surpluses
- Large well infiltration tests in Campina de Faro and Querença-Silves aquifers (April 2014), Algarve, Portugal, aiming extra groundwater storage in wet years to be usable later during drought years
- Laboratory soil-column infiltration tests with Campina de Faro, Querença-Silves and Melides soils for further use in SAT basins to be constructed in 2015

#### Books:

- Managed Aquifer Recharge Sites - Knowledge Basis I, under the related DEMEAU FP7 project: M11\_1 catalogue of European MAR applications\_plus\_appendix.pdf
- Managed Aquifer Recharge - Knowledge basis II - two GABARDINE (Groundwater artificial recharge based on alternative sources of water) project reports are available on Portuguese and Spanish (Catalonia) Case-studies
- Managed Aquifer Recharge - Knowledge basis III - TRAGSA contributes a new publication on one decade of managed aquifer recharge in the Santiuste aquifer, Spain

#### Papers:

- GAALLOU, N., LEITÃO, T. E. e LOBO FERREIRA, J.P., 2014 - Artificial recharge enhancement to prevent seawater intrusion in the coastal aquifer of Korba-Mida (Tunisia). Congresso da IWA - World Water Congress & Exhibition 2014, Lisboa, 21 a 25 de setembro de 2014, 8 pp.
- LOBO FERREIRA, J.P., ESCALANTE, E., SCHÜTH, C. e LEITÃO, T.E., 2014 - Demonstrating Managed Aquifer Recharge (MAR) as a Solution for Water Scarcity and Drought in Portugal and Spain. "12.º Congresso da Água /16.ª ENASB/XVISILUBESA", organizado pela APRH, APESB e ABES, Lisboa, 5-8 de março de 2014, 15 pp.

## SCIENTIFIC SUPPORT & NETWORKING

### DEMO Sites



1. Large well infiltration tests in Campina de Faro and Querença-Silves aquifers (April 2014), Algarve, Portugal, aiming extra groundwater storage in wet years to be usable later during drought years

### Participants



### Participants



Demonstrating Managed Aquifer Recharge as a Solution to Water Scarcity and Drought

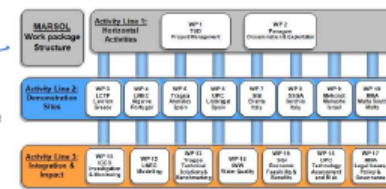
An EU FP7 Project



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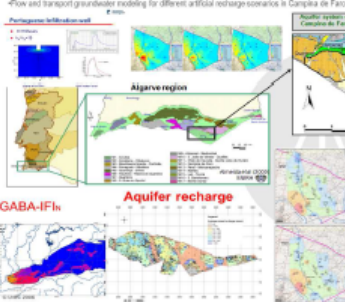


### AG 128 CONTACT

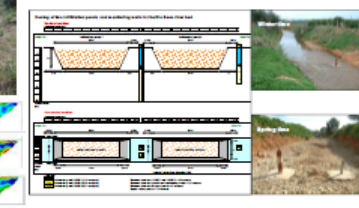
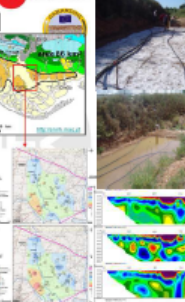


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### FARO CASE-STUDY AREA, DEVELOPED IN THE FRAMEWORK OF GABARDINE PROJECT



### Flow and transport groundwater modeling for different artificial recharge scenarios in Campina de Faro







**Obrigado pela vossa atenção !**