

Water challenges for a changing world

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EDITORIAL

Since 1993 the World Water Day is celebrated every year on 22 March to draw citizens' attention to the need of achieving a sustainable use of this vital resource. This year the focus on the World Water Day is set on the importance of water for the development of most jobs and activities. As it is known, employment is the main source of people's good economic and social conditions. According to United Nations almost half of the world's workers - 1.5 billion people - work in water related sectors and nearly all jobs depend on water and those that ensure its safe delivery. Without water no agriculture, no fishing, no industry would be possible but also no health, wellness, tourism and many other productive activities. This 2016 World Water Day with its theme —**water and jobs**—always promotes protection of water in enough quantity and quality but stresses in particular the way this natural resource can change workers' lives and livelihoods - and even transform societies and economies.



PROGRESS ON WATER JPI ACTIVITIES

Joint Call 2016 is open



The Joint Call on "Sustainable management of water resources in agriculture, forestry and freshwater aquaculture sectors" launched within the frame of the WaterWorks 2015 ERANET and co-funded by organizations of the Water JPI and FACCE JPI opened on last 16 February. The first step of this call will close on **19 April 2016 at 17:00 CET**. Details are provided on the [Water JPI website](#).

In March 15, it was streamed live the presentation of the Water JPI 2016 Joint Call, as part of the activities developed in the ERA-NET Cofund WaterWorks2015, a collaborative effort of the Water JPI and the FACCE JPI. The presentation was organised by the Joint Call Secretariat (FCT, Portugal) with the collaboration of the Coordination Team of WaterWorks2015 (ANR, France). This event attracted an audience of approximately 100 people, which included funding partner organisations and the research community interested in applying to the Water JPI 2016 Joint Call. The presentation included the scope of the call, research topics, and guidelines for applicants. In addition, FAQs were addressed by the Call Secretariat in order to maximise the time dedicated to the questions from the audience. During 45 minutes, the questions provided by the potential applicants were answered by the Call Secretariat and the Coordinator of WaterWorks2015. The presentation and the answers to the questions will be made available for download as soon as possible in the [official webpage of the 2016 Joint Call](#).

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Meetings in Dublin

Members of the Water JPI Advisory Boards will meet on 21 March to discuss on the next Implementation Plan 2017-2019 and the implementation of the SRIA 2.0. A meeting of the ERANET-COFUND WaterWorks2014 will take place on 22 March followed by the 7th Management Board on 23 March.

Meetings in Malaga

The General Assembly of WaterWorks2014 will be held on 13 April 2016 and it will be followed by a meeting among partners of the other ERANET-COFUND WaterWorks 2015. The 8th Water JPI Governing Board will take place on 14 and 15 April 2016.

New version of the Water JPI SRIA

The SRIA 2.0 will be presented for approval during the GB meeting in Malaga and launched at the [Water JPI Conference](#) in Rome on the 19th of May 2016. This major event will gather representatives from other JPIs, the European Commission (DGs Research and Environment), Water JPI funded projects coordinators, and various stakeholders. After a presentation of the Water JPI SRIA, three roundtables will foster exchanges around the SRIA, its implementation and the development of international research cooperation. Fill in this [form](#) to register. Attendance of all JPI stakeholders is welcome.

Pilot Call FRAME project

The third meeting of the JPI water project FRAME "A novel Framework to Assess and Manage Chemicals of Emerging Concern in Indirect Potable Reuse" was hosted by BRGM in Orléans, France from 8th to 10th of March, with the active participation of more than 20 scientists from the partner institutions and stakeholders. The meeting was preceded by a half-day meeting for stakeholders where the project concepts and technologies related to indirect potable reuse (IPR) were presented and regulatory framework and impacts of FRAME were discussed. Discussion with stakeholders highlighted that the implementation of IPR projects in Europe are still hindered by a misperception regarding the true risks of this reuse practice and regulatory constraints which in some cases require that drinking water limits are met in reclaimed water prior to recharging groundwater. It is necessary to communicate that the infiltration of reclaimed water can already be today an inevitable part of the water cycle. Natural attenuation of contaminants

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and pathogens is an effective process which can be added to conventional treatment trains to produce water with a potable quality. During the following General Assembly of FRAME, partners shared preliminary results on initial pilot- and full-scale studies. The efficacy of the different applied treatment trains was verified by measuring a wide set of regulated and unregulated compounds using target, suspect and non-target screening to enable the control of chemicals of emerging concern (CECs). Risks from chemical and microbiological contaminants were evaluated by applying a set of bioassays and measuring pathogens and antibiotic resistant genes. The possibility to extract integrated indices for chemical, toxicological and microbiological risks and to integrate them in the developing Decision Support Framework (DSF) was discussed. The DSF structure will include the treatment processes, transport modelling as well as the overall process evaluation and will support stakeholders in conducting feasibility studies for the application of IPR considering their specific field site conditions.

Pilot call project PERSIST

The aim of the PERSIST project is to gain fundamental information on the behavior of emerging organic contaminants (EOCs), and to target pharmaceuticals and resistant microbial communities in both surface water and groundwater. The partners of the consortium - University of Nîmes (UNîmes), Helmholtz Zentrum München (HCM) and Catalan Institute for Water Research (ICRA) - met for the 2nd time in Munich at the Helmholtz Zentrum, where progression of the work was presented and future work was discussed.

The first step of the project already achieved consists in the characterization of the hydrochemical system and emerging organic contaminants (EOCs) screening in groundwater and surface water, in both the Empordà basin and the Vistrenque catchment. Field work was carried out and 54 and 57 samples of groundwater and surface water were collected from the Empordà Basin and Vistrenque catchment, respectively. Samples were analyzed for natural geochemical and isotopic data, as well as for EOCs on both sites, especially pharmaceuticals and, among them, human and veterinary antibiotics. In addition, antibiotics resistant genes were searched for in groundwater in the Empordà Basin, and multi resistant bacteria were searched for in surface water in the Vistrenque catchment. EOCs, multi resistant bacteria and resistant genes were detected in many samples, proving the occurrence of EOCs pollution and some effects on the microbial communities.

Based on these results, the hydrodynamic behavior of both aquifers systems, including the continuum with surface water, has been defined. Such knowledge, which represents a first contribution of the project, allows identifying the wells and surface water locations that will be monthly monitored for both natural tracers and EOCs (8 boreholes and 2 stream water points in the Empordà basin and, 7 boreholes and nearby stream water in the Vistrenque catchment). This periodic monitoring of water resources quality will complete the tasks of the project by assessing seasonal variability.

INTERVIEW WITH JAVIER MARUGÁN



Javier Marugán received his Ph.D. in Chemical Engineering in 2003 working on the development of supported photocatalysts for the treatment of cyanide industrial wastewaters. Since 2009 he is associate professor, coordinator of the Chemical Engineering Degree Program and head of the Water Analysis Laboratory of Universidad Rey Juan Carlos. He has been visiting researcher at the Institut für Technische Chemie (ITC) of Hanover University (Germany), Instituto de Desarrollo Tecnológico para la Industria Química (INTEC) in Santa Fe (Argentina), Plataforma Solar de Almería (PSA) in Almería (Spain), the School of Chemical Engineering and Advanced Materials of Newcastle University (United Kingdom), the School of Engineering and Applied Sciences of Harvard University (USA) and the Environmental Engineering Department of the Massachusetts Institute of Technology (USA). His main research interests related to water treatment are focused on the design and scaling-up of photoreactors for water disinfection, including the simultaneous removal of contaminants of emerging concern.



How dangerous are new pollutants for water security and human health?

I guess this is a question for toxicologists to answer. We are aware of several investigations reporting the effects of these pollutants on the aquatic ecosystems at different levels, although to the best of my knowledge there are not reports yet on the effect on humans. The exact concentration levels that could be considered as dangerous for humans and therefore require regulation are still to be quantified for many of these pollutants. In any case, their presence in the effluents of wastewater treatment plant constitutes an alarm on the necessity of improved technological solutions for the monitoring and treatment of the streams discharged to the water bodies.

Which are the new tools and methodologies proposed by the project you are coordinating to reduce the impacts of water contaminants?

The MOTREM project focuses on the development of integrated processes for monitoring and treatment of emerging contaminants (ECs), improving the efficiency of the removal of these pollutants in urban wastewater treatment plants (WWTPs), especially for water reuse. The goals of MOTREM project are: i) the development of new processes or modifications of the current biological and disinfection technologies in WWTPs by advanced oxidation and biooxidation processes to achieve the removal of ECs before water reuse or the discharge of the effluents to the environment; and, ii) the development of new technologies and control strategies for the monitoring of the wastewater treatment plant operation regarding the removal of ECs, including analytical procedures and ecotoxicology assessment.

Can you, please describe the first results of the transnational cooperation in water research and innovation realized by the MOTREM project?

In addition to the parallel development of the technologies by the different partners, the first period has mainly focused on the identification of the pollutants more refractory to the water treatment processes to be used as indicators of the wastewater plant operation efficiency in order to develop new sampling and analytical methodologies for their monitoring, making possible the link with the control strategies. The choice of this ECs is not necessarily based on the toxicology but on practical criteria such as widely occurrence, availability of analytical techniques for their quantification and resistance to the treatment that makes them suitable indicators for engineering purposes.

Which are the main outcomes expected by the activities carried out by the MOTREM consortium?

The main outcomes expected for the project are technologies and methodologies for improving the efficiency in the removal of the pollutants to make safer the discharge of water from the wastewater treatment plants. For the industrial sector the economic analysis of these technological solutions would be conditioned to the final values of removal that the future legislation will adopt, but in any case the idea is developing scalable technologies able to meet present and future requirements.

Innovative technologies solutions are very relevant in the water sector. Is Europe enough competitive in this field?

The outcome of MOTREM project is aligned to the priority theme "Developing Safe Water Systems for the Citizens" of the Strategic Research and Innovation Agenda (SRIA) of the Water JPI. Consequently, it is expected that the remarkable significance of the project both at national and international level will contribute to the strengthening of the European leadership and competitiveness on water research and innovation while safeguarding water resources. The European water sector is in a privileged position to lead the innovation required by present and future requirements.

International cooperation to tackle water challenges is crucial. How could it be improved concretely?

European scientific and technological cooperation on water has strongly increased in the last decade. However, water is a very local issue, meaning a risk of fragmentation and duplication of the efforts. Initiatives such as the Water JPI play a critical role to mitigate this risk.

Are joint calls funded by funding agencies in different countries an efficient instrument to cooperate for improving water management with a global vision?

Joint calls are a helpful tool to identify research and innovation priorities at a European level and to underline the importance of transnational collaboration. They should improve the global efficiency of research efforts and optimize the use of public funds. However, the start of the engine requires a huge effort of coordination from the funding agencies to align the schedule, procedures and requirements to meet those of the joint calls and make them compatible with their respective national funding programs.

Which is your opinion on the alignment of national water RDI programmes and initiatives proposed by the Water JPI Strategic Research and Innovation Agenda?

A good alignment between innovation investment priorities and social challenges is absolutely required, and this is something that falls on the responsibilities of the European governments. The Water JPI SRIA covers this objective in a successful way making all the member states row in the same direction.

RESEARCH HIGHLIGHTS

A new tool to evaluate drought damages over time

Researchers have developed a new tool for assessing and predicting the damage caused by droughts to crop yields and hydroelectric energy production. The tool could provide useful information to policymakers, helping them develop drought management practices to improve food and energy security and adapt to climate change.

Droughts can have wider reaching and longer lasting effects than other types of [natural disasters](#), such as forest fires or floods, due to their cascading impacts on the complex [hydrological](#) cycle and related, sometimes continent-wide, dependencies. For example, a drought in one country can reduce river flows relied upon by a neighbouring country. As such, better understanding of the complex effects of droughts on societies and countries can improve resilience to these events. This is especially important, since risk of drought is expected to increase over the coming years due to [climate change](#).

In this research, funded by the European Commission as part of the GAP-PESETA project¹, the authors aimed to investigate and validate the relationship between drought severity and measurable damages throughout Europe, based on 'power-law functions'. A power-law is a mathematical technique describing the relationship between two quantities, where smaller changes in one factor (i.e. droughts) result in larger changes in another (i.e. damages). The researchers chose two measures, using extensive existing data, of drought damage: changes in crop yields and hydroelectric power generation.

Combining these data with three different types of standardised meteorological drought indicators allowed the researchers to identify which indicators and timescales (three or 12 months) were best associated with damages. The authors used publicly available data, gathered between 1950 and 2012, on both damages and drought measures from 21 European countries. This research is the first of its kind to apply this approach on a near continent-wide basis.

The 'Standardised Precipitation Evapotranspiration Index' (SPEI) indicator, over a three-month period, showed the best correlation for crop yields. The authors explain this was likely because this period of time best represents crop water requirements.

Many countries, especially Mediterranean countries such as Italy, Portugal and Spain, showed a strong relationship between droughts risks and crop yields. This reflects their vulnerability to water scarcity, the authors say.

Yet, the relationship was not as strong for all countries. For example, cereal production in Greece and Albania had only a weak or no relationship. Such differences in vulnerability could be due to a variety of factors. For example, whether irrigation is typically used, the availability and use of drought resistant crops and reservoir management practices.

The SPEI, again, showed the best correlation between drought and hydropower: this time over a 12-month period, which, the authors say, matches typical reservoir management time scales. As with crop yields, a strong correlation was also found between drought and hydropower generation damages. Countries which rely heavily on hydropower, such as Albania, Portugal and Switzerland, were most vulnerable. In countries such as Germany and the UK, with more diversified energy production, there was a smaller relationship between drought and hydropower damages. Effective drought mitigation practices in such countries could also explain the lower effects of droughts.

The authors highlighted that the results show how drought damages can be cumulative, and that the method can help reveal the true costs of droughts over time. Over the long term, more frequent but less severe droughts can lead to similar damages as one-off extreme drought. Possibilities for improving the approach include the collection of higher spatially and temporally resolved damage data and their careful filtering against non-drought-related economic effects such as the recent financial and economic crises. An example of such influences is shown for the case of inland water transport. The approach could also be used in combination with climate projection data, the authors say, to aid planning of climate change mitigation or adaptation measures for future food and energy security.

1. *Assessment of drought damages and their uncertainties in Europe was supported by the Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis (PESETA) programme. See <https://ec.europa.eu/jrc/en/peseta>*

Source: Naumann, G., Spinoni, J., Vogt, J. V. & Barbosa, P. (2015) Assessment of drought damages and their uncertainties in Europe. Environmental Research Letters. 10 (12), pp. 124013. DOI: 10.1088/1748-9326/10/12/124013

DROPLETS

EIP Water Leeuwarden Declaration

The annual conference of the EIP European Innovation Partnership on Water took place on 10 February 2016 in Dutch Leeuwarden. With more than 550 participants from over 50 countries the conference resulted into the [Leeuwarden declaration](#) which summarizes key findings and recommended actions in 8 areas of water sector: circular economy and water innovation (WI), regions and cities and WI, sustainable development goals and WI, regulation and WI, finance for WI, public procurement and WI, partnerships and WI, showcases and demonstration sites and WI.

Thousands of demonstrators in Catalonia to save Ebro delta

The Ebro River in Catalonia (Spain) represents one of Europe's most important wetland areas. It is the third longest river flowing into the Mediterranean. The flow of water and sediment from the river play a crucial role in the preservation of the delta and the integrity of its wetlands from the intrusion of saline water. The delta faces great challenges because of human development. Last January the Spanish government finally agreed on

a plan called the Ebro River Basin Management Plan. Tens of thousands of people took to the streets of Amposta in Catalonia to protest against the Spanish government plans to restrict water flow. [Read the article](#)

City Blueprint E-Brochure

A compendium of best practices which summarizes the work done by the City Blue print Action Group of the European Innovation partnership on water is available [here](#).

Evaluation of Joint Programming

The European Commission has published the [report](#) of the Expert Group on "Evaluation of Joint Programming to address grand societal challenges" that presents the findings, conclusions and recommendations of the Group that was established by the Commission in June 2015. The report of the Annual Joint Programming conference held in Brussels on 14-15 January 2016 is available [here](#).

GWP celebrates 20 years

Global Water Partnership was founded in 1996, in a bid to support countries in the sustainable management of their water resources for the benefit of poor and vulnerable groups. To achieve this, a strong focus was placed on an action-oriented, cross-sector approach. GWP now has over 3,000 partners in 174 countries. [To know more](#)

Water governance in cities

Since 2009 the OECD Water Governance programme has been assessing the capacity of governance systems to handle current and future water challenges. Urban, demographic and climate trends are increasingly exposing cities to risks of having too little, too much and too polluted water. A [publication](#) is the result of a two-year project which building on a survey of 48 cities in OECD countries and emerging economies, analyses key factors affecting urban water governance, discusses trends in allocating roles and responsibilities across levels of government, and assesses multi-level governance gaps in urban water management with the aim of promoting a strategic vision across sectors.

OPPORTUNITIES

Consultation to shape the H2020 SC 5 Work Programme

As the European Commission is starting to prepare the next Horizon 2020 Work programme and calls for proposals for the period 2018-2019-2020, a [consultation](#) has been launched concerning Societal Challenge 5 '*Climate action, environment, resource efficiency and raw materials*'. It consists of some questions about challenges, outputs or gaps, benefits or potential priorities for research and innovation in this context. Consultation is open until Friday 8th of April 2016. Responses should be sent to RTD-ENV-H2020STAKEHOLDERS@ec.europa.eu.

ERANETMED Pre-announcement of call

The programme involving Cyprus, Germany; Algeria, Egypt, Spain, France, Greece, Italy, Lebanon, Morocco, Malta, Tunisia, Turkey invites applications for its joint call on environmental challenges and solutions for vulnerable communities which is expected to open on 21 March with a closing date on 31 May 2016. [To know more](#)

Public consultation on H2020 FET

The European Commission invites to send new ideas for Future and Emerging technologies in order to prepare the FET Work Programme 2018-2020 in Horizon 2020. The deadline for this consultation is 30 April 2016. [To know more](#)

Consultation on the revised strategy of the JPI Climate

Submission of responses to the published questionnaire is available till 1.4.2016. [To know more](#)

New ENI CBC Med Programme adopted

The European Commission has recently adopted the 2014-2020 cross-border cooperation (CBC) "Mediterranean Sea Basin" Programme. The main objective of the Programme, with €209 million of EU funding under the European Neighbourhood Instrument (ENI), is to foster fair, equitable and sustainable economic, social and territorial development in regions placed along the shores of the Mediterranean Sea. It provides a framework for implementing cooperation projects in four main thematic objectives: business and SMEs development; support to education, research, technological development and innovation; promotion of social inclusion and the fight against poverty; environmental protection, climate change adaptation and mitigation. [To know more](#)

How to best combine the EFSI and ESI Funds

With the aim of providing an overview of the possible combinations of EFSI and ESI Funds, the European Commission has recently published "European Structural and Investment FUNDS and European Fund for Strategic Investments complementarities". These guidelines are conceived as a tool to ensure coordination and synergies, designed to help local authorities and project promoters to make full use of the opportunities of combining these two instruments in a different but complementary way in terms of rationale, design, and legislative framework reinforcing each other. The brochure is expected to evolve being enriched with the experience drawn from concrete cases and feedback received from stakeholders. [To Know more](#)

BBI JU annual work plan for 2016

The Bio-Based Industries Joint Undertaking (BBI JU) has recently published its [Annual Work Plan for 2016](#). The Bio-Based Industries Joint Undertaking is a new €3.7 billion Public-Private Partnership between the EU and the Bio-based Industries Consortium. Operating under Horizon 2020, it is driven by the Vision and Strategic Innovation and Research Agenda (SIRA) developed by the industry: "**Valorisation of the organic content of wastewater as feedstock, contributing to the renewable circular economy**" is included in the research actions. The topics of the new Call are 26 for a total budget of 160 million euros. The BBI JU Call will officially open on April 18. [To Know more](#)

UPCOMING EVENTS



3rd Annual SUSTAINABLE URBAN DRAINAGE SYSTEMS MIDDLE EAST

The third edition of this conference to be held in Doha (Qatar) on 28- 29 March 2016, has expanded its focus. The main objective of the Summit this year is to promote a sustainable water management in the Middle East Region through the implementation of ecologically effective and integrated urban drainage networks. An interesting platform to see how other governments are using SuDS (sustainable urban drainage system) principles to solve groundwater issues, learn about innovative flood management and prevention measures and examine existing and emerging technologies and solutions for their implementation and maintenance. [To know more](#)



Bioeconomy Utrecht

The fourth BioEconomy Stakeholders' Conference, will be held on 12 & 13 April 2016 at Rabo Nederland in Utrecht, the Netherlands under the auspices of the Dutch EU Presidency. More information is available [here](#).



RICH Symposium

RICH, the network of National Contact Points for Research Infrastructures, in cooperation with the European Commission's Research and Innovation Directorate-General, organises the Symposium on European Funding Instruments for the development of Research Infrastructures on 19 April 2016, in Madrid. See the [agenda](#).



BBI JU 2016 Info Day & Brokerage event

This event on 21 April in Brussels is dedicated to Bio-Based Industries Joint Undertaking (BBI JU) call for proposals, aiming at the realization of the potential of the european bioeconomy. During the morning session useful information about how to take part in BBI JU's 2016 Call for proposals will be provided, including rules for participation or tips and tricks on writing a proposal. In the afternoon two parallel sessions focusing on networking and brokerage activities will facilitate the partnerships. [To Know more](#)



EUREKA Innovation Week

This event in Stockholm combines the strategically important areas of the [EUREKA](#) network including international collaboration Innovation with the opportunity to meet, share ideas, interact and discuss with stakeholders from European industry, SMEs, academy, policymakers, representatives from regional and local authorities.



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