Workshop on the Alignment of on-going projects Topic: Emerging Pollutants and Pathogens

30 November 2016
Vienna, Austria

Welcome

Rosa Rodríguez Bernabé
WW2014 Coordinator
(MINECO, Spain)

Dominique Darmendrail
Water JPI Coordinator
(ANR, France)

Alignment of on-going project aims at:

- Improving the efficiency and effectiveness of the Water JPI Community: Can we do more with what we have?
- Linking projects to the strategy of the Water JPI
- Bringing gaps during the execution of projects
- Topic: Emerging Pollutants, including pathogens
- Targeted projects:
  - Water JPI Pilot Call
  - Waterworks2014
  - Other international collaborative projects
  - Relevant national projects

Joint Programming

- Is a new way to address RDI problems with (at least) European dimension
  - An initiative of European Member States and the European Commission
  - For tackling major, common, European societal challenges in a coordinated way, through:
    - coordinating national / regional, public, research, development and innovation programmes in Europe
    - Developing Joint multilateral activities
    - **aligning** national research programmes in an effective manner,
    - making better use of Europe's limited public RDI funding
    - and extending links to various international initiatives.
  - A process based on variable geometry

Water JPI

10 JPIs since 2008

- Alzheimer and other Neurogenerative Diseases (JPND)
- Agriculture, Food Security and Climate Change (FACCE)
- A Healthy Diet for a Healthy Life (HDHL)
- Cultural Heritage: a Challenge for Europe (JPI CH)
- Urban Europe - Global Urban Challenges, Joint European Solutions (Urban Europe)
- Connecting Climate Knowledge for Europe (Climate)
- More Years, Better Lives - the Potential and Challenges of Demographic Change (MYBL)
- Antimicrobial Resistance - The Microbial Challenge - An Emerging Threat to Human Health (JPIAMR)
- Water Challenges for a Changing World (Water)
- Healthy and Productive Seas and Oceans (Oceans)

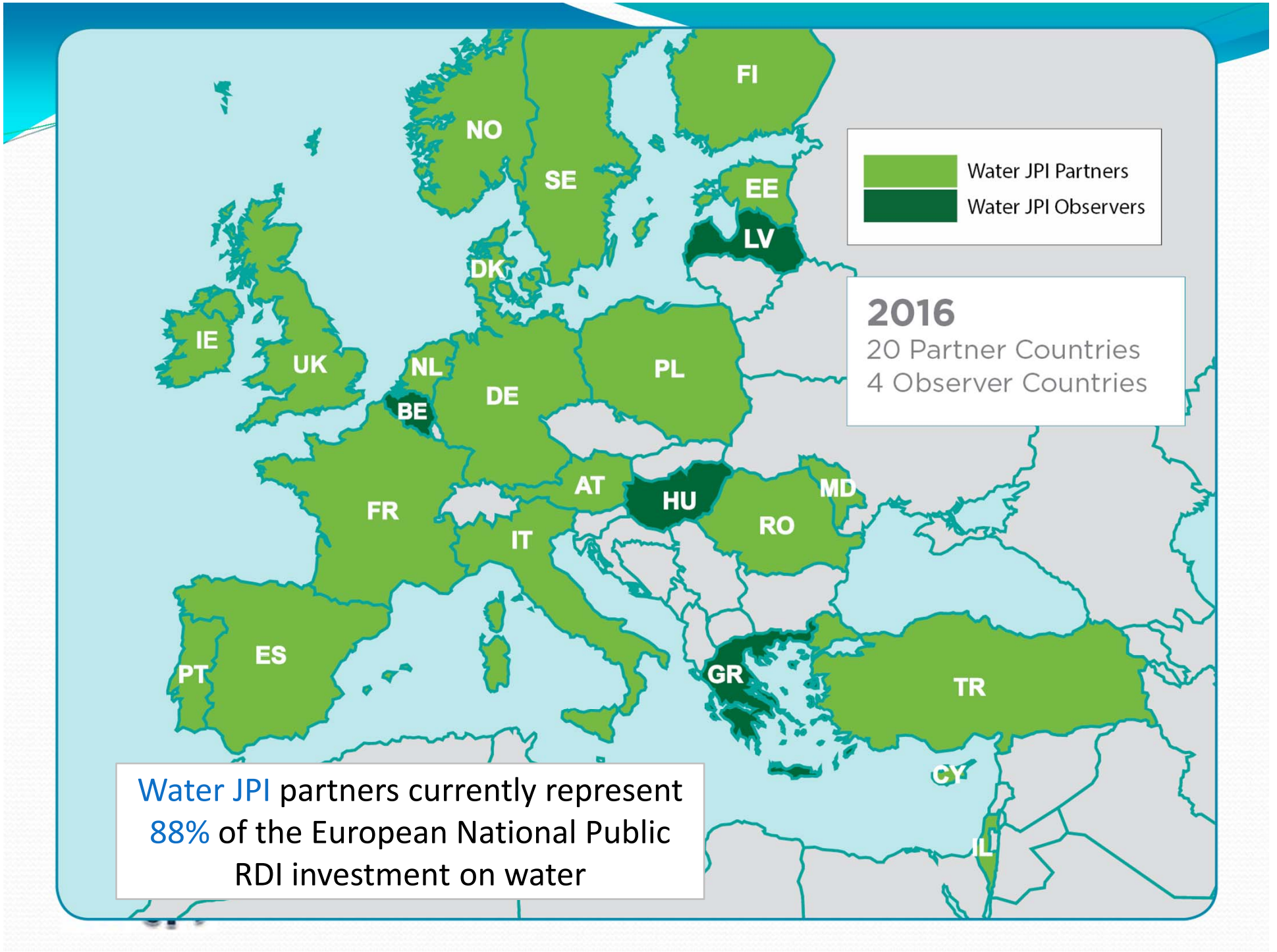
The Water JPI

- The Water JPI, entitled "Water Challenges for a Changing World", was formally approved by the European Council in December 2011.
- The Water JPI is dedicated to tackling the ambitious challenge of achieving sustainable water systems for a sustainable economy in Europe and abroad.
- This will be realised through a multi-disciplinary approach, which includes economic, ecological, societal and technological considerations.

UN Sustainable Development Goals

Water is central to many of the UN SDGs

Water JPI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Water JPI Partners
Water JPI Observers
2016
20 Partner Countries
4 Observer Countries
Water JPI partners currently represent 88% of the European National Public RDI investment on water

Main Objectives of Water JPI and Activites to Realise

OBJECTIVES

Reaching effective, sustainable coordination of European water RDI

Involving water end-users for effective RDI results uptake

Harmonising National water RDI agendas in Partner Countries

Supporting European leadership in science and technology

TOOLS / ACTIVITIES

Joint Call Management for providing and steering **research and innovation** in the water sector

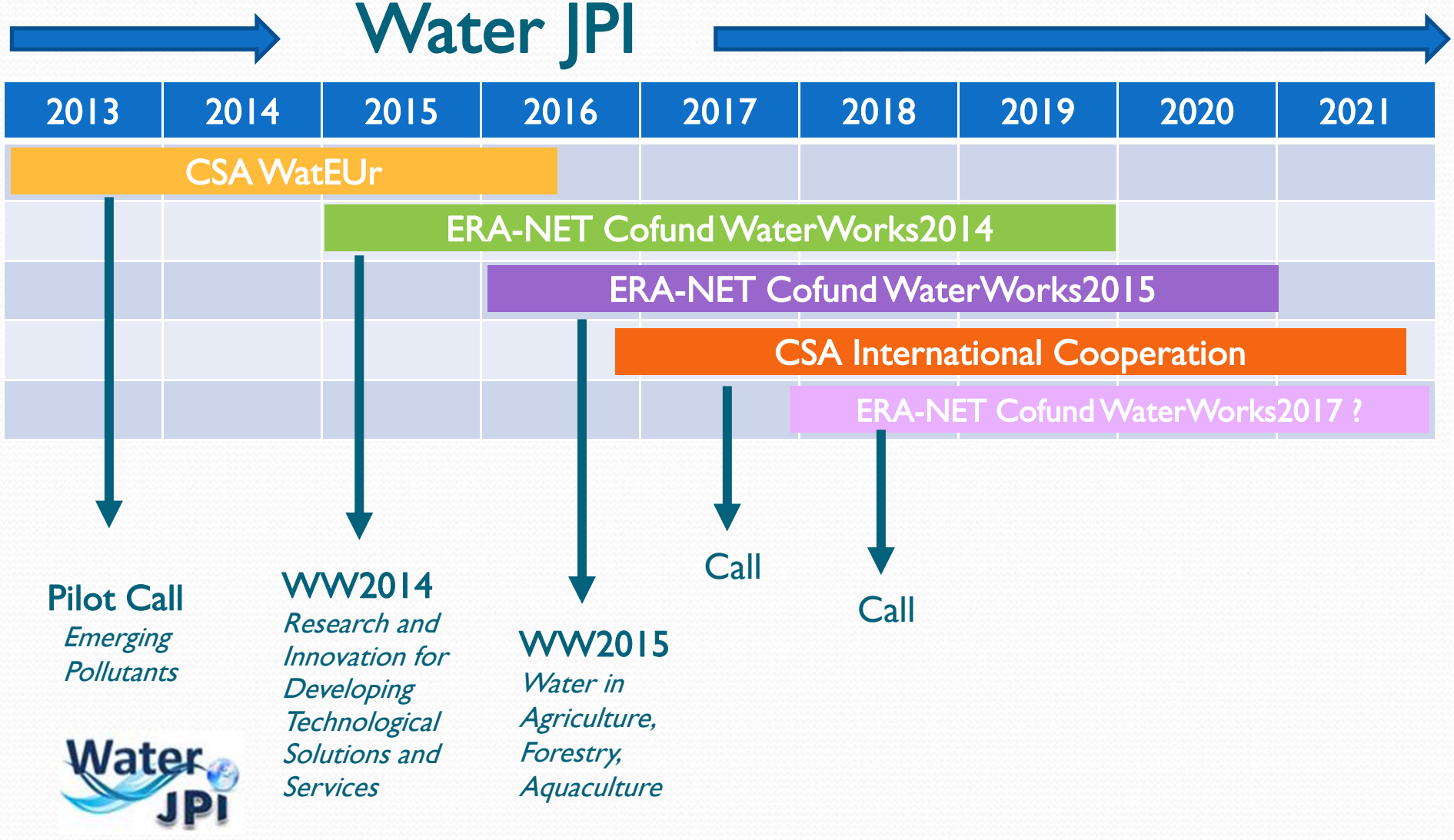
Alignment of Research Agendas (SRIA Document and Implementation Plan) and RDI activities (including mapping activities and infrastructures)

International Cooperation (MoUs, Call Partnerships…)

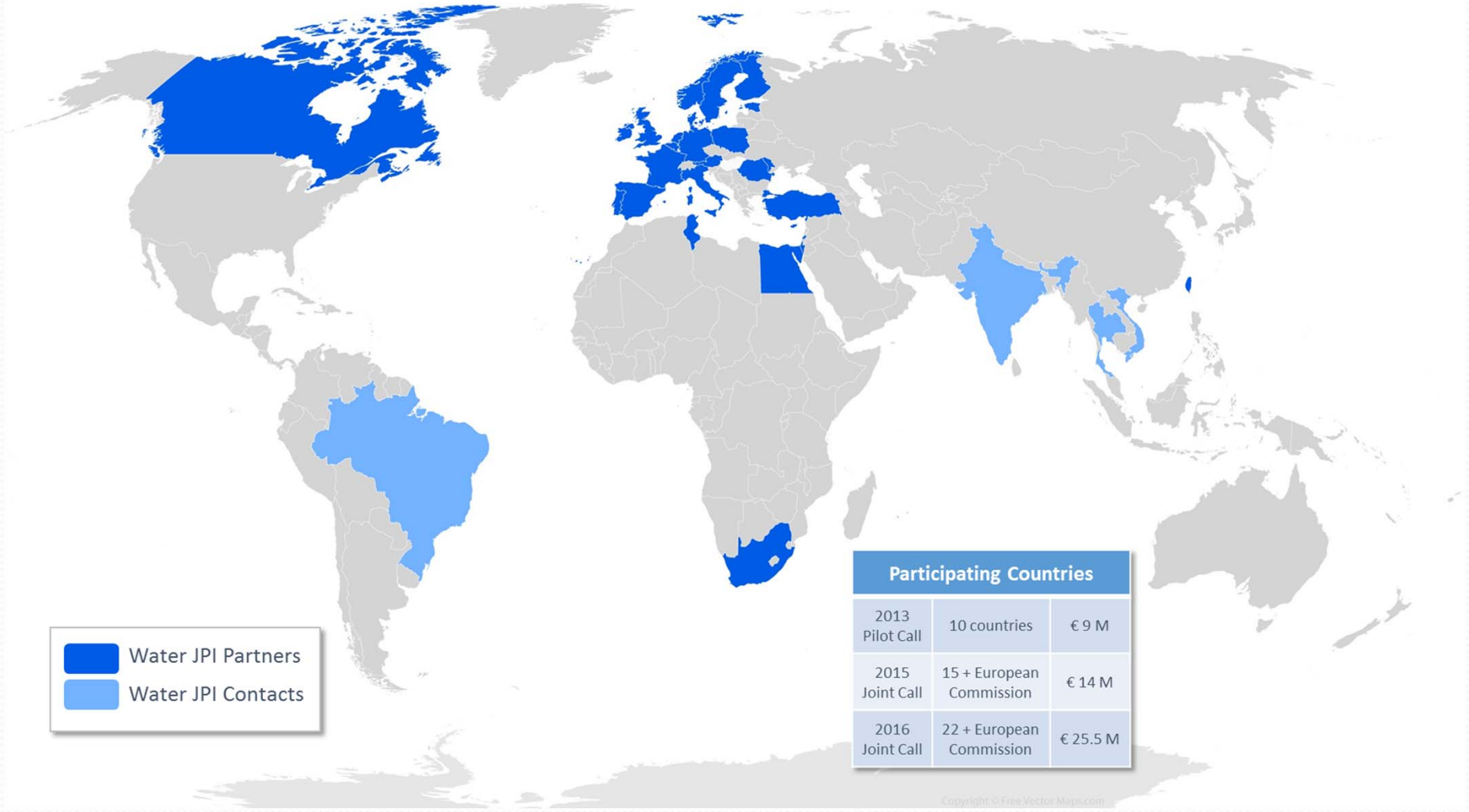
Possible Joint Actions

- Shared strategic research & Innovation agenda
- Mapping exercises
- Joint calls
- Knowledge hub (Including development of policy briefs, innovation factsheets)
- Demonstration programmes or launch of demonstration platforms
- Access to key infrastructures, observatories
- Training and capacity building
- Joint events / conferences / workshops / webinars
- Brokerage events / roadshows
- Mobility schemes (for researchers, for research programmes managers)
- Connections with leading research networks (e.g. COST Actions)

Timeline of Water JPI Joint Calls



First implementation actions



Participating Countries		
2013 Pilot Call	10 countries	€ 9 M
2015 Joint Call	15 + European Commission	€ 14 M
2016 Joint Call	22 + European Commission	€ 25.5 M


Water JPI
Strategic Research & Innovation Agenda 2.0
Water Joint Programming Initiative
KEY ACHIEVEMENTS 2011 – 2016
APRIL 2016
Water JPI
www.waterjpi.eu
Water Joint Programming Initiative
AN INTRODUCTION TO THE STRATEGIC RESEARCH & INNOVATION AGENDA 2.0
APRIL 2016
www.waterjpi.eu

Water JPI

SRIA

Strategic Research and Innovation Agenda

- Conceived as a participatory, inclusive, shared and forward-looking strategic document that lays out Research, Development and Innovation (RDI) needs in Europe in the field of water
- Conceived as an instrument to guide European research and innovation

➡ **Objective: to be the European reference document on water stakes that will frame H2020 calls, etc.**

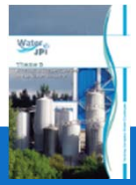
SRIA structure

Vision Document
(5 themes)

Theme 1
Improving Ecosystem Sustainability and Human Well-being

Theme 2
Developing Safe Water Systems for Citizens

Theme 3
Promoting Competitiveness in the Water Industry



Theme 4
Implementing a Water-wise Bio-based Economy

Theme 5
Closing the Water Cycle Gap
Improving Sustainable Water Resources Management

SRIA 2.0
(5 themes and 11 sub-themes)

Outcomes expected:

- Progress in alignment of projects through:
  - exploring collaborations and synergies
  - identifying stakeholders and discussing how to better target them
  - identifying knowledge gaps in relation to Water JPI SRIA
  - suggesting topics for workplans, strategic agendas, calls, etc.

Agenda

8:30 - 9:00	Participant Registration
09:00 – 09:15	Welcome and presentation of the workshop and its objectives
09:15 – 09:35	Tour de Table *1slide for each project. Presented by speaker*
09:35 – 10:05	Impact in policy of RDI activities
10:05 – 11:30	Poster session Coffee (served from 11:00)
11:30 – 13:00	Working sessions in parallel groups (Part I) • Focus on collaboration, impact of collaboration and needs • Breakout group topics: *1) ecological status* *2) human risks and environmental risks* *3) chemical analysis* *4) microbial resistance*

Agenda

13:00 – 14:00	Lunch
14:00 – 15:45	Working sessions in parallel groups (Part II)
15:45 – 16:00	Short Break
16:00 – 17:25	Presentations by Rapporteurs and discussion on the outcome of the working sessions
17:25 – 17:45	The Knowledge Hub of the Water JPI.
17:45 - 18:00	Conclusions and Closure
18:00 – 19:30	Cocktail and networking

Tour de Table

Miguel A. Gilarranz (MINECO, Spain)

MOTREM

Title: *Integrated Processes for Monitoring and Treatment of Emerging Contaminants for Water Reuse*

Coordinator: Javier Marugán (URJC, Spain)

Funding institution: MINECO, BBF, AF, MIUR, CDTI

Number of Partners and countries: 6 ES, DE, FI, IT

Partners from: Academia, companies

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

PERSIST

Title : Fate and persistence of emerging contaminants and MRB in a continuum of surface water groundwater from the laboratory scale to the regional scale

Coordinator/representative : Corinne Le Gal La Salle

Funding institution : University of Nîmes, EA CHROME

Number of Partners and countries: 3 ES, FR, GR

Partners from: Water agency, Water Companies, Academia, SME, administration

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

PROMOTE

Title: Protecting Water Resources from Mobile Trace Chemicals – PROMOTE

Coordinator/representative: Urs Berger/Thorsten Reemtsma

Funding institution: Bundesministerium für Bildung und Forschung (Germany), Forskningsrådet (Norway), Ministerio de Economía y Competitividad (Spain), Office National de l'Eau et des Milieux Aquatiques (France)

Number of Partners and countries: DE, ES, NO, NL, FR

Partners from: Academia, research institutes, authorities

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

StARE

Title: Stopping Antibiotic Resistance Evolution

Coordinator/representative Célia Manaia / Sara Rodriguez

Funding institution: RPF (CY), BMBF (DE), AKA (FI), EPA (IE), RCN (NO), FCT (PT), MINECO (ES)

Number of Partners and countries: 7 NO, ES, FI, PT, IE, CY, DE

Partners from: Academia, SME, companies, administration

Breakout session:

1. Ecological status
2. Human risks and environmental risks
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4. Microbial resistance

TRACE

Title: Tracking and assessing the Risk from Antibiotic Resistant genes using Chip technology in surface water Ecosystems

Coordinator/representative: Wolfgang Fritzsche (GE)/ Carles Borrego (ES)

Funding institution:	JPI Water
Number of Partners and countries.	6: GE (2x), ES, IT, PT, IE
Partners from:	Academia, SME,

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

ACWAPUR

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

Jens Aamand, Geological Survey of Denmark and Greenland

Innovation Fund Denmark

Funding institution: IFD(DK), MIUR (IT), MINECO (ES), FORMAS (SE)

5 partners, 4 countries: DK, SE, IT, and ES (all from academia)

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

DESERT

Title: Low Cost water desalination and sensor technology compact module

Coordinator/representative: Gaetano Alessandro Vivaldi (Executive coordinator)

Funding institution: EU, MIUR, F.R.S.-FNRS, CDTI and MINECO

Number of Partners and countries: 5 ES, IT, BE

Partners from: University, research centers and enterprise

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

MeProWaRe

Title: Novel **Me**thodology for the **Pro**motion of Treated Wastewater **Re**use for Mediterranean Crops Improvement

Coordinator/representative: Dr. Eng. Alfieri Pollice

Funding institution: MIUR (IT), FCT (PT), MINECO (ES)

Number of Partners and countries: 4 IT, ES, PT

Partners from: Academia

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

Reuse and management

Pioneer STP

The Potential of Innovative Technologies to Improve Sustainability of Sewage Treatment Plants

Coordinator/representative University of Santiago de Compostela

Funding inst. MINECO/CDTI(ES), FORMAS (SE), IFD (DE),MIUR (IT)

Number of Partners and countries. eg: 5 ES, IT, DK, SE

Partners from:

Academia: University of Verona, Technical University of Denmark, Royal Institute of Technology

Companies: Aqualia

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

Control, Mitigation and treatment

PROGNOS

Title: Predicting In-Lake Responses to Change Using Near Real Time Models

Coordinator: Don Pierson Uppsala University Sweden

Funding institution IS-EPA, NO-RCN, SE-FORMAS, DK-IFD, IL-MOE

Number of Partners and countries 5: SE, NO, DK,IE,IL

Partners from: Academia, SME, companies, administration

Stockholm Vatten, UFZ, Magdeburg, Oslo Kommune, Irish Water, Israeli Water Authority

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

WATINTECH

Smart Decentralized Water Management through a dynamic integration of technologies

Coordinator/representative: Ignasi Rodriguez-Roda

Funding institution: IFD (DK), MIIUR (IT), FCT (PT), CDTI (ES) MINECO (ES).

Number of Partners and countries: 5 ES, IT, PT, DK

Partners from: Academia, companies

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

WE-NEED

Title: WatEr NEEDs, availability, quality and sustainability

Coordinator/representative: Monica Riva

Funding institution: MIUR, MoE-IL, MINECO, FTC

Number of Partners and countries. 4 ES, IS, IT, PT

Partners from: Academia

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

Project

Title: GeoSorbents (Novel water treatment materials from low-cost clay minerals and industrial side-products)

Representative PhD Anne Heponiemi

Funding institution Finnish Funding Agency Tekes

Number of Partners and countries. eg: 3 FI

Partners from: Academia, SME, companies, administration

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

CONPAT

Title: Aquatic contaminants – pathways, health risks and management

Coordinator: Ilkka Miettinen/National Institute for Health and Welfare, Finland

Funding institution: Academy of Finland

Number of Partners and countries. 2 FI

Partners from: national research institutes

Breakout session:

1. Ecological status
2. **Human risks and environmental risks**
3. Chemical analysis
4. Microbial resistance

DeTER

Title: Detection, Toxicology, Environmental fate and Risk assessment of nanoparticles in the aquatic environment

Coordinator/representative: Dearbháile Morris

Funding institution: Environmental Protection Agency (Ireland)

Number of Partners and countries. 1, IE

Partners from: Academia

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

Investigation of the implications for Ireland of emerging standards on pharmaceuticals in receiving waters

Coordinator/representative: Neil Rowan

Funding institution: Environmental Protection Agency (Ireland)

Number of Partners and countries. 1, IE

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

Project

Title: Sources, Pathways and Environmental Fate of Microplastics

Coordinator/representative Dr Ian O'Connor

Funding institution: Environmental Protection Agency, Ireland

Number of Partners and countries. 3. IE, NL

Partners from: Academia, SME

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

Passive sampling as a screening tool for monitoring emerging contaminants

Coordinator/representative Dublin City University

Funding institution Irish EPA

Number of Partners and countries. eg: Ireland, UK,

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

PEACE

Pollution and ecosystem adaptation to changes in the environment

Luca Nizzetto

Norwegian Research Council

Number of Partners and countries: 3 NO, SV, CH

Partners from: Academia, Industry

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

REMANTAS

Title: Enhanced Raman scattering for aquatic media: a new technology for on-site analysis

Coordinator: Emmanuel Rinnert (Ifremer FR) / Representative: Stéphane Le Floch (Cedre FR)
Funding institution: French National Research Agency - ANR

Number of Partners and countries: 6 FR

Partners from: Academia, Research institutes, Association, Companies

Breakout session:

1. Ecological status
2. Human risks and environmental risks
3. Chemical analysis
4. Microbial resistance

Topics for the breakout groups

1. Ecological status: 1 project
2. Human risks and environmental risks: 9 projects
3. Chemical analysis: 4 projects
4. Microbial resistance: 3 projects
5. Other: 3

Topics for the breakout groups

1. Ecological status: 1 project
2. Human risks and environmental risks: 9 projects
3. Chemical analysis: 4 projects
4. Microbial resistance: 3 projects
5. Treatment, reuse, management

JPI members will join the groups and participate actively

Chairs

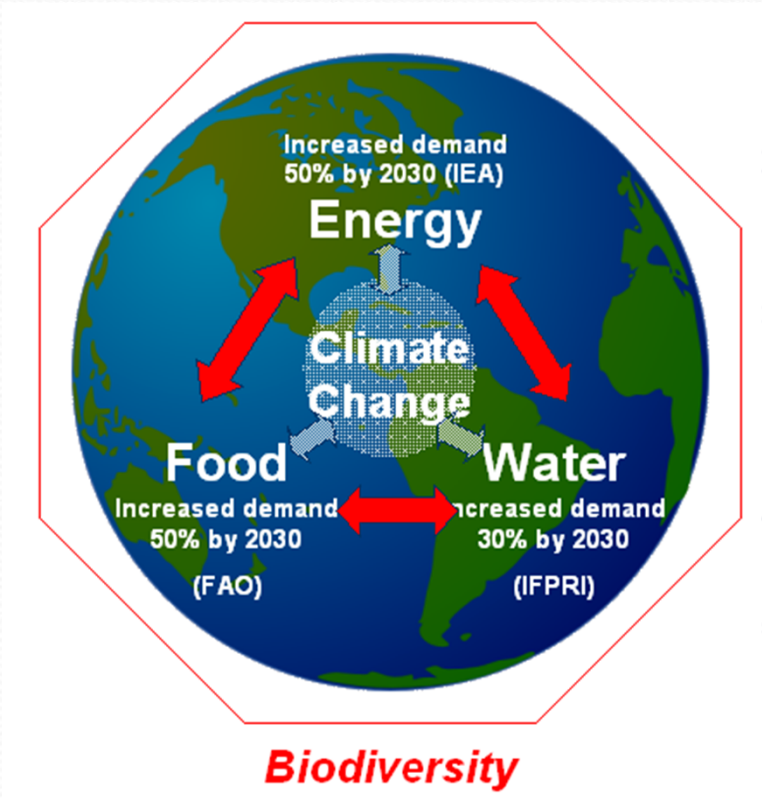
1. Ecological status, Human risks and environmental risks: Elve Lode
3. Chemical analysis: Øyvind Mikkelsen
4. Microbial resistance: Robert Konecni
5. Treatment, reuse, management: Steven Eisenreich

Impact in policy of RDI activities

Dr. Damià Barcelò

(IDAEA-CSIC, Barcelona, ICRA, Girona, Spain)

Water and food security
The challenge of feeding 9 billion people

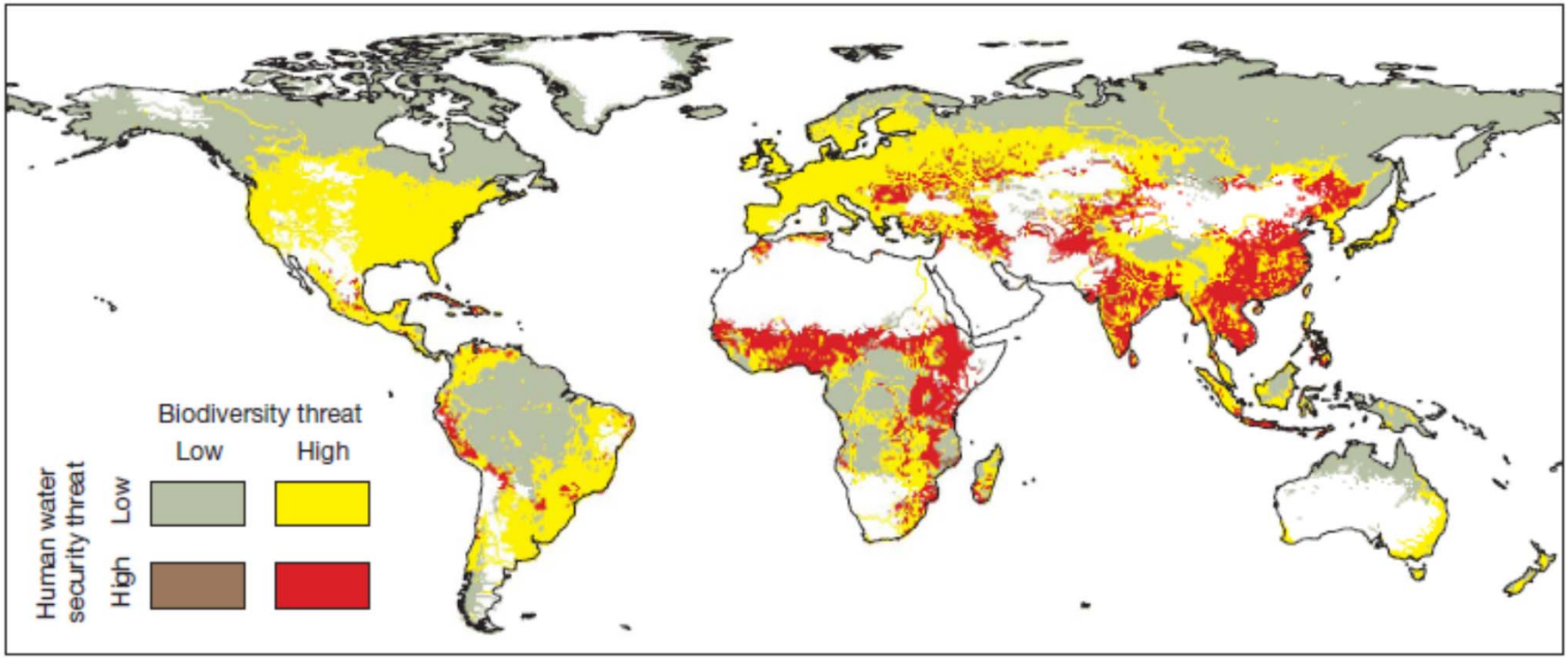


- Will the World face a Perfect Storm of problems by 2030?
- Prof. John Beddington (Science, 2010):
  - Through 1963-2011 global meat consumption increased from 72 to 297 Million Tonnes (meat–based diets)
  - Water, Food and Energy problems are intimately connected
- In the agricultural sector, farmers do not want to use water per se… they just want to grow crops profitably.

Water and food security
The challenge of feeding 9 billion people

- China has destroyed 28,000 rivers in 1993-2013… equivalent to Mississippi river flow of 16.790 m^3/s
- "*It has become a truism that Water Scarcity will be an important issue worldwide in the 21st century. We need to change in water management and use*" (The Big Thirst: The Secret life and Turbulent Future of Water, by Charles Fishman, 2011)
- From **water scarcity** to **resource scarcity**

Effects on water availability and biodiversity



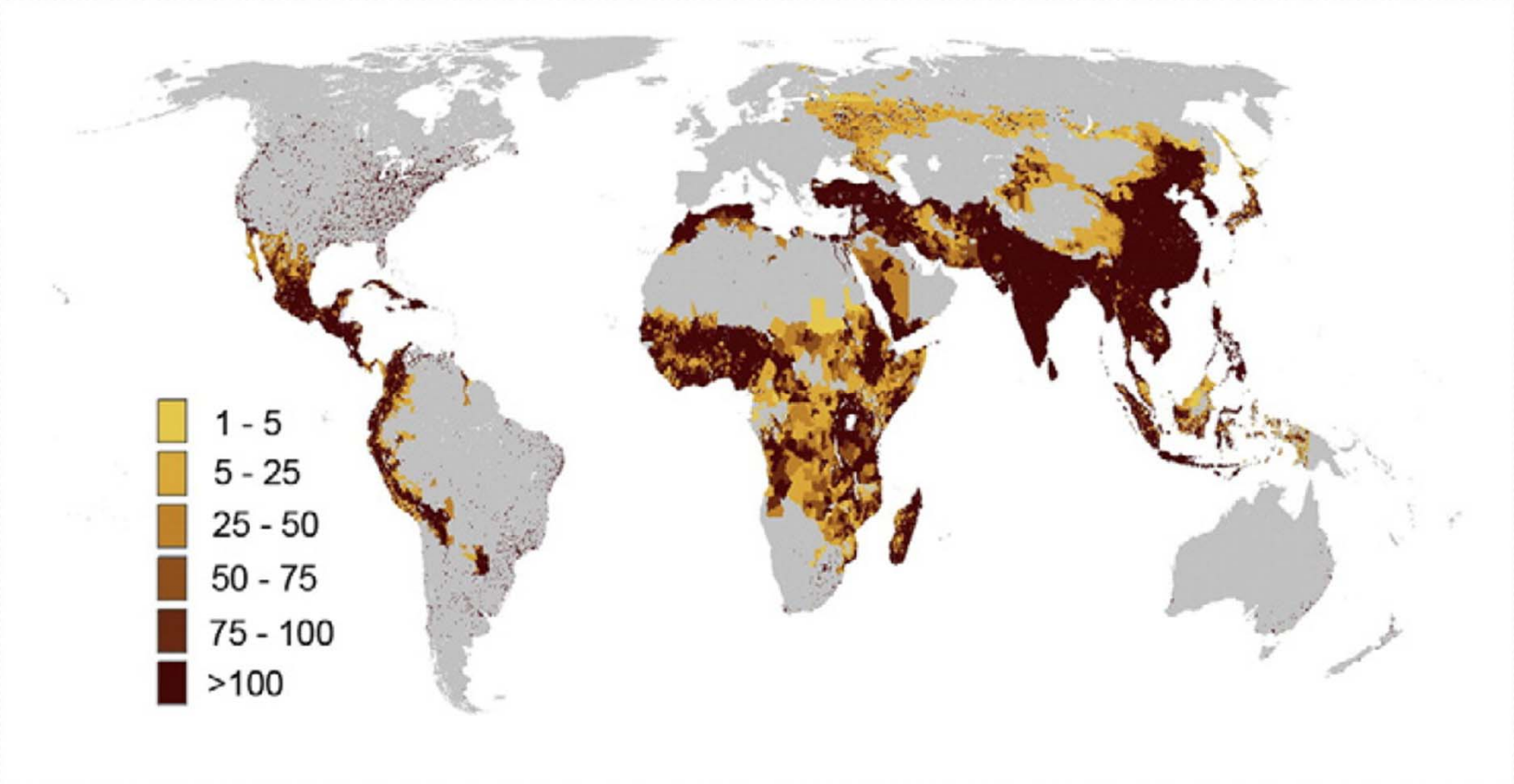
doi:10.1038/nature09440

Global threats to human water security and river biodiversity

C. J. Vörösmarty[1]*, P. B. McIntyre[2]*†, M. O. Gessner[3], D. Dudgeon[4], A. Prusevich[5], P. Green[1], S. Glidden[5], S. E. Bunn[6], C. A. Sullivan[7], C. Reidy Liermann[8] & P. M. Davies[9]

- 80% of human population under risk
- 72% of large rivers show high threat level

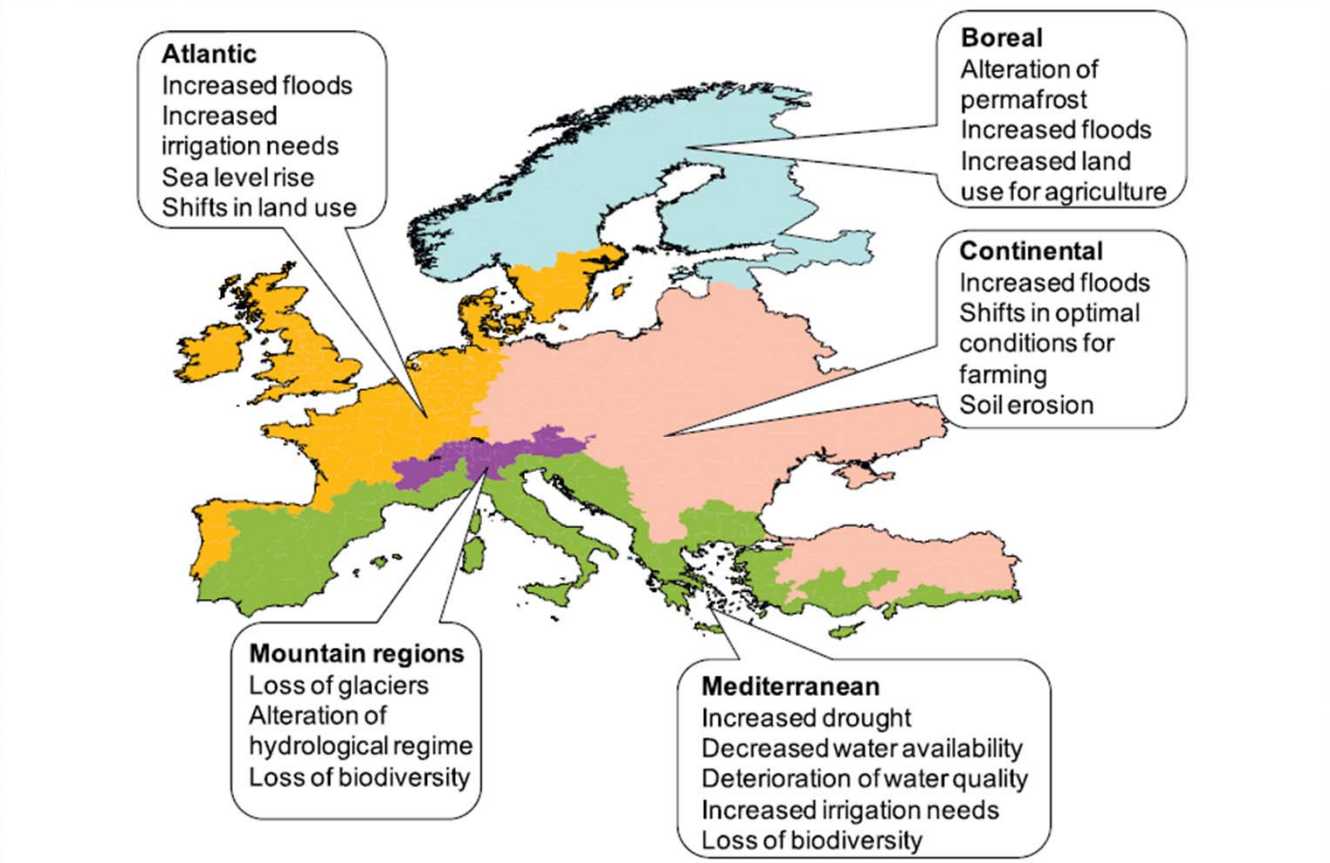
Projected global increases of demand for meat



Map showing projected global increases of demand for meat (beef, pig, chicken) from 2000–2030. Legend indicates kg/km^2 demand increase (FAO, 2011). Developing countries of Latin America, Africa, and Asia exhibit the highest levels of demand increase. Data for Europe were not available.

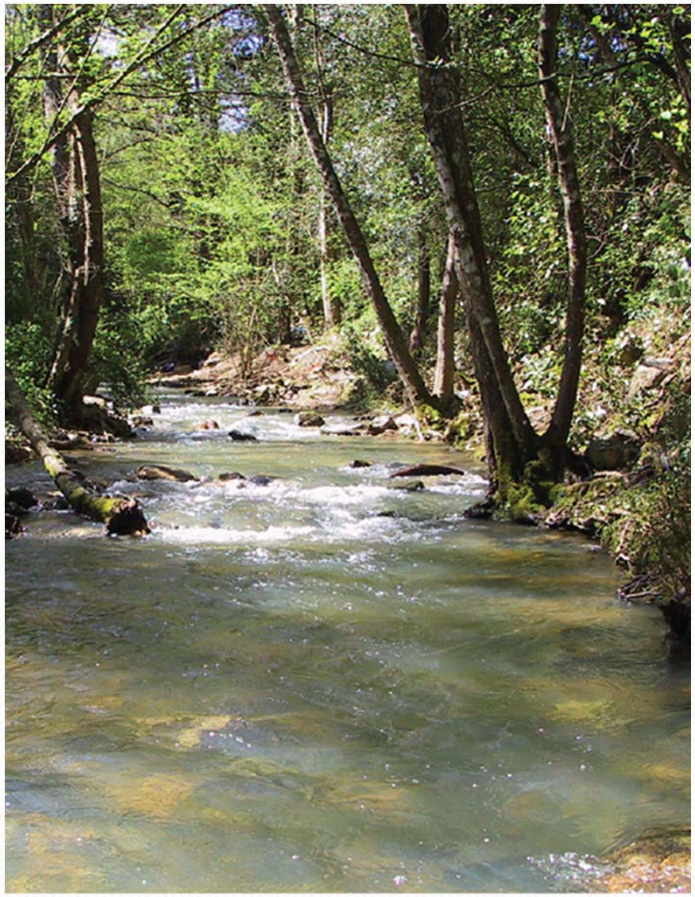
Source: Machovina et al. STOTEN (2015)

Changes in the risk of climate change



Summary of changes in the risk of climate change for agricultural water management in Europe

Source: Iglesias et al. Agricultural Water Management (2015)



Eco-Hydrology under scarcity: on-going projects

- Illustrating EU problems by case study with stakeholder alignment

River hydrology: Multiple stressors affect response to scarcity

- Higher hydrological variability
- Higher frequency of extreme events (floods, droughts)
- Higher water temperature
- Higher nutrient concentrations
- Presence of inorganic pollutants
- Presence of emerging contaminants
- Higher temperatures facilitate introduction of new pathogens
- Higher Indirect Human Exposure (via food) to pathogens and chemicals from agriculture

Why should we care about temporary waterways?

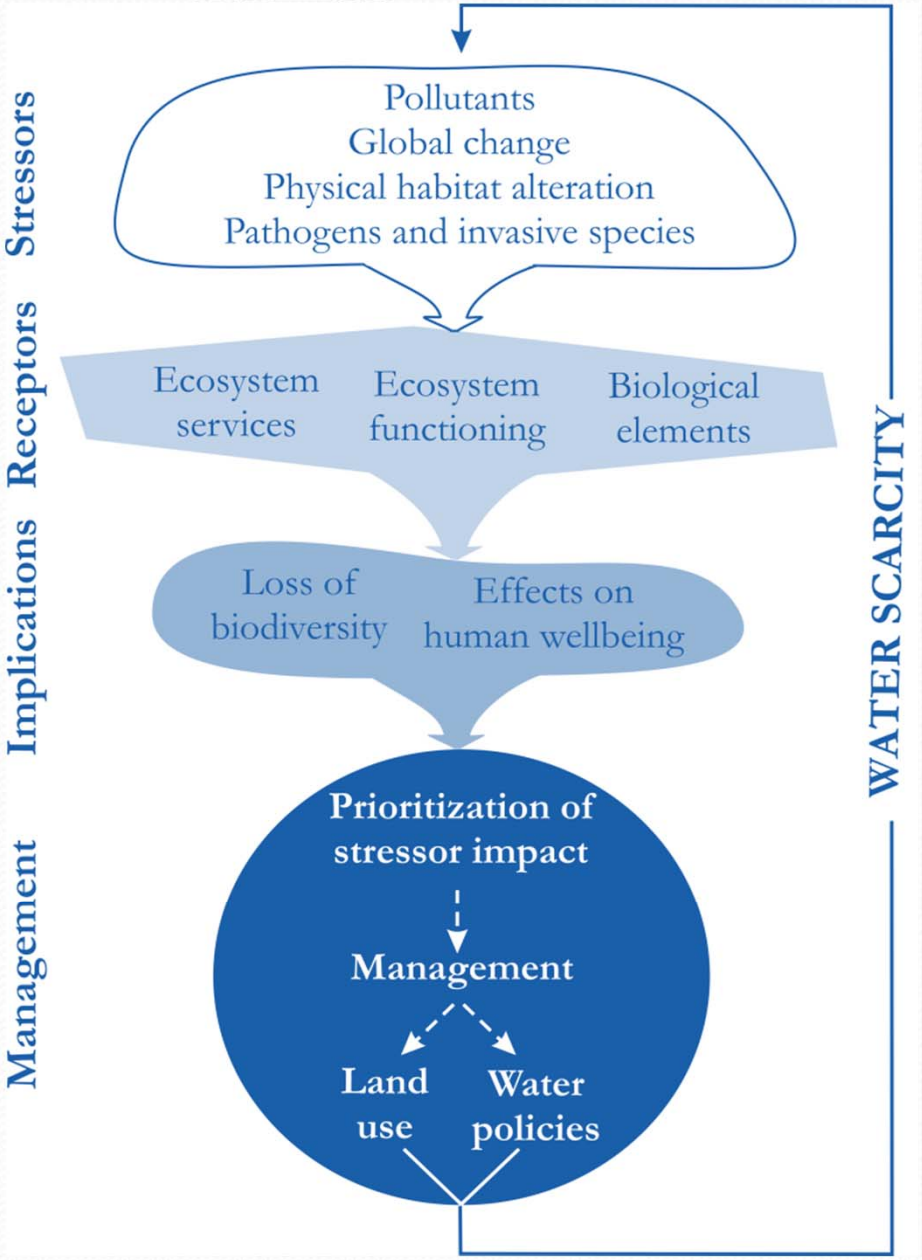
1. Between **30-60 % of global river network is temporary**, that is, waterways that cease to flow at some points in space and time along their course are as abundant as permanently flowing waterways. Moreover, some large permanent rivers are shifting to temporary because of climate change and extraction of water.

2. Temporary waterways have a **non-negligible ecological and economical value**, with unique aquatic and terrestrial diversities and crucial ecosystem services in semi-arid regions worldwide.

Acuña et al 2014 Science 343: 1080-1081

GLOBAQUA and SCARCE projects

- Addressing these issues requires moving from stressors to receptors, and then to the implications for biodiversity and humans.
- Recommendations can then be provided for management



GLOBAQUA WPs related with policy

- **WP9-SOCIOECON: methodology for socioeconomic management**

Objectives:
To estimate how changes in the supply, both in quantitative and qualitative terms, of the important water-related ecosystem services, **might affect the socio-economic development**

- **WP11-INTEGRATION: integrated model framework**

Objectives: Development of a prioritization and optimization model framework linked with dynamic, spatially- explicit water quality and quantity models based on environmental and economic considerations. Application to case-studies and up-scaling to pan-European scale, **so policy recommendations relevant for the EU directives can be formulated**

- **WP12-POLICY: water management policy**

Objectives: to establish **how current water management practices and policies could be improved** by accounting better for the interaction of multiple stressors within the frame of strong pressure on water resources.

GLOBAQUA actions undertaken

- Direct interaction with the members of the **advisory board**
- Participation **in policy events**:
  - 2013 Workshop on Biodiversity and Ecosystem Services: a strategic dialogue between science and policy organised by the Environment Directorate, DG RTD
  - 2015 MAES Delivery Workshop organised by EU and including an exhibition in which face-to-face presentations of MAES-related activities by EU, MS, stakeholders, and researchers were included
- Performance of **Stakeholders workshop** to elicit and validate preliminary values of ecosystem and to comments on scenario in all river basins included in GLOBAQUA project
- Collaboration with other EU projects in order to produce joint **policy briefs**

SCARCE WP related with policy

WP 9 – FRAME: Integration of results at the watershed scale and implications for generation of EU WFD River Basin Management Plans

- To transform results on management options
- To provide sound scientific assessment for River Basin Management Plan (RBMP) and Programs of Measures (PoM´s)

WFD 2000/60/EC

- Final objective: good ecological and chemical status of water bodies
- Management tool for the RBMPs

Filling the gaps in-between research and management

TRANSLATION TOOL

Connecting science-management practise

Management and regulatory oriented language

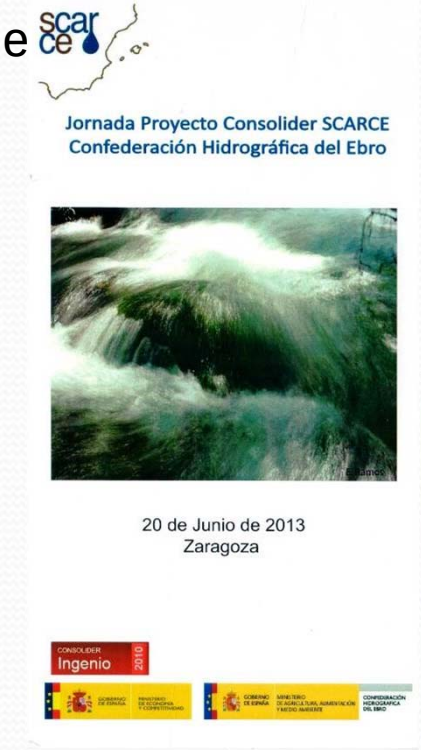
Brinding communication gaps between scientists and water managers

Added value to the river basin management

SCARCE/NET-SCARCE actions undertaken

- Meetings in the water authorities facilitie
  - June 2013, Ebro water authority

  - June 2013, Basque Water Agency

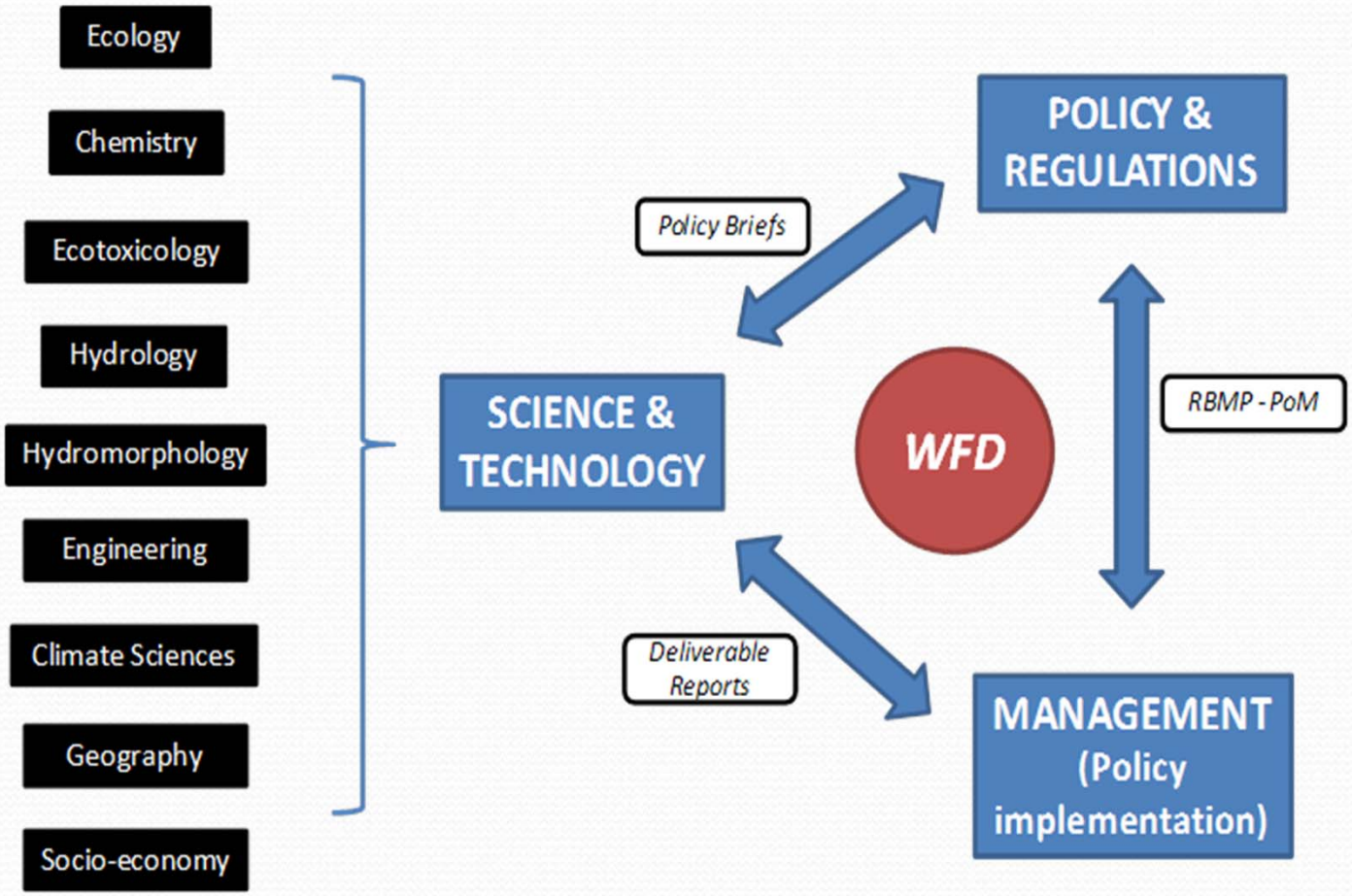


Science ↔ Policy

- **Cons**
  - **Different working "time scales"** in science (long term) and management (daily pressures)
  - **Different communication** channels, language styles and audiences.
  - **Economical crisis** does not facilitate the exchange between science and management
- **Pros**
  - There is a **public concern on the issue of global change** (climate, water scarcity…), particularly in the Mediterranean area.
  - **Adapting water management** to new needs require tools from different knowledge areas.
  - The **Water Framework Directive** constitutes the regulatory core around which new management has to be set.
    - Many aspects of the WFD require technical and scientific support
  - **European and national Research policy** (FP7, H2020, national…) in the field of water conceived to support regulatory needs.

Water JPI

The WFD as a core to work around

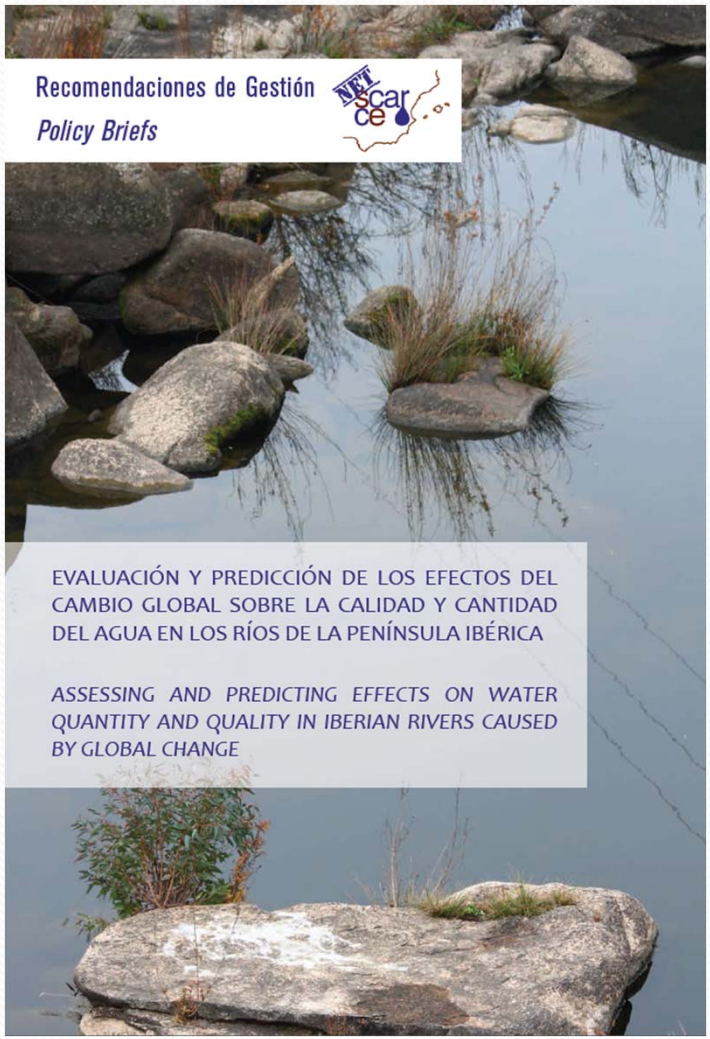


SCARCE conclusion: opportunities for collaboration

- Views of **scientists** and **managers** are complementary rather than mutually exclusive
- If daily pressures can be overcome, there are plenty of opportunities for a fruitful cooperation between both sides..
- We realize that **management technical staff** and **researchers** have often developed **good professional relationships** based on previous personal knowledge (same scientific and technical educational background etc.). This is an asset that should be promoted from the highest political and administrative levels.
- Along the **SCARCE** project some **practical examples** of **such collaboration** possibilities have been shown and are reflected in **Policy briefs .**

SCARCE/NET-SCARCE actions undertaken

- Publication of SCARCE Policy Briefs
  - Written in two languages (Spanish and English)
  - Summarize and transfer the most relevant scientific outcomes from SCARCE project to the water managers
  - Designed to overcome language barriers between managers and researchers
  - Including 9 policy briefs that deal with the main topics of the SCARCE project



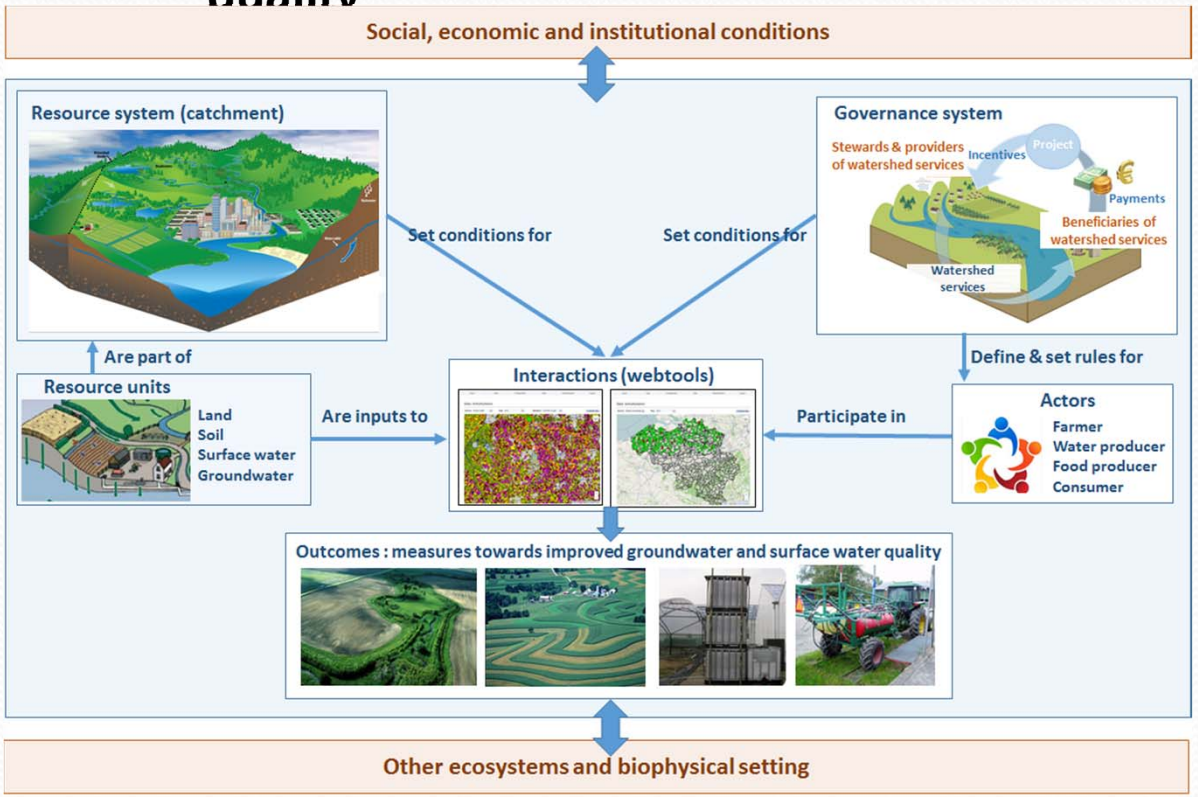
WATERPROTECT

Innovative tools enabling drinking WATER PROTECTion in rural and urban environments

H2020-topic:
RUR-04-2016: Water farms – improving farming and supply of drinking water.
H2020 - WP 2016-2017:9
Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy.

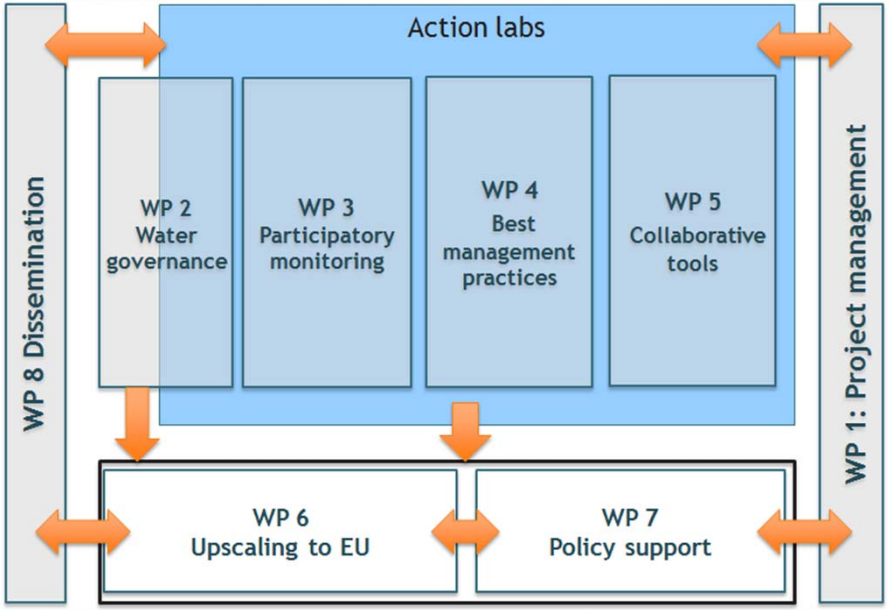
The overarching **objective** of WaterProtect is to **contribute to the effective uptake and realisation of innovative farming systems delivering good water quality**

To this end, WaterProtect will **create an integrative multi-actor participatory framework**, based on innovations in water governance, participatory monitoring, farming systems, and software tools that enable actors to monitor, to finance and to effectively implement management practices and measures for the protection of water sources. This will underpin the overall aim to produce **good drinking water quality through water farms** in rural and urban environments.



WATERPROTECT

Innovative tools enabling drinking WATER PROTECTion in rural and urban environments



WORK PACKAGE LOGIC AND INTERCONNECTION

The WaterProtect project is subdivided into 8 work packages and three phases. Phase I of the project is a generic stage involving WP2-5 (theories, literature, protocols for water governance through a desk study approach). Phase II uses the participatory action research approach in action labs in WP2-5. Phase III of the project uses a comparative case study approach to upscale the results from the action labs (WP6) and **to assess policy implications (WP7).** Throughout all phases activities for managing and steering this process (WP1: multi actor stakeholder management) and activities to ensure impact (WP8) are performed.

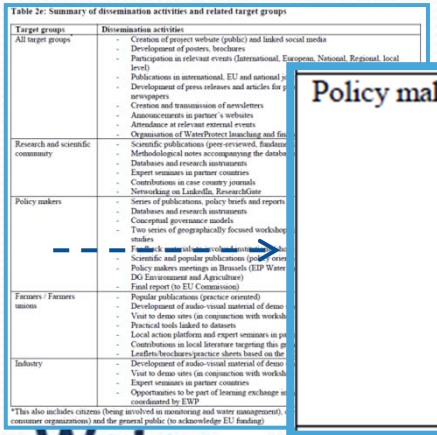
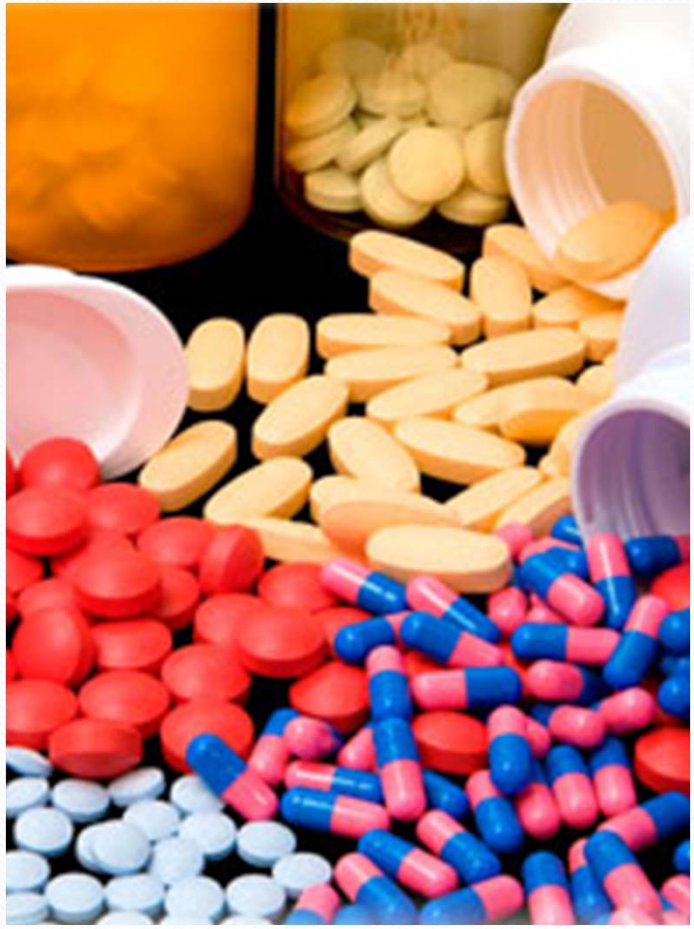


Table. Summary of dissemination activities and related target group

Policy makers	- Series of publications, policy briefs and reports - Databases and research instruments - Conceptual governance models - Two series of geographically focused workshops in partner countries with visit to case studies - Feedback materials to involved institutions (short fact sheets and briefs by request) - Scientific and popular publications (policy oriented contributions) - Policy makers meetings in Brussels (EIP Water and Agriculture, Working Group of DG Environment and Agriculture) - Final report (to EU Commission)



Water Framework Directive and Emerging Contaminants

- A problem of increasing magnitude for River Basin Manager…

EU Water Framework Directive

Precautionary Principle

Dynamic list – update every 4 years

Upcoming Priorities – Emerging Contaminants
(Future Candidates for Monitoring)

'Substances that are not part of routine monitoring programmes but have been shown to occur in the environment and may be candidate for **future regulations**, depending on research on their (eco)toxicity, potential health effects, public perception and on monitoring data regarding their occurrence in the various environmental compartments'

Emerging substances of concern

- Algal and cyanobacterial toxins
- Brominated flame retardants
- Disinfection by-products
- Gasoline additives
- Hormones and other endocrine disrupting compounds
- Organometallics
- Organophosphate flame retardants and plasticisers
- Perfluorinated compounds
- Pharmaceuticals and personal care products
- Polar pesticides and their degradation/transformation products
- Surfactants and their metabolites

Conclusions - where do we go next?

- ✓ Keep on developing of more sensitive and validated analytical methods for environmental samples (especially for the steroid estrogens due to low LODs stipulated in the Watch list)
- ✓ Technology-focused studies for effective and efficient control measures for environmental contaminants removal particularly at areas showing disproportionally high levels of these contaminants in terms of load
- ✓ Evaluation of validated technologies which were shown effective for the removal of contaminants in wastewater,
- ✓ Identification and quantification of population level effects of wild biota from endocrine disrupting chemical exposure
- ✓ Investigation of seasonal variations in environmental contaminants load and removal efficiencies for future studies in view climate change.

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

ELSEVIER

Review

Monitoring, sources, receptors, and control measures for three European Union watch list substances of emerging concern in receiving waters – A 20 year systematic review

Erin Jo Tiedeken [a], Alexandre Tahar [a], Brendan McHugh [b], Neil J. Rowan [a,*]

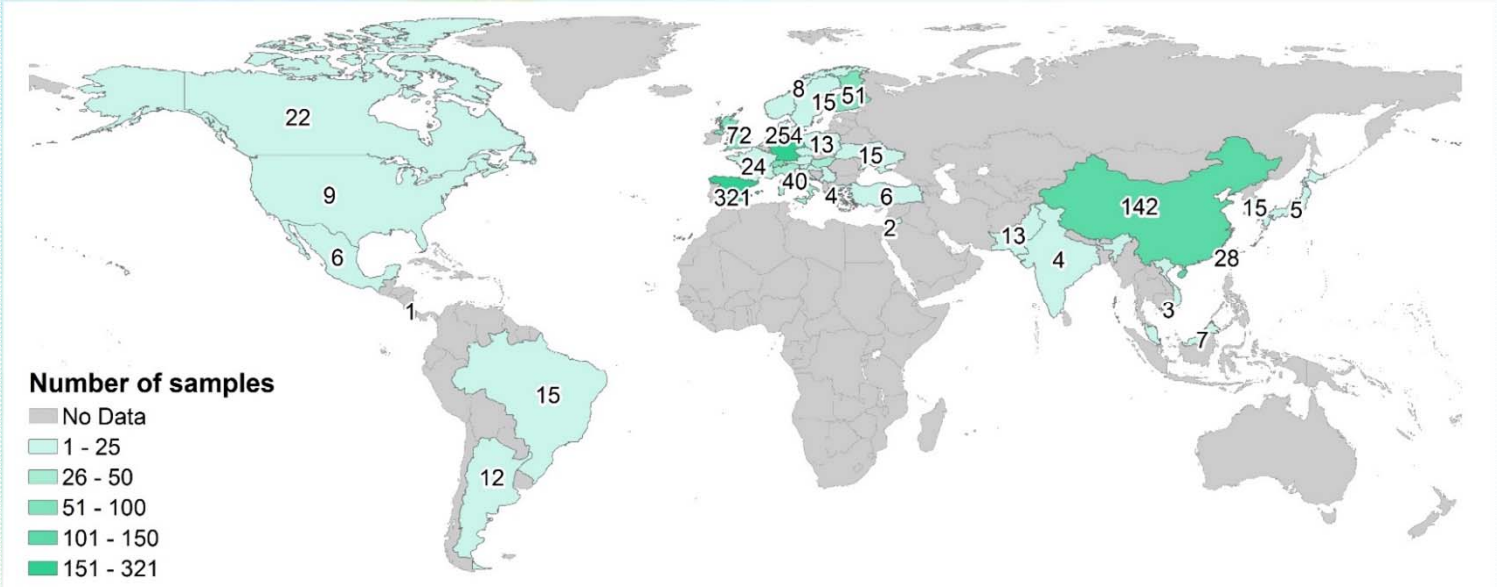
[a] Bioscience Research Institute, Athlone Institute of Technology, Co. Westmeath, Ireland
[b] Marine Institute, Rinville, Oranmore, Co. Galway, Ireland

Global occurrence of DICLOFENAC (WFD Watch List) in freshwaters

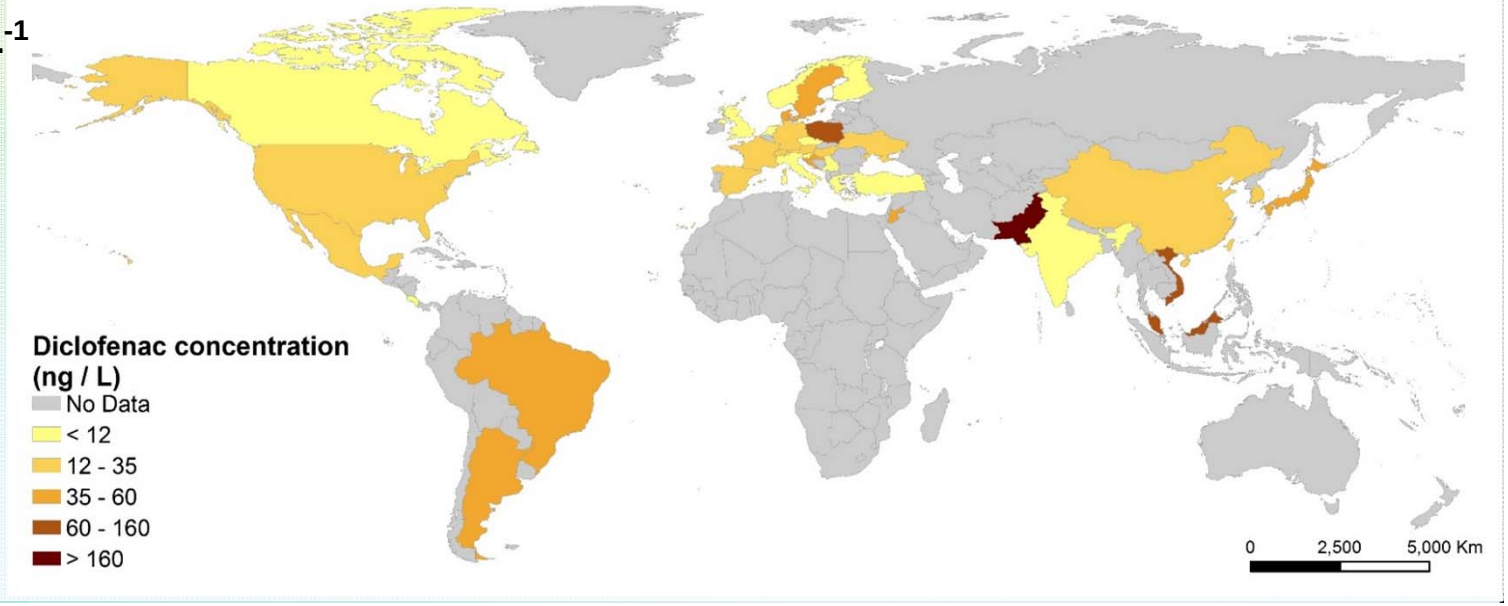
142 studies

1264 samples

38 countries



Med 21 ± 722 ng L^{-1}



Challenges and allignment actions with policy impact

- New research and policy challenges

Heading towards solutions and future challenges…

- WWT options to remove pollutants + ARG
- Wastewater-fed aquaculture (India)
- What about sediments? MAES recommendations
- Organics in sludge? Plant-uptake ?
- Groundwater/Drinking contamination (sludge into soil) (Germany)
- Microplastics in WWTP: emerging risk?
- Climate change/Water/Agriculture/Mediterranean : PRIMA?

Article on antibiotic resistant bacteria

Science of the Total Environment 447 (2013) 345–360

Contents lists available at SciVerse ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Review

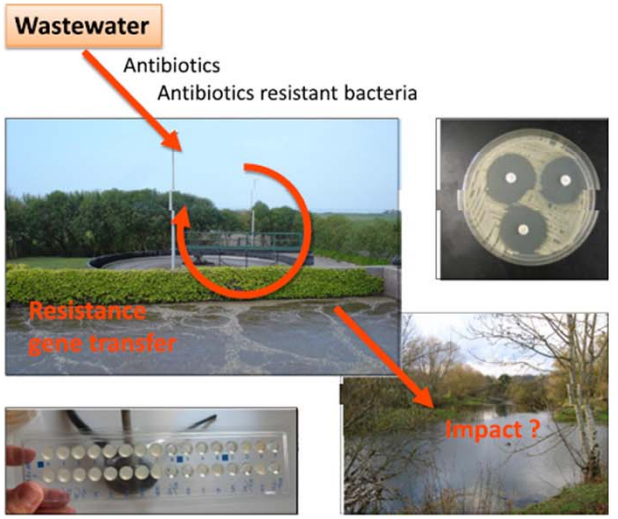
Urban wastewater treatment plants as hotspots for antibiotic resistant bacteria and genes spread into the environment: A review

L. Rizzo [a,*], C. Manaia [b], C. Merlin [c], T. Sch

HIGHLIGHTS

- UWTPs may positively affect ARB spread and selection as well as ARG transfer.
- Resistance integrons may be used to characterize ARG transfer.
- High trough technologies are a useful complementation of PCR technologies.
- Biological process effect on ARB and ARG transfer should be further investigated.
- Advanced treatments/disinfection effect should be further investigated too.

GRAPHICAL ABSTRACT



Science of the Total Environment 542 (2016) 965–975

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Separate treatment of hospital and urban wastewaters: A real scale comparison of effluents and their effect on microbial communities

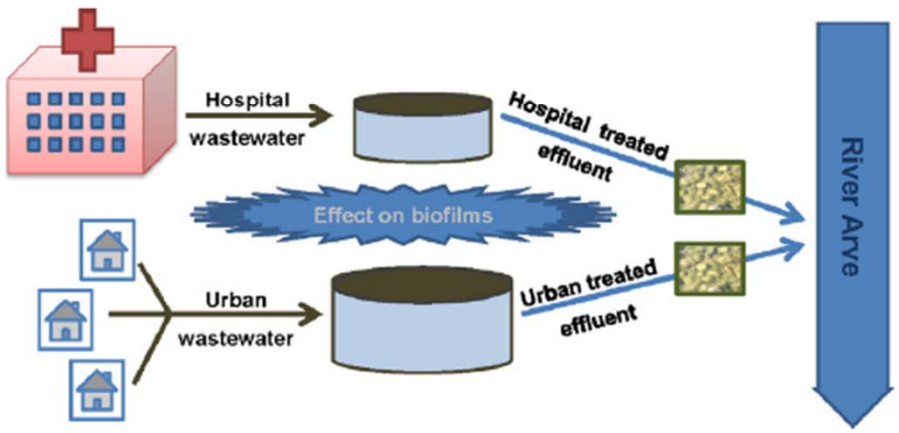
Teofana Chonova [a,b,*], François Keck [a,b], Jérôme Labanowski [c], Bernard Montuelle [a,b], Frédéric Rimet [a,b], Agnès Bouchez [a,b]

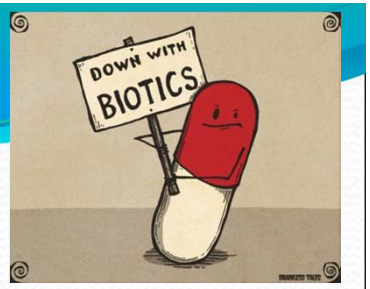
[a] INRA, UMR CARRTEL, F-74200 Thonon-les-bains, France
[b] Université Savoie Mont Blanc, UMR CARRTEL, F-73011 Chambéry, France
[c] Université de Poitiers, ENSIP, UMR CNRS 7285, Inst Chim Milieux & Mat Poitiers, F-86022 Poitiers, France

HIGHLIGHTS

- We compared treatment with activated sludge of hospital and urban wastewaters.
- Pharmaceuticals had higher removal efficiency during hospital wastewater treatment.
- Treated hospital effluents still contained higher concentrations of pharmaceuticals.
- Biofilms developed in the two treated effluents had different community structure.
- Biofilms in hospital treated effluents were less developed and had lower diversity.

GRAPHICAL ABSTRACT





Finally to address antibiotic resistance

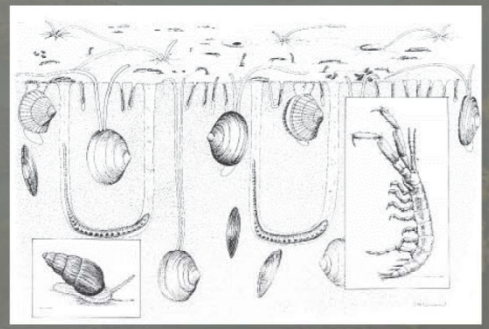
new measures being introduced

The Calcutta model: Wastewater fed-aquaculture

The use of municipal wastewater fed to fertilize ponds began in Calcutta in the 1930s; the city now has perhaps the largest wastewater-fed aquaculture system in the world. A large number of people derive their livelihood from the sewage-fed aquaculture using the principles of systems ecology and applying it through ecological engineering.

Other key-features of sediment

Too much sediment	Too little sediment	Sediment as resource
Obstruction of channels Rivers fill and flood Reefs get smothered Turbidity	Beaches erode Riverbanks erode Wetlands are lost River profile degradation	Construction material Sand for beaches Wetland nourishment Soil enrichment Habitat and food for life



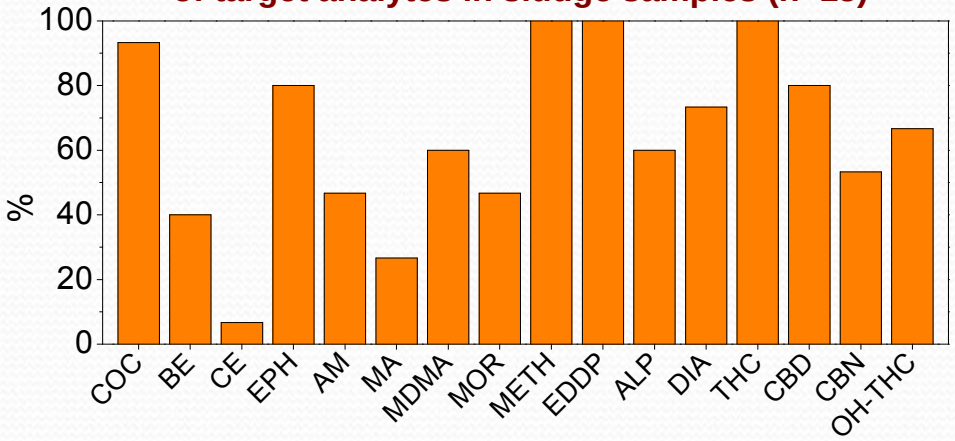
sediment =
essential & integral element of river-sea systems

Source scheme: Martin, 2002

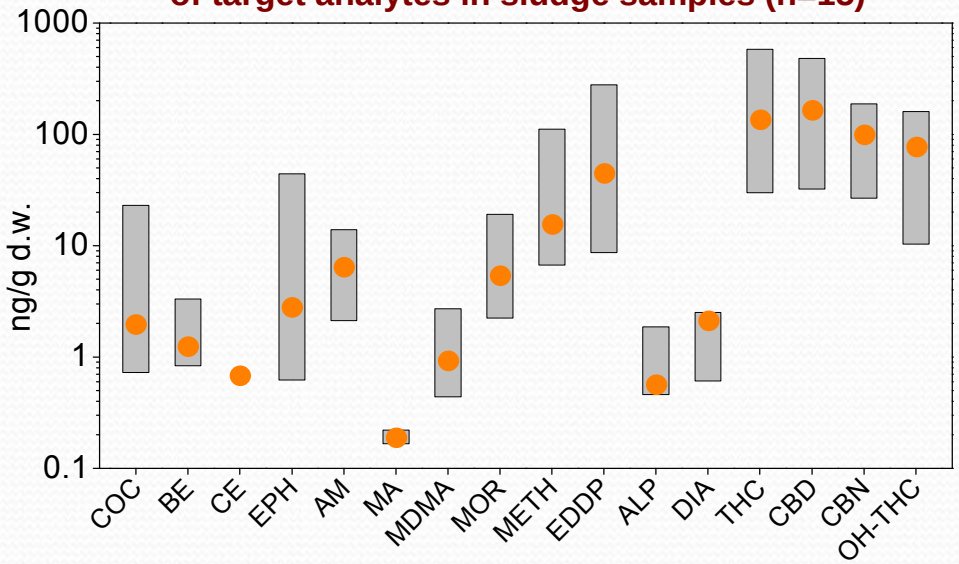
Analysis of illicit and abused drugs in sewage sludge

Occurrence of target analytes in sludge samples

Frequency of detection of target analytes in sludge samples (n=15)



Median and concentration range of target analytes in sludge samples (n=15)



- HER, 6ACM, LSD and OH-LSD were not detected
- The most ubiquitous compounds were METH, EDDP and THC (Log K_{ow}>3) (100%), followed by COC, EPH and CBD (≥ 80%)
- The most abundant compounds were the cannabinoids (median concentrations ranged from 78.4 ng/g d.w. (OH-THC) to 168 ng/g d.w. (CBD)), followed by EDDP (45.6 ng/g d.w.) and METH (15.9 ng/g d.w).
- The remaining compounds presented median concentrations lower than 6.6 ng/g d.w.

Mastroianni *et al.* J. Chromatogr. A (2013) 1322: 29-37.

Where is the Value in Sludge?

City of 1M people:
metals & P in sludge
=> $13M/y

Figure 5. Relative potential (*y*-axis) for economic value from biosolids for the top 30 elements based upon a community of 1 000 000 people producing 26 kg/person-year of dry biosolids. Gray bars indicate elements considered potentially toxic for land application and have dry weight concentration limits on their land application regulated by the Part 503 Biosolids Rule.

Ag > Cu > Au > P > Fe > Pd > Mn > Zn > Ir > Al > Cd > Ti...

ES&T 2015, 49:9479-9488

Environmental Science & Technology

Article

pubs.acs.org/est

Irrigation of Root Vegetables with Treated Wastewater: Evaluating Uptake of Pharmaceuticals and the Associated Human Health Risks

Tomer Malchi,[†,‡] Yehoshua Maor,[‡] Galit Tadmor,[†,‡] Moshe Shenker,[†] and Benny Chefetz*[,†,‡]

[†]Department of Soil and Water Sciences, Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, Rehovot 76100, Israel

[‡]The Hebrew University Center of Excellence in Agriculture and Environmental Health, P.O. Box 12, Rehovot 76100, Israel

- pharmaceuticals uptake by treated wastewater-irrigated root crops (carrots and sweet potatoes)
- concentrations in the carrot leaves were in the following order: carbamazepine > **lamotrigine** > caffeine

Environmental Science & Technology

Article

pubs.acs.org/est

Insights into the Uptake Processes of Wastewater-Borne Pharmaceuticals by Vegetables

Myah Goldstein,[†,‡] Moshe Shenker,[†] and Benny Chefetz*[,†,‡]

[†]Department of Soil and Water Sciences, Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, Rehovot 76100, Israel

[‡]The Hebrew University Center of Excellence in Agriculture and Environmental Health, P.O. Box 12, Rehovot 76100, Israel

Water JPI

Recommendations for the actions for sludge:

*(Taken from the **Draft Summary of the Sludge Organic Contaminats workshow,** Malmö, October 2016)*

The following actions were proposed to take forward the objectives identified above:

- Establish a simple **data base of key relevant papers and reports, concerning organic contaminants in sewage sludges and their possible transfer to soil and crops.** A first list of papers as proposed by workshop participants, is included below. This is open to input to update.
- Propose **collaboration at a global level** with similar work in other continents, e.g. US the ***NSSS*** (National Sewage Sludge Surveys) sludge contaminant chemicals data repository, see above.
- Develop a **document presenting the advantages of sewage biosolids recycling to agriculture**: circular economy and jobs, farmers' income, nutrient recycling, organic carbon – soils and climate change (4/1000), safety and environmental aspects, with recognition that other solutions for sludge management are appropriate according to local situations. ESPP or joint document? For decision makers.
- **Input to definition of R&D programme**s (EU Horizon 2020, other EU programmes, national R&D funding …) proposing relevant work on organic contaminants in sewage solids (see research priorities above), in particular data to support **risk assessments**.
  - workshop participants to identify and communicate consultations and opportunities for making such inputs
  - develop a joint document outlining R&D needs and priorities
- **Identify R&D needs relevant to EU and national policies:**
  - EU Sludge Directive (86/278/EEC) and national sludge spreading regulations and plans
  - EU and national circular economy policies
  - End-of-Waste and fertiliser regulations
- **Joint projects:** workshop participants may develop joint projects (R&D, water industry). ESPP is not an R&D brokerage operator, but can circulate proposals or partner search offers.

Water JPI

Perfluorinated chemicals problem published in German newspaper FAZ, October 2016:

Between 2005. and 2008. compost that was used in agricultural fields in Baden-Wurttemberg was highly contaminated with perfluorinated compounds.

Even today, these compound are detected in soils across 400 hectares. As the result, two tap water facilities were closed due to concerns that contaminated water was not suitable for human consumption.

WISSENSCHAFT

NACHRICHTEN

Woher kam das Zeug bloß?

Das Problem: Polyfluorierte Chemikalien

Microplastics in the aquatic environment

Environmental Science & Technology

Article

pubs.acs.org/est

Wastewater Treatment Works (WwTW) as a Source of Microplastics in the Aquatic Environment

Fionn Murphy,[*,†] Ciaran Ewins,[‡] Frederic Carbonnier,[§] and Brian Quinn[†]

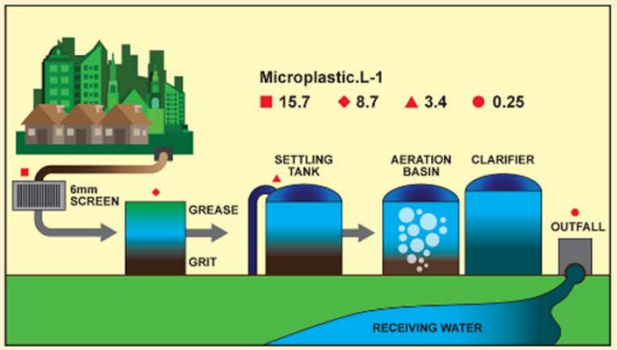
[†]Institute of Biomedical and Environmental Health Research (IBEHR), University of the West of Scotland, Paisley PA1 2BE, Scotland

[‡]University of the West of Scotland, Paisley PA1 2BE, Scotland

[§]Saur Glasgow, Beardmore Street, Dalmuir, Glasgow G81 4SA, Scotland

Supporting Information

ABSTRACT: Municipal effluent discharged from wastewater treatment works (WwTW) is suspected to be a significant contributor of microplastics (MP) to the environment as many personal care products contain plastic microbeads. A secondary WwTW (population equivalent 650 000) was sampled for microplastics at different stages of the treatment process to ascertain at what stage in the treatment process the MP are being removed. The influent contained on average 15.70 (±5.23) MP·L^{-1}. This was reduced to 0.25 (±0.04) MP·L^{-1} in the final effluent, a decrease of 98.41%. Despite this large reduction we calculate that this WwTW is releasing 65 million microplastics into the receiving water every day. A significant proportion of the microplastic accumulated in and was removed during the grease removal stage (19.67 (±4.51) MP/2.5 g), it was only in the grease that the much publicised microbeads were found. This study shows that despite the efficient removal rates of MP achieved by this modern treatment plant when dealing with such a large volume of effluent even a modest amount of microplastics being released per liter of effluent could result in significant amounts of microplastics entering the environment. This is the first study to describe in detail the fate of microplastics during the wastewater treatment process.



Climate change impacts in Water Management under Scarcity in Morocco

Science of the Total Environment 573 (2016) 862–875

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Climate change and adaptive water management measures in Chtouka Aït Baha region (Morocco)

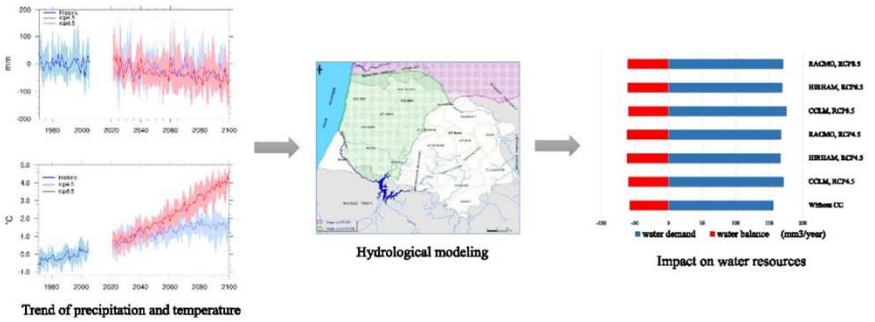
Marieme Seif-Ennasr [a,*], Rashyd Zaaboul [b], Abdelaziz Hirich [b], Giulio Nils Caroletti [b], Lhoussaine Bouchaou [a], Zine El Abidine El Morjani [c], El Hassane Beraaouz [a], Rachael A. McDonnell [b], Redouane Choukr-Allah [b,d]

[a] Applied Geology and Geo-Environmental Laboratory, Faculty of Sciences, Ibn Zohr University, Agadir, Morocco
[b] International Center for Biosaline Agriculture, Dubai, United Arab Emirates
[c] Taroudant Polydisciplinary Faculty of Ibn Zohr University, Morocco
[d] Agronomic and Veterinary Medicine Hassan II Institute, Complex of Horticulture, Agadir, Morocco

HIGHLIGHTS

- Climate change seems to have effect on water availability for agriculture.
- Future precipitation and temperature projections are generated for two RCPs.
- We simulate the effect of CC on water balance and agricultural water demand.
- Temperature will increase and precipitation will decrease leading to water scarcity.
- Several adaptive strategies are feasible and must be implemented urgently.

GRAPHICAL ABSTRACT



Acknowledgments

EU FP7 project **GLOBAQUA**: Grant agreement: 603629

EU FP7 project **SOLUTIONS:** Grant agreement 60343

IDAEA-CSIC team

Water 2014 Works

Poster session

10:00 - 11:30

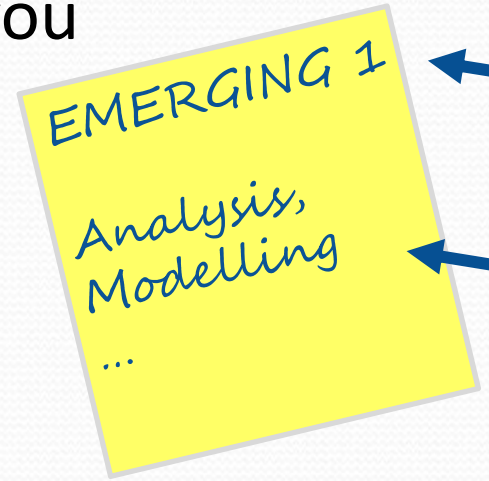
Guidelines:

Alignment:

- Cooperation
- Agreement
- Going in the same way

Guidelines: poster session

Sticky-notes available to mark the poster of the projects that are interesting for you



Your project

Describe interest

Templates available to keep record of who (project) is interested in your project and why.
Also to remember what projects are interesting for you

Guidelines: poster session

Outcomes:

- Mutual knowledge
- What is been done in boundary fields
- First approach to collaborations
- First approach to new approaches

Guidelines: breakout groups

Part I: 11:30 – 13:00

Focus on **collaboration**:

- within your area of expertise (more impact/efficiency)
- with other areas (new approaches)
- Collaborations for your project
- Collaborations needed to solve challenges in the field

Outcome:

- Identify links between projects and groups
- Type of collaborations needed in the field
- Type of resources/framework needed

Guidelines: breakout groups

Part II: 14:00 – 16:00

1. Focus on **RDI – stakeholders gap**:

- What stakeholders should be targeted?
- What is the profile of stakeholders (power vs interest)?
- How to approach them, lessons learnt by participants

Template available por personal notes and orienting discussion

<u>Outcome:</u>

- Identify stakeholders relevant in the field of E.P
- Actions for targeting/involvement of stakeholders

Guidelines: breakout groups

Part II: 14:00 – 16:00

2. Focus on **RDI needs and gaps**:

- What is new in the field of emerging pollutants?
- Are there gaps in the SRIA of the Water JPI?
- Where do we need more knowledge to understand the problem?
- Where do we need more knowledge to apply results?

<u>Outcome:</u>

- Cover gaps in the SRIA
- Common interests in the field
- Suggestions for agendas and workplans

Working sessions in parallel groups (Part I)

10:00 - 11:30

Working sessions in parallel groups (Part II)

14:00 – 15:45

Discussion on the outcome of the working sessions

Chaired by

Padriac Larkin (EPA, Ireland)

The Knowledge Hub of the Water JPI

Kristina Laurell
(FORMAS, Sweden)

The Water JPI Knowledge Hub

- The WaterJPI Knowledge Hub is a network built for **selected research groups and targeted to stakeholders**.
- The first network will, focus the research area, **emergin polutions**
- The Knowledge Hub will establish a **critical mass of research and technological excellence**,
- The purpose of the KH is to integrate and share knowledge, infrastructures, data and modelling tools, training and capacity building, in addition to improved communication and networking with stakeholders and the scientific community.

Knowledge Hub Workshops

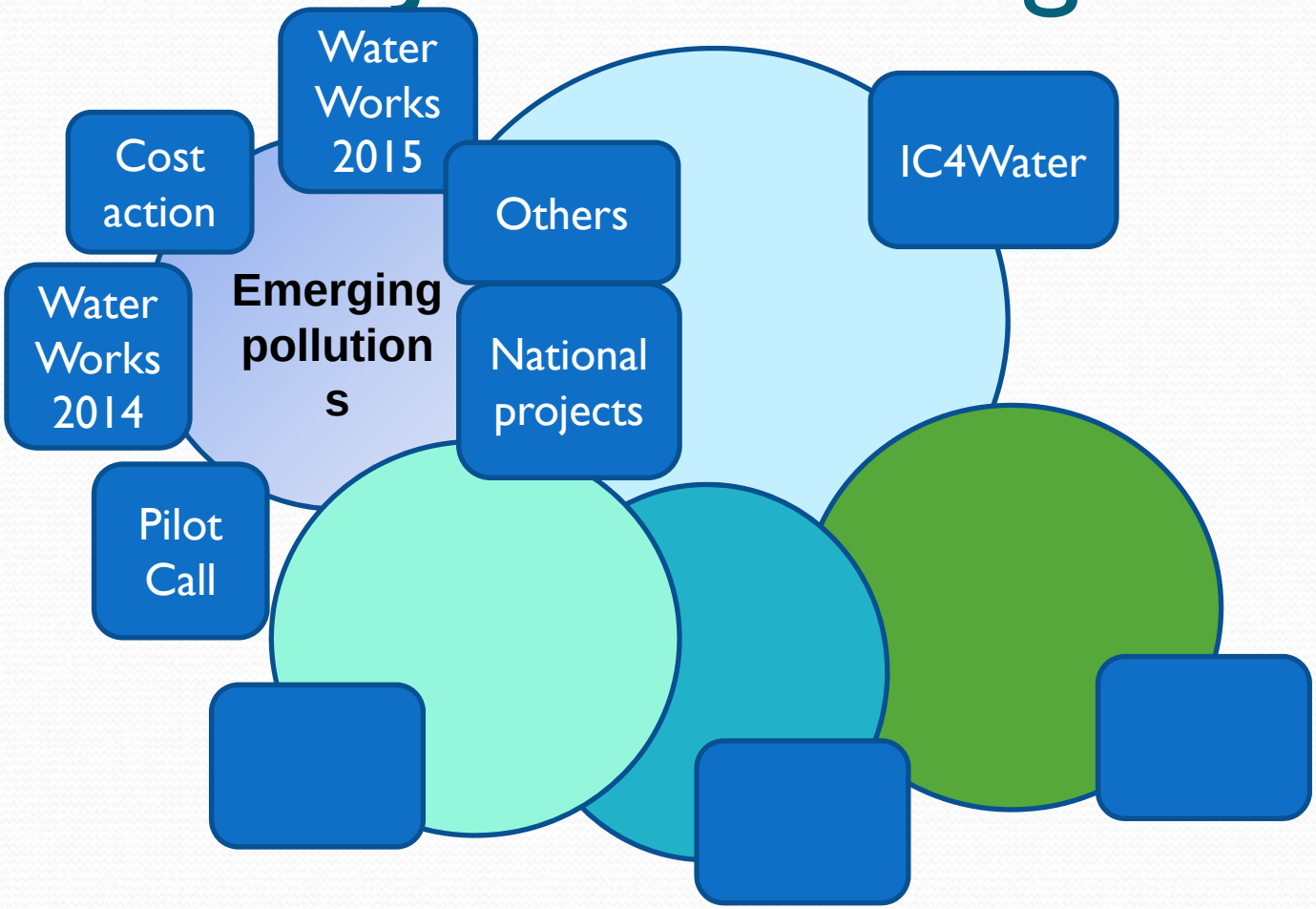
We are envisaged to **hold three workshops**: 2017, 2018 and 2019

1. Why? - Workshops will be organized by WaterJPI to create physical meeting places.

2. How? - The workshops will be build on the Exploratory Workshops, which will take place under the WaterWorks2014 Additional Activities. MINECO has the responsibility for these workshops

3. How? - The workshops will depend on the selection the instrument for building the Knowledge Hub. FORMAS arrange the First Workshop March 2017

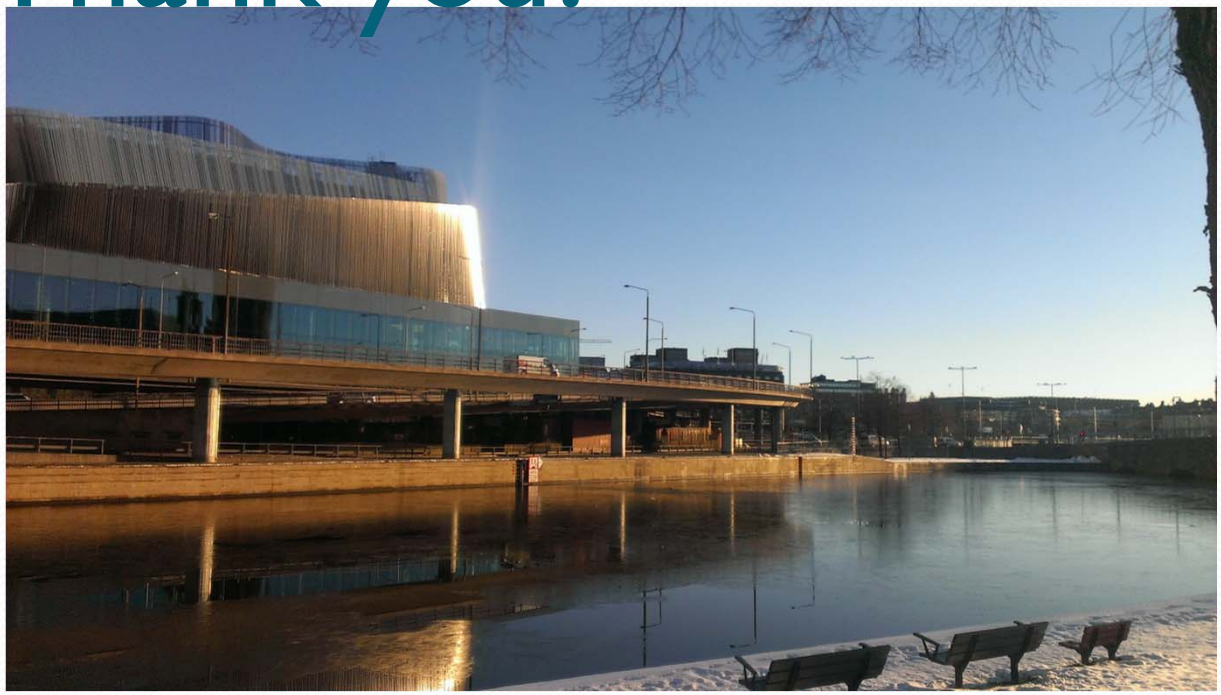
Water JPI Knowledge hubs



Discussion

- Would you benefit from being included in a Knowledge Hub?
- What kind of impact could the Knowledge Hub create?
- What kind of input is possible and realistic for you when participating in the Knowledge Hub?

Thank you!



More information about WaterJPI Knowledge Hub

Waterjpisecretariat@agencerecherche.fr
and
Kristina.laurell@formas.se

Conclusions

Thank you very much for your participation in the 1st workshop on the Alignment of on-going RDI projects!