ACWAPUR

Accelerated Water Purification during Artificial Recharge of Aquifers – A tool to restore drinking water resources

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Water JPI
WaterWorks2014 Cofunded Call
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CONSORTIUM DESCRIPTION

ACRONYM	TOPIC	Coordination	Partners
ACWAPUR	**I**		
Accelerated Water Purification during Artifical Recharge of Aquifers – A tool to restore drinking water resources		**Artificial recharge, water recycling, reuse of water, pathogens, pollutants, drinking water, contaminants, groundwater, N, P, inorganic nutrients**	

PRINCIPAL INVESTIGATOR	INSTITUTION	COUNTRY
Jens Aamand	**Geological Survey of Denmark and Greenland**	**Denmark**
Jesus Carrera	Instituto de Diagnostico Ambiental y Estudios del Agua	Spain
Sara Hallin	Swedish University of Agricultural Sciences	Sweden
Caterina Levantesi	Italian National Council of Research	Italy
Xavier Sanchez-Vila	Universitat Politecnica de Catalunya	Spain

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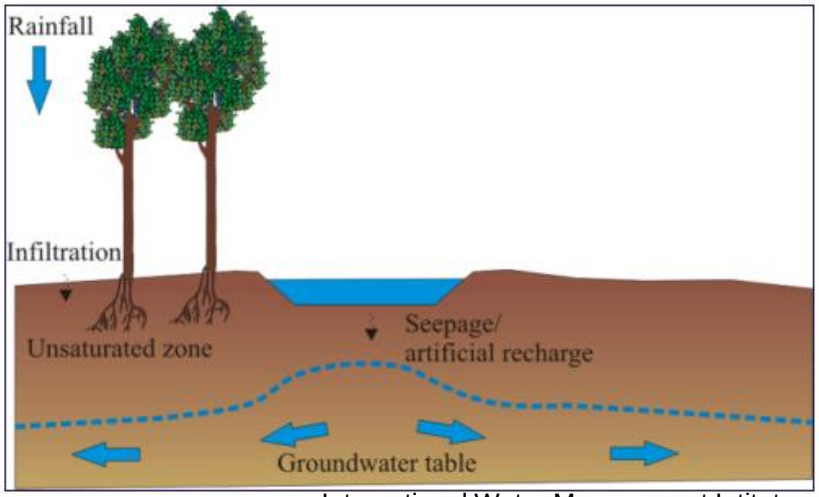
Artificial Recharge of Aquifers

Groundwater is an important, but limited drinking water resource worldwide

Over exploitation of groundwater lead to

- Aquifer depletion
- Salt water intrusion
- Streams impairment
- Wetlands desiccation



International Water Management Intitute

Artificial recharge of aquifer – a tool to replenish overexploited groundwater resources

Aim of Project

To develop **new technological applications, and management tools and guidelines** to prevent leaching of pathogens, inorganic nutrients, organic pollutants, and their degradation products to underlying aquifers during Artificial Recharge of Aquifers (ARoA).

This will be achieved by the construction of **advanced treatment barriers** that hinder leaching of pathogens and at the same time provide optimal conditions for microbial degradation processes

The JPI - Waterworks 2014 call

Research and Innovation for Developing Technological Solutions and Services for Water Treatment, Reuse, Recycling and Desalination:

Developing low-energy, low cost, low chemical and high-efficiency technologies and processes for water treatment and desalination

Developing water recycling technologies and concepts leading to the production of safe resources for reuse;

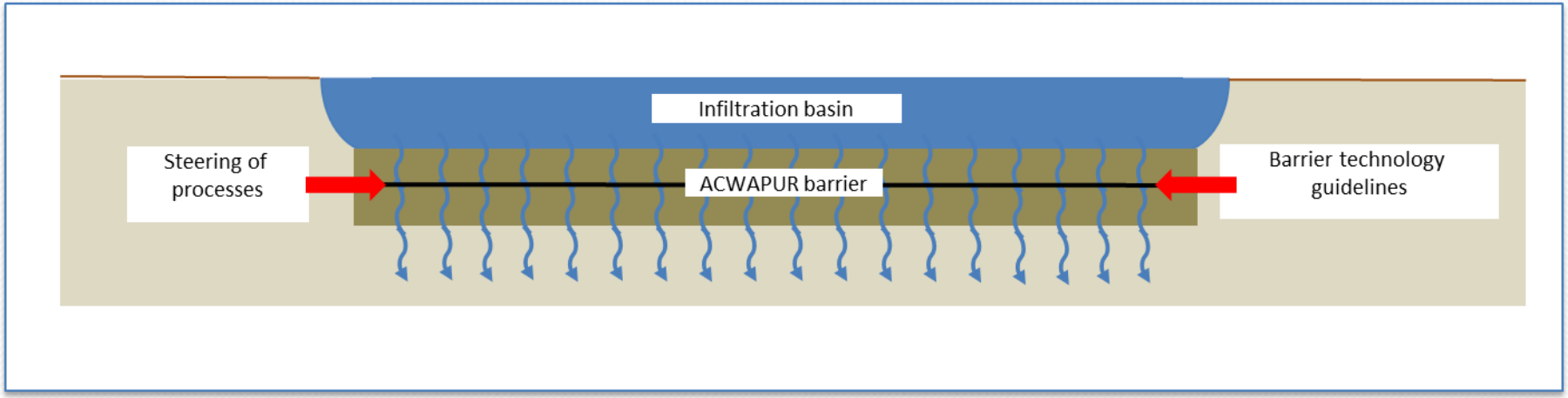
Developing innovative chemical/physical/biological tools to assess risks and to enhance the resilience of urban water systems;

Artificial Recharge of Aquifers

Artificial recharge of Aquifers are used worldwide, but is most often operated as a 'black box' technology

The technology face problems related to

- Leaching of nutrients (e.g. NO_3)
- Leaching of organic pollutants (e.g. pesticides, pharmaceuticals)
- Leaching of pathogens and antibiotic resistance



Steering of processes

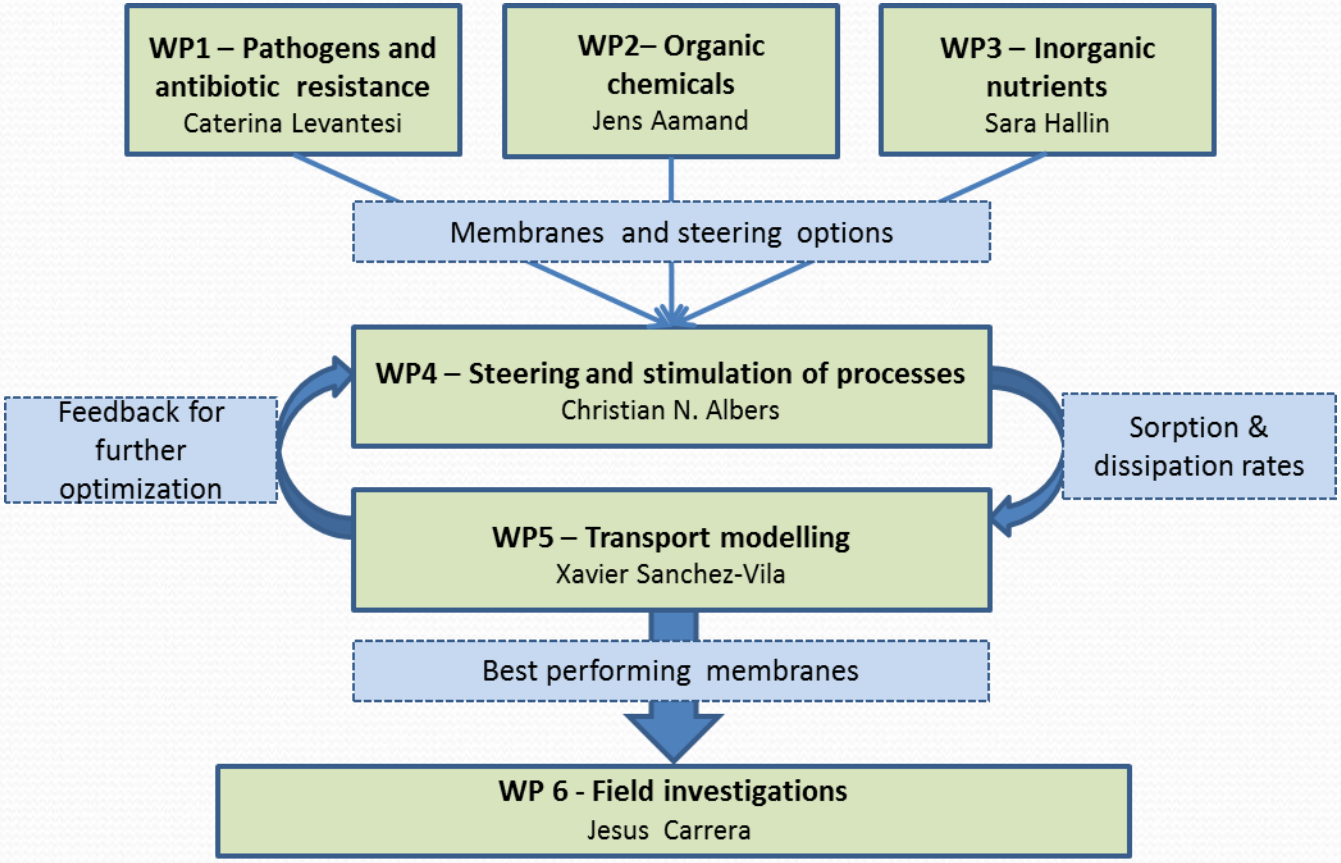
The Barrier

E.g. clay, sand mixed with vegetable compost, releasing easily degradable organic matter, thereby creating series of redox conditions.

The Steering Tool

- Stimulation of ammonium oxidizing bacteria degrading organic pollutants co-metabolically
- Supply of degrading bacteria and/or nutrients
- Addition of organic carbon to facilitate N removal
- Coating of barriers with iron oxides to facilitate entrapments of pathogens
- Introduction of submerged plants provide oxygen and prevent clogging

Project structure



Partner experiences

GEUS

Sorption & degradation of contaminants. Large scale column Set-ups

CNR

Spreading of pathogens & antibiotic resistance

SLU

Nitrate removing processes Molecular microbiology

ACWAPUR

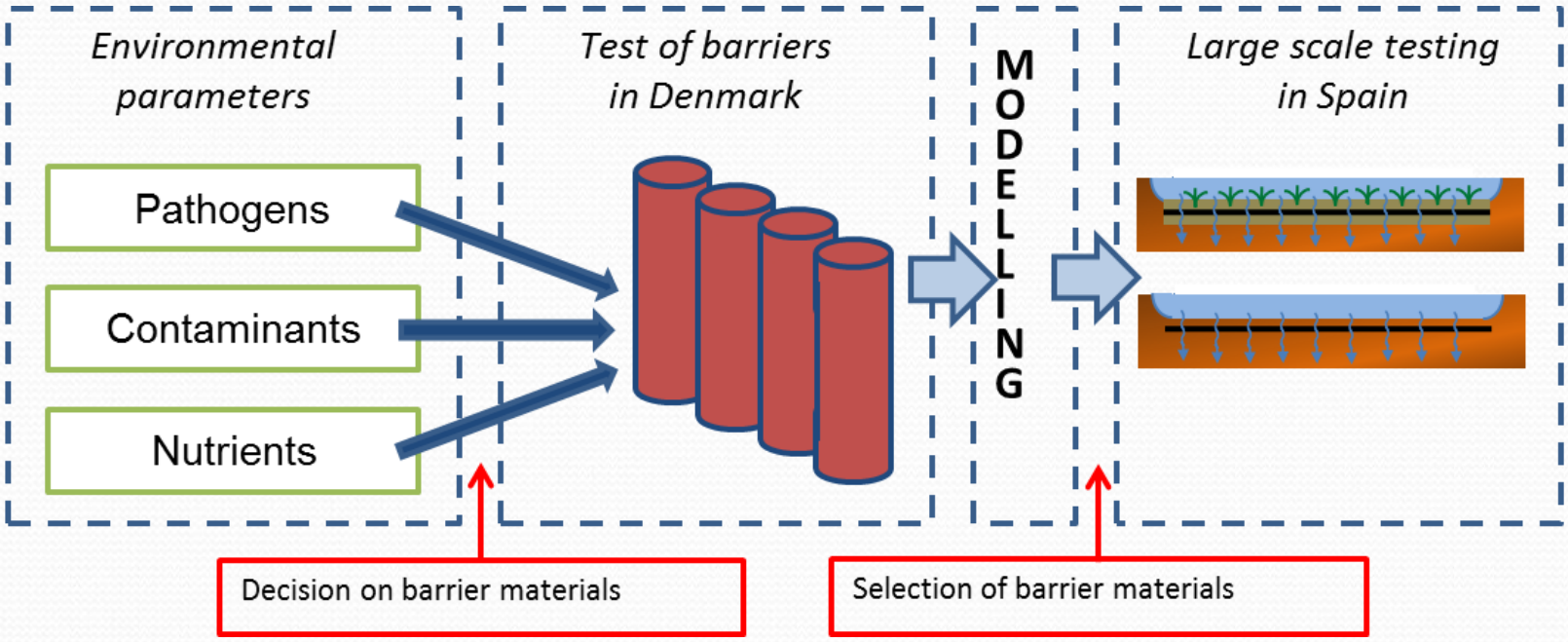
UPC

Mathematical modelling of contaminant fate

CSIC

Advanced chemical analysis Experience with field work & access to field site

Research flow



Impact

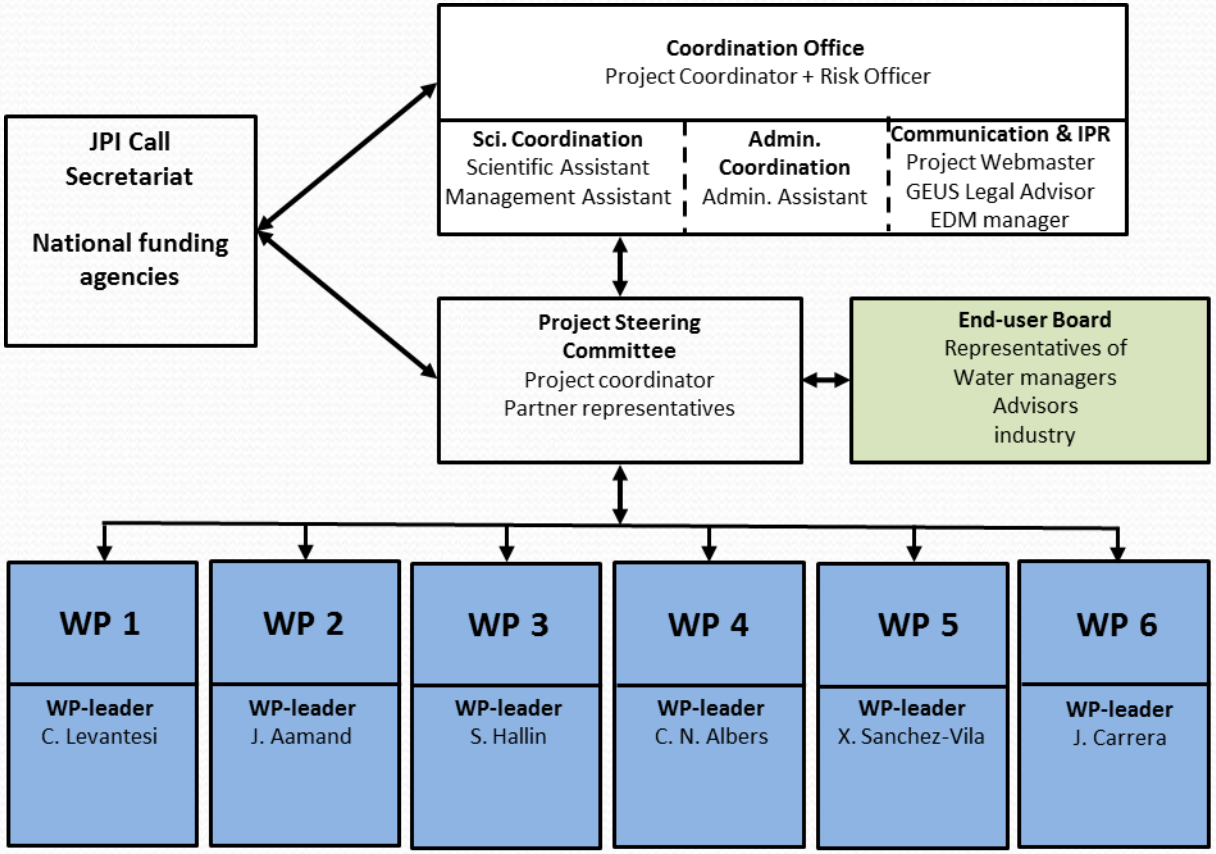
Artificial Recharge of Aquifers (ARoA) is considered as one of the most cost-effective and environmental friendly technologies for treatment of polluted waters.

In practise it is the only technology available for replenishment of overexploited water resources.

ACWAPUR will improve the effectiveness of ARoA through the development of tailored and reliable barriers preventing the intrusion of organic chemicals, inorganic nutrients, and pathogens into groundwater aquifers.

The ACWAPUR outcome will support water managers implementing the Water Framework Directive and other water management strategies.

Implementation



The End-Users Board

Contact person	Organisation/Country	Field
Uwe Dünnbier	Berliner Wasserbetriebe, D	Waterworks
Victoria Colomer	Catalonian Water Agency, ACA, E	Government Agency- Water Resources
Enric Queralt	Groundwater Users Cooperative (CUADLL), E	Water supply, ARoA
Philip McCleaf	Uppsala Water and Waste AB (Municipal company), SE	Drinking Water Treatment/Water Resources
Willem-Jan Knibbe	Oasen, NL	Waterworks
Claus Jørgensen	DHI, DK	ARoA-advisory
Paola Miana and Stefano Della Sala	Veneziana Energia Risorse Idriche Territorio Ambiente Servizi (VERITAS)	Waterworks

ACWAPUR

A three-year project to be finished 30th April 2019

Kick-off meeting in Uppsala, Sweden 26th May 2016

Project meetings

- January 2017 in Copenhagen
- January 2018 in Barcelona
- November 2018 in Rome

ACWAPUR will educate

- 2 Postdocs (30 and 36 months)
- 2 PhDs
- 1 Early Stage Researcher (24 month**)**

Outcome/deliverables

New barrier prototypes (end of project)
Guidelines for management and steering of ARoA (end of project)

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