Managed Aquifer Recharge: Addressing the Risks of Recharging Regenerated Water (MARadentro)

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Deputy coordinator: Jesús Carrera Ramírez

Water JPI 2018 Joint Call

12 April 2019, Stockholm

MARadentro aims to renaturalize regenerated water by recharge through a reactive barrier

Addressing

- ...
- ...

MARadentro aims to renaturalize regenerated water by recharge through a reactive layer

- The stimulation of natural pollutants degradation and pathogens retention by using reactive layers based on:

MARadentro aims to renaturalize regenerated

Biotic Systems

Abiotic Systems

MARadentro aims to re-naturalize regenerated water by recharge through a reactive layer

- The stimulation of natural pollutants degradation and pathogens retention by using reactive layers based on:
  - biotic systems (plants, fungi and microorganisms)
  - abiotic processes (organic carbon –woodchips, and iron oxide).
- The prediction of pathogens and pollutants behaviour
  - application of reactive transport modelling tools

MARadentro aims to re-naturalize regenerated water by recharge through a reactive layer

Stimulate natural pollutants degradation and pathogens retention by using reactive layers based on

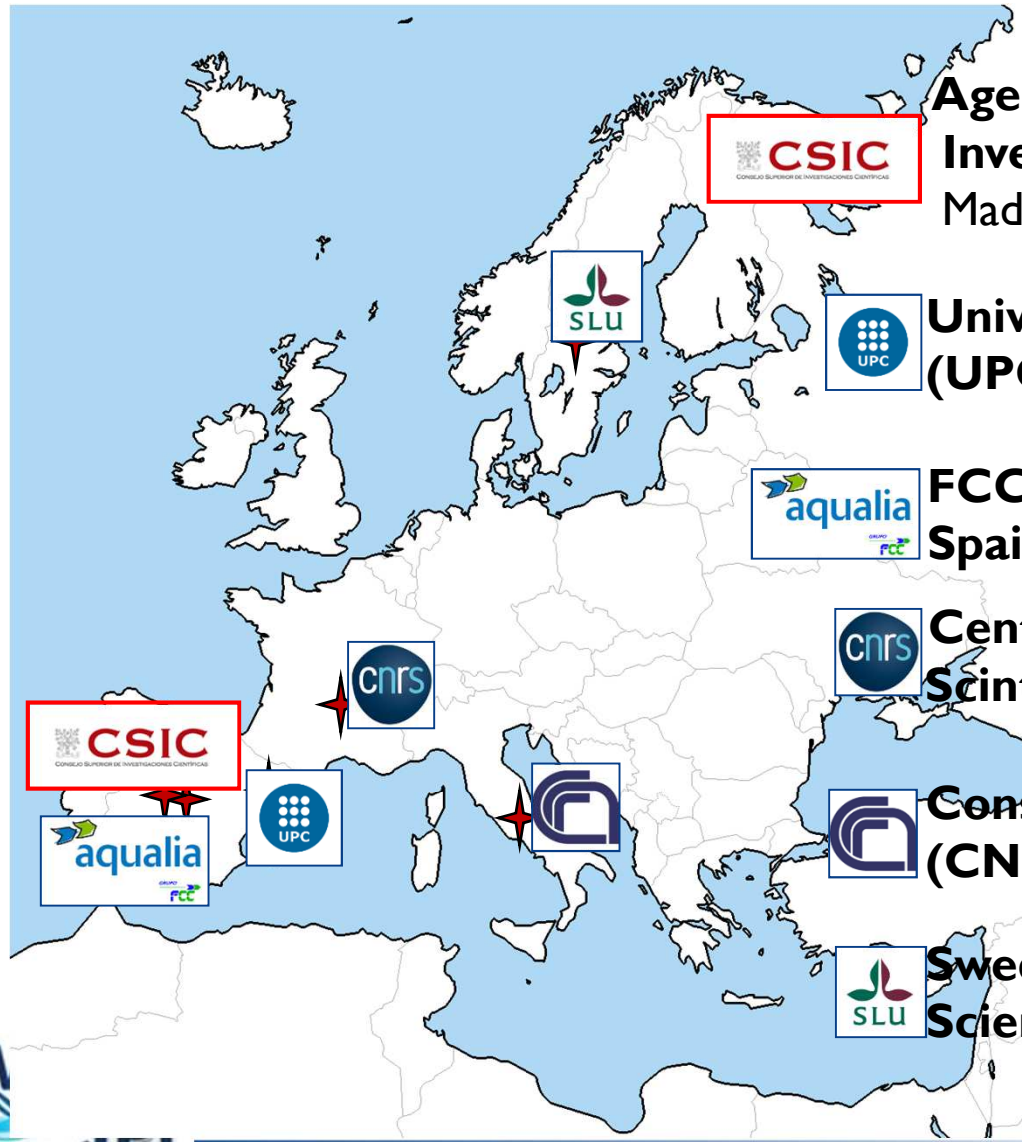
- biotic systems (plants, fungi and microorganisms)
- abiotic processes (organic carbon –woodchips, and iron oxide).

Predict the behavior of pathogens and pollutants

- application of reactive transport modelling tools

- The challenges in upscaling MAR operations
  - three domains: lab tests, pilot MAR and a field MAR site

Six Partners from 4 EU countries Multidisciplinary Consortium



Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC), Madrid, **Spain**. (Coordinator).

Universidad Politécnica de Cataluña (UPC), Barcelona, **Spain**.

FCC Aqualia, S.A. (AQUALIA), Madrid, **Spain**

Centre National de la Recherche Scintifique (CNRS), Montpellier, **France**

Consiglio Nazionale delle Ricerche (CNR), Rome, **Italy**.

Swedish University of Agricultural Sciences (SLU), Uppsala, **Sweden**.

Support from 4 EU countries
Health, water companies, policy makers

Catalonian Public Health Agency (Spain)

Catalonian Water Agency (ACA, Spain)

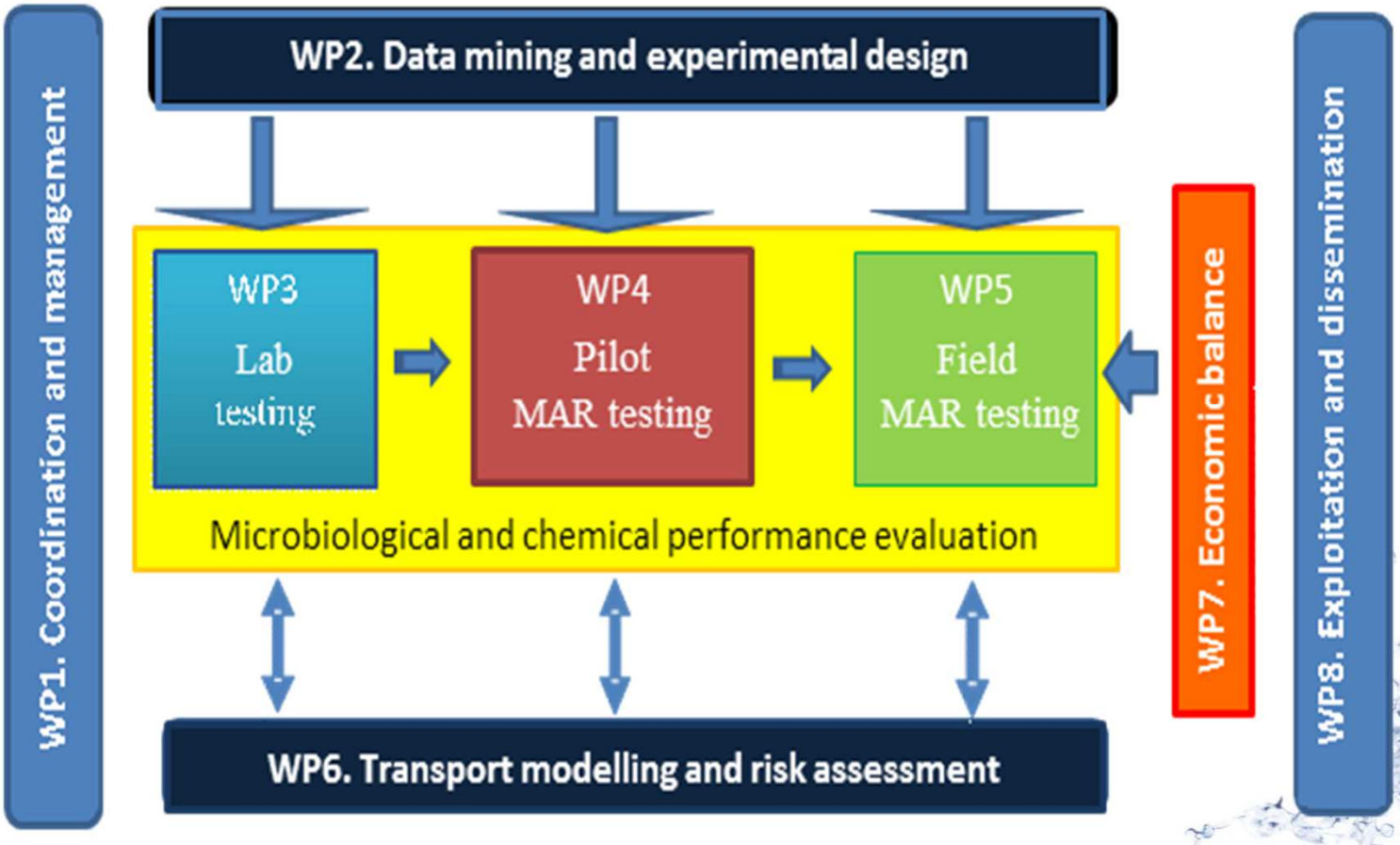
Montpellier Mediterranean Metropole (France),

Joint Research Center (JRC, Italy),

VERITAS S.p.a (Italy)

Norrvatten (Sweden)

Eight integrated WPs



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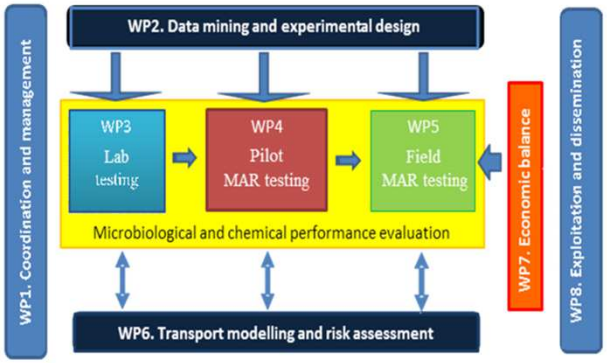
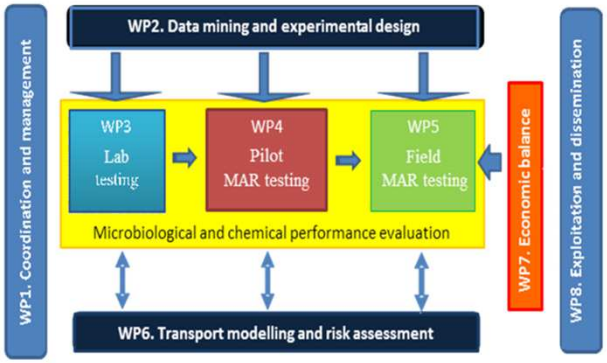


WP1. Coordination and management

Provide administrative and financial management coordination.

Supervision, quality control and overall coordination of the activities in WP 2-8.

Eight integrated WPs

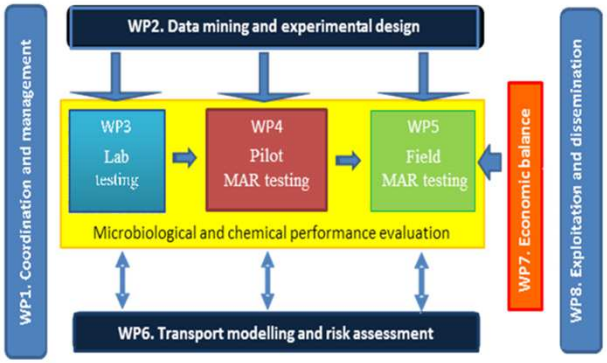


WP2. Data mining and experimental design

Review existing registries to identify methodological, data needs and information gaps.

Will allow configuring novel reactive layers and to design and implement MAR at the 3 domains.

Eight integrated WPs



WP3. Laboratory testing

Column experiments, to evaluate and calibrate the performance of several layers compositions.

Microbiology, toxicity and chemical analyses will be used to evaluate the performance of the tested systems for pathogens and pollutants removal.

WP4. Pilot MAR testing

Pilot MAR in Palamós WWTP (Spain).
Six recharge areas (2,4 m^2) connected to 15 m long sediment tanks.

Test options

Biomass augmentation (fungi, microorganisms),
Addition of organic carbon sources and
addition of reducing chemicals (iron oxide).

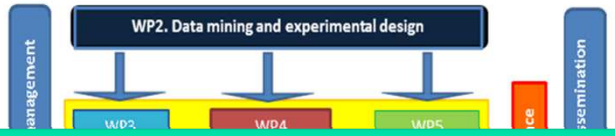
Microbiology, toxicity and chemical analyses will be used to evaluate the performance of the tested systems for pathogens and pollutants removal.

WP5. Field MAR testing

Validate MAR technology in a WWTP
Assess the feasibility of the MAR prototype under long-term operation.

The design, construction and evaluation will be led by the industrial partner, AQUALIA

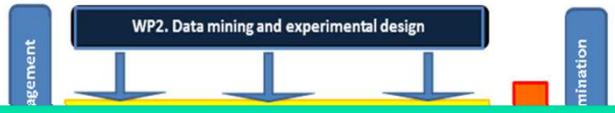
Microbiology, toxicity and chemical analyses will be used to evaluate the performance of the system for pathogens and pollutants removal.



WP6. Transport modelling and risks assessment

Numerical models incorporating pathogen and colloids transport, ecotoxicological data as well as the degradation of pollutants and its interaction with biogeochemical processes will be developed to understand and predict the fate of pollutants and pathogens in MAR.

The models will be used to perform a risk assessment aimed at ensuring the no-risk of MAR at environmental and human levels.



WP7. Economic balance

A comprehensive and interactive model will be created, to be applied for economic feasibility studies and technical project evaluations under different scenarios.

Evaluation of the economic impact, market trends and technology positioning.

Transfer of project results from R&D performers to industrial players.

WP8. Exploitation and Dissemination

Dissemination of **MARadentro** outcomes and commercialization prospective for the MAR prototype.

Targets

Scientific community, scientific papers and conference presentations. Special sessions will be organized.

Regulatory community, recommendations (EU Parliament).

Water companies, recommendations and guidelines for MAR implementation.

General public, webpage, TV documentary, visit to the sites.

MARadentro will contribute to

RENATURALIZE REGENERATED WATER BY

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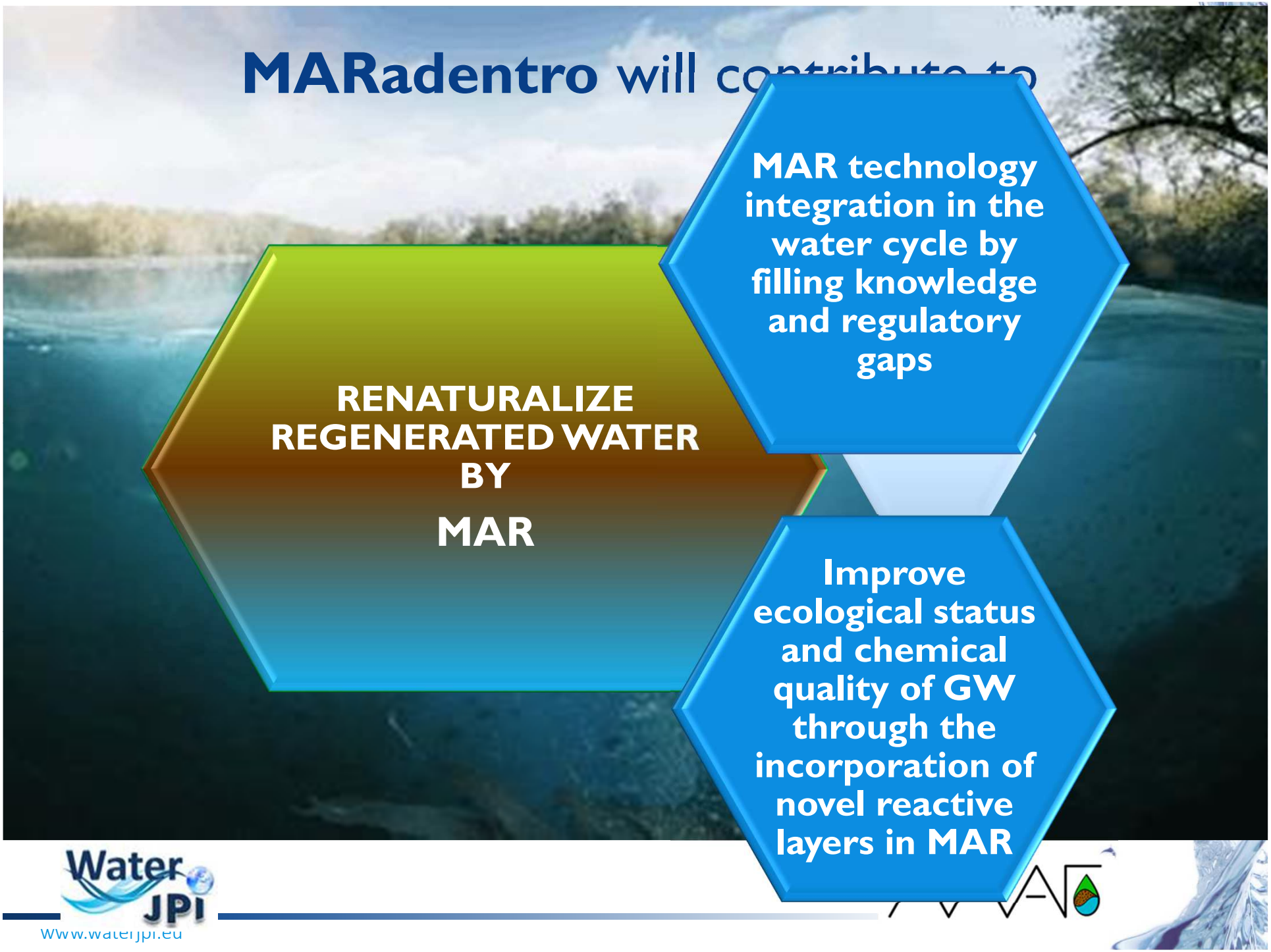
MAR technology integration in the water cycle by filling knowledge and regulatory gaps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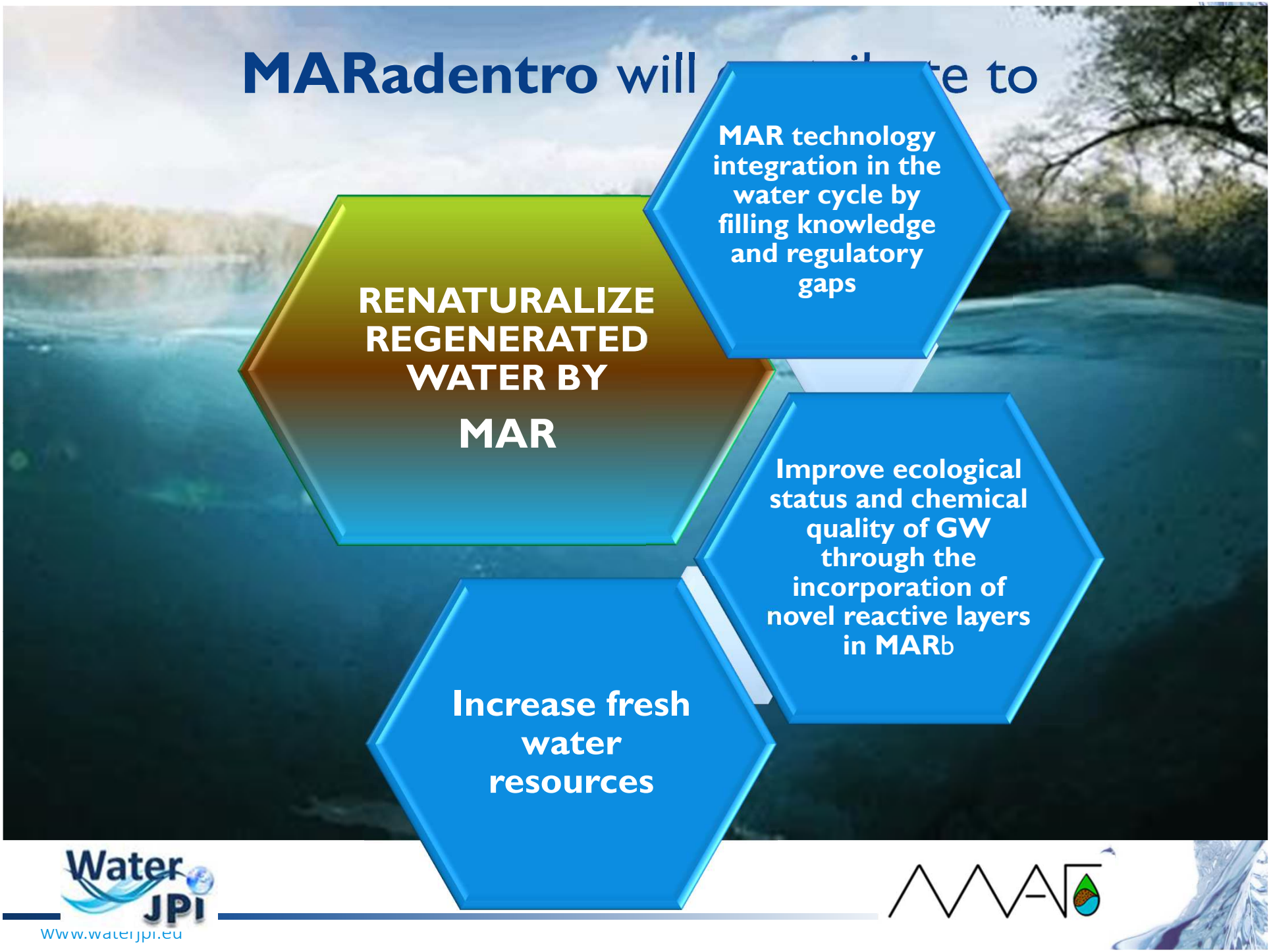
Improve ecological status and chemical quality of GW through the incorporation of novel reactive layers in MAR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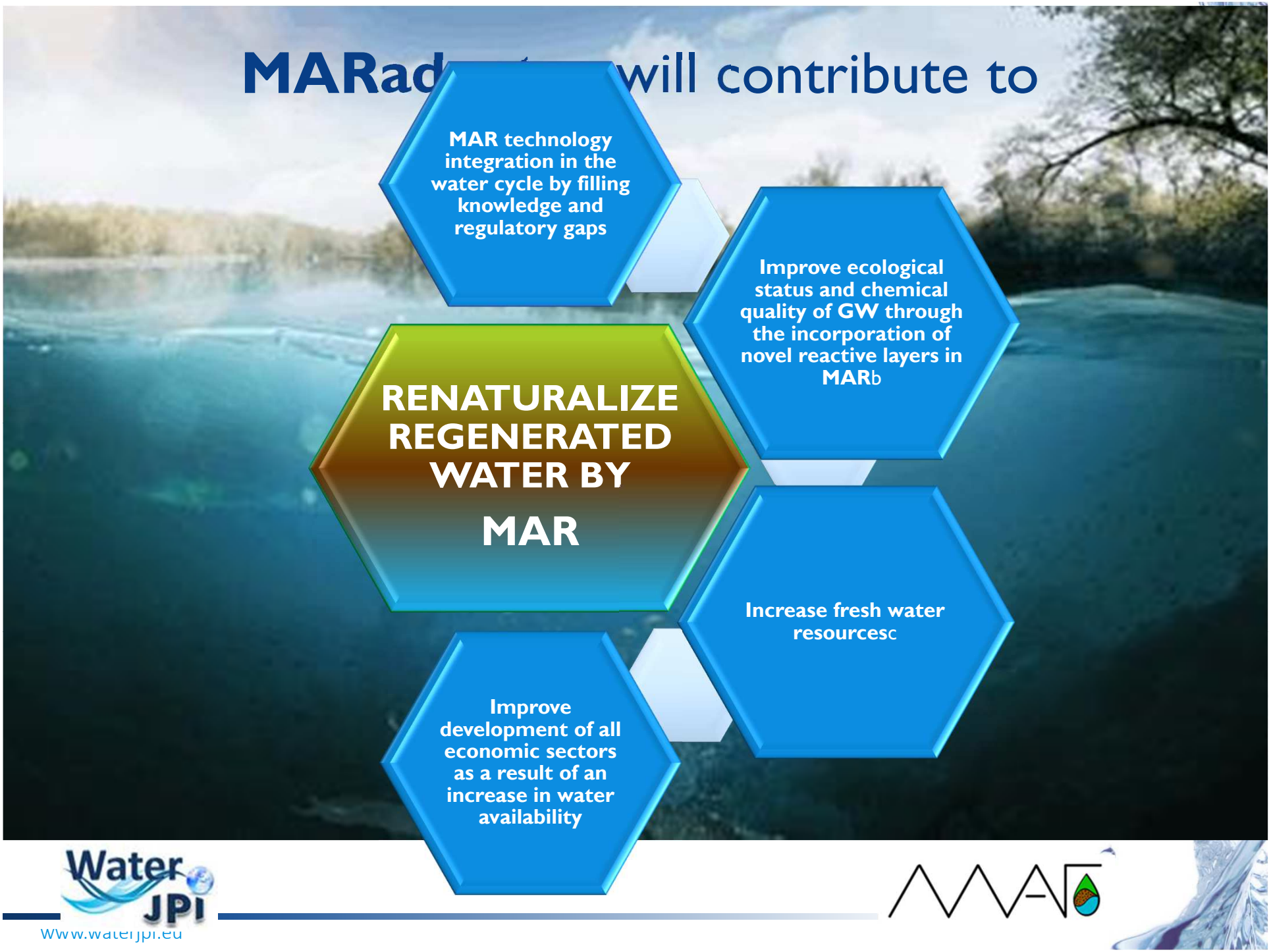
Increase fresh water resources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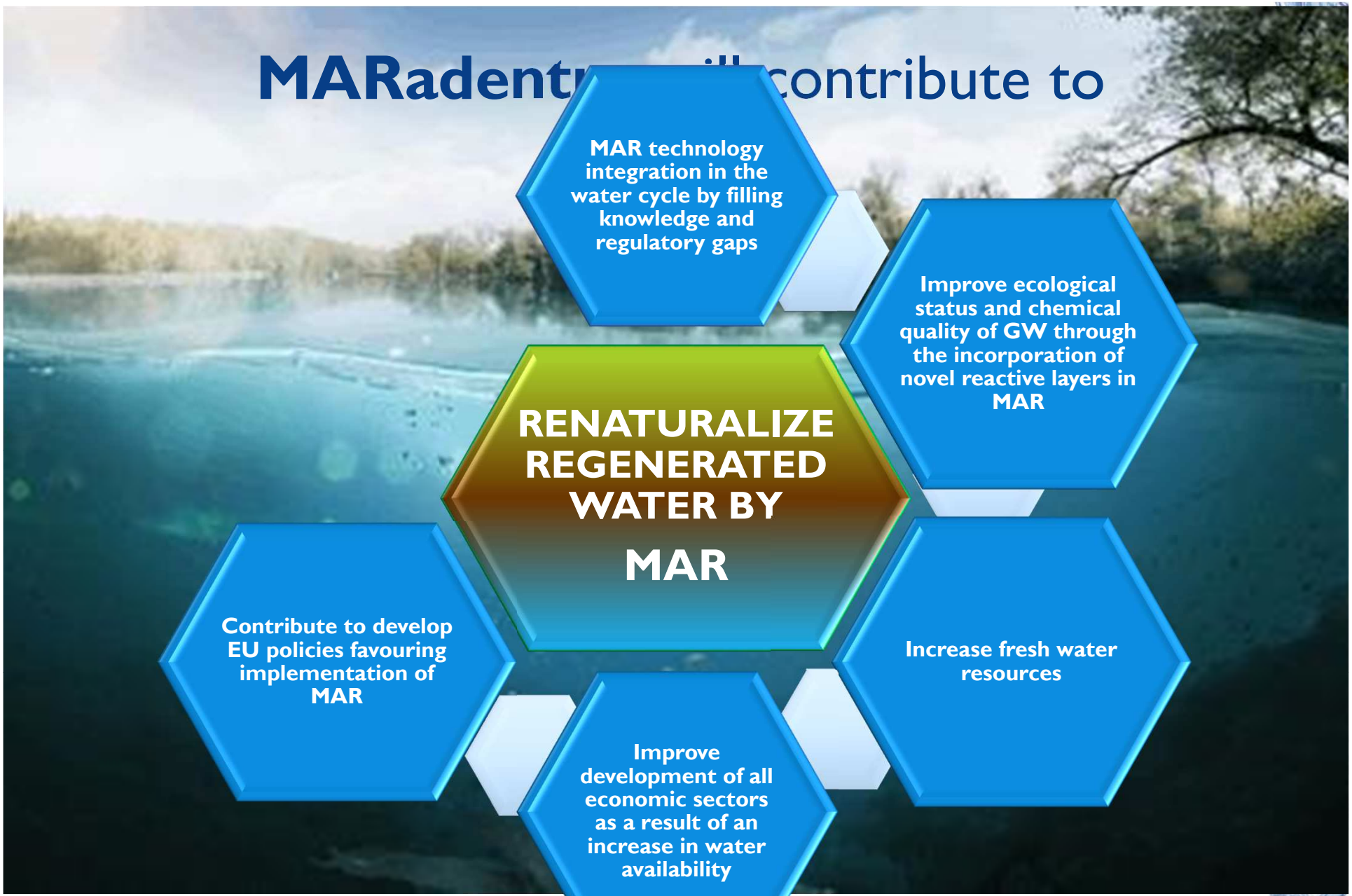
Improve development of all economic sectors as a result of an increase in water availability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RENATURALIZE REGENERATED WATER BY MAR
Contribute to develop EU policies favouring implementation of MAR
Increase fresh water resources
Improve development of all economic sectors as a result of an increase in water availability

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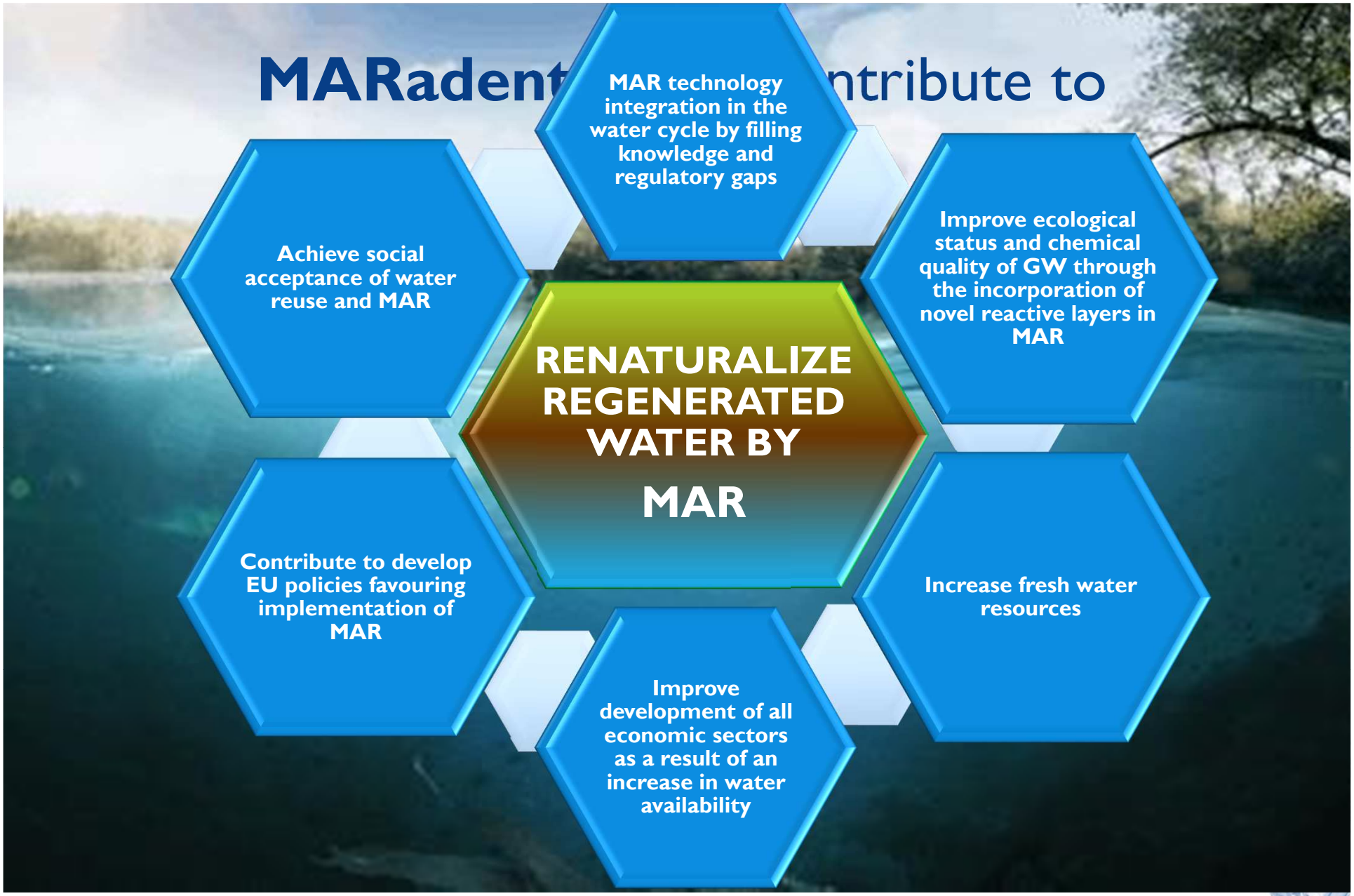

Any comments?