**Annex 5**

**Templates for Mid-Term Evaluation Report**

**(Individual and Consensus)**

**Water Joint Programming Initiative**

**2018 Joint Call**

*Closing the water cycle gap - Sustainable management of water resources*

These Project Management Guidelines will be effective from the date of the National funding decisions and shall remain in force until the last final project report is approved in 2022.

**The Mid-Term Consensus Report will be made available to the Consortium as well as CSC and JPI Water GB.**

**MID-TERM INDIVIDUAL EVALUATION REPORT**

**PROJECT TITLE AND ACRONYM**

Name of Coordinator: Silvia Diaz Cruz

Project code: WaterWorks2017-MARadentro

Duration of project: 36 months

Start date: 17 May 2019End date:16 May 2022

**DETAILS OF THE EVALUATOR**

Name: Mario Schirmer

Organisation: Eawag, Swiss Federal Institute of Aquatic Science and Technology (CH)

Date of review: 19 April 2021

### **Scientific and technological progress** (*Maximum 250 words)*

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| Despite COVID-19 pandemic related difficulties, the MARendro project is progressing well. The consortium provided suitable MAR types, along with a study case from a target site in Spain. The fate of major microbial and chemical contaminants was reviewed together with processes affecting their transport and fate in MAR. The review has controlled the design of laboratory and pilot experiments to improve the overall performance of the system, with a focus on processes and impacts of microbial and chemical contamination transport and fate.  The methodology for the batch experiments was established and validated. More than 200 batch experiments were performed to test the sorption of different materials (sand, clay, woodchips, compost, zeolite etc.). Different parameters have been tested, such as the contact time between the water and the sediment, the sediment granulometry (crushed vs. natural), the water/soil ratio, and the water composition. The team found out that the soil composition is the most important  parameter on the sorption efficiency.  The industrial partner Aqualia looked for the best location for the real field scale MAR prototype installation and decided on a site. Also the modelling work is progressing well. The partner UPC started to produce the basis of the numerical models by constructing and verifying the conceptual model using data available prior to MARadentro. |

### **Collaboration, coordination and mobility within the Consortium** (*Maximum 250 words)*

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| Several MARadentro partners have successfully collaborated for years, and thus, it can be regarded as an extension of previous collaborations and as the consolidation of established connections among partners. Some laboratory and field tasks were designed to be carried out by students from every partner, thus ensuring a continuous interaction among partners, which has been realized in the sampling campaigns. Some exchanges of researchers among the partners, mostly to perform laboratory experiments were foreseen. So far only one student is performing a Postdoc stay. Senior researchers and PhD students had not the chance to carry out research stays as a consequence of the COVID-19 situation. Mobility has been affected. However, online meetings have been organized to plan and manage the water chemistry data and the protocol for column experiments.  Clearly, the project has a transnational nature. Initial MAR studies at a laboratory scale are performed in France by CNRS. The pilot MAR system (managed by CSIC and UPC) and the real-scale MAR (managed by the industrial partner Aqualia) are located in Spain, where chemical analysis is performed. Microbial communities’ studies (SLU), as well as microbiological analysis (IRSA-CNR), are carried out in Sweden and Italy, respectively. MARadentro clearly meets the required transnational nature and its added value. |

### **Coordination with other international project funded by WaterWorks2015, or other instruments** (*Maximum 250 words)*

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| CNRS partner as well as CSIC, are part of another JPI project funded in the 2018 joint call named  UrbanWat. They jointly developed the methodology for batch experiments at Montpellier (France). MARadentro is connected with the Spanish project ROUSSEAU (http://rousseauproject.es). Both projects are coordinated by the same coordinator and thus, a smooth collaboration was established from the beginning of MARadentro. The ROUSSEAU project aims to fill in current knowledge gaps in the reuse of regenerated water in agricultural irrigation (wastewater reuse after further treatment). To this end, the propagation of waterborne biological and chemical emerging contaminants to soil, plants, and ultimately humans are investigated in different types of crops, water reclamation techniques, irrigation systems, and study sites. The regenerated water produced by the WWTP secondary effluent infiltration through reactive barriers in MARadentro is used to irrigate vegetables grown in two agricultural plots located by the MAR pilot in Palamos. Results to date show that MAR water significantly decreases the transfer of chemical and biological contaminants to vegetables in comparison with the WWTP outflow.  MARadentro also collaborates with the Catalonian project RESTORA (https://restora.h2ogeo.upc.edu/). This project focuses on the use of organic substrates to accelerate water re-naturalization in MAR. In this case, emphasis lies on Antibiotic resistance genes and chaotic mixing. |

### **Coverage of the themes and sub-themes of the call** (Maximum *250 words)*

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| MARadentro contributes to a large range of themes and sub-themes of the call. This research covers Sub-theme 1.2. Integrative management by implementing Natural Water Retention Measures (NWRM) such as Managed Aquifer Recharge (MAR). Furthermore, the project strengthens socio-economic approaches to water management (Theme 2) and especially to Sub-theme 2.3. Connecting science to society and Sub-theme 2.4. Promoting new governance and knowledge management approaches. In this regard, the project aims at developing innovative water management tools and approaches suitable for decision-making based on an analysis of the limitations of current practices. In addition, MARadentro contributes to Theme 3. Supporting tools for sustainable integrative management of water resources and complements the actions developed under the European Strategy Forum for Research Infrastructures (ESFRI) and other European initiatives. |

1. **Stakeholder/industry engagement** (*Maximum 250 words)*

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| The visibility of the MARadentro project is large. This was strengthened through the end-users meeting in Barcelona in December 2019). There the project established cooperation with several water agencies and actors in the field. Now the team collaborates with the Catalan Water Agency (ACA) which funded the project RESTORA - Managed recharge of aquifers and use of Organic Substrates to Accelerate water re-naturalization. They also signed an agreement with Consorcio Costa Brava (CCB) which is supporting the implementation of MARadentro within the Palamos WWTP. The research team is also involved as the coordinator of COMAIGUA S.L, a management of integrated water cycle company in the project proposal LIFE-REMAR: Reactive barriers for water re-naturalization during managed aquifer recharge in the Baix Camp region in Spain. Furthermore, the company Mejoras Energeticas S.A. is also involved as an industrial partner. Finally, a Research Technical Support contract was signed between CSIC and Consorci Besos-Tordera (CBT) a management of integrated water cycle company. |

### **Recommendations for improvements/amendments of the report** (Please complete Table below)

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1. **Recommendations/ problems and risks** (Maximum *250 words)*

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| I do not see any additional risks to the ones which occurred due to the COVID-19 situation. The project team will reach their goals. |

**MID-TERM EVALUATION CONSENSUS REPORT**

**This Consensus Report will be made available to the Consortium as well as CSC and JPI Water GB.**

**PROJECT TITLE AND ACRONYM**

Name of Coordinator:

Project code: WaterWorks2017-CONSORTIUM ACRONYM

Duration of project:

Start date: End date:

**FOLLOW-UP GROUP**

Please include the data of the FG members reviewing the report

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| Name | Organisation | Signature |
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### **Scientific and technological progress** (Maximum *250 words)*

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| *Please describe the work performed and the results obtained during the lifetime of the project, and the conformity of work progress within the initial schedule. Take into account the following aspects:*   * *Has progress been achieved towards reaching the project objectives according to the original description and milestones?* * *Detailed update on methodology & results* * *How has the progress of the project promoted a multi-disciplinary work?* * *Dissemination of the results (publications, patents, other)* |

### **Collaboration, coordination and mobility within the Consortium** (Maximum *250 words)*

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| *Please evaluate the collaboration, coordination and mobility within the Consortium*  *Take into account the following aspects:*   * *Efficiency on the coordination and organization of the projects* * *Collaboration effective between the partners* * *Mobility of the research between the consortia* * *Does the project meet the transnational nature and its added value?* |

### **Coordination with other international project funded by WaterWorks2017, or other instruments** (Maximum 250 *words)*

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| *Please evaluate the external collaboration of the Consortium*  *Take into account the following aspects:*   * *Collaboration effective with other projects funded under the 2018 Joint Call:* * *Collaboration effective with other projects or consortia.* |

### **Coverage of the themes and sub-themes of the call** (Maximum 250 words*)*

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| *Please evaluate relation within the project results and the themes and the sub-themes of the call.*  *Theme 1. Enabling sustainable management of water resources.*  The overall aim for this theme is to develop new governance and knowledge management approaches.   * *Sub-theme 1.1. Promoting adaptive water management for global change:*   The aim of sub-theme 1.1 is to increase knowledge and to develop evidence-based methodologies and technologies for monitoring the cumulative impacts of human activities and climate change on the water cycle, but also to develop management options on the water cycle (considering all cycle compartments) and water / ecosystem services. This knowledge must be applicable for the adaptive management of water resources on a regional scale, while enabling downscaling to address local or catchment situations.   * *Sub-theme 1.2. Integrative management by implementing Natural Water Retention Measures (NWRM) such as Managed Aquifer Recharge (MAR):*   The aim is to increase the knowledge and develop NWRMs such as MAR in a multidisciplinary way, to protect, prolong, sustain and augment freshwater supplies. Evidence of their effectiveness and on the multiple benefits they deliver should be demonstrated.   * *Sub-theme 1.3. Mitigating water stress in coastal zones and urbanized areas:*   The aim is to develop and demonstrate a comprehensive coastal zone management system based on monitoring and modelling to ensure the provision of freshwater security under a range of conditions including saline intrusion, sediment management, storms, floods and droughts, but also specific coastal water uses. Please, refer to H2020 calls on nature-based solutions to propose complementary actions.  *Theme 2. Strengthening socio-economic approaches to water management.*  The overall aim of this theme is envisaging education and communication initiatives to raise social awareness of consumption habits and water scarcity and to increase the levels of social acceptance and use of recycled water.   * *Sub-theme 2.1. Integrating economic and social analyses into decision-making processes:*   The aim is to increase the knowledge the effectiveness and efficiency of existing economic mechanisms and policy instruments related to water management, with a special emphasis on implementation of water policies (such as the EU Water Framework Directive) and development of a circular and green economy. The approach should aim to break boundaries between services valuation including more flexible pricing and charging mechanisms, management tools and institutions, and the employment of economic and social sciences to develop best practice management guidelines for efficient water uses, including under extreme events such as droughts and floods.   * *Sub-theme 2.2. The reuse of water:*   The aim is to develop integrative methods and cost-effective technologies for the implementation of acceptable and sustainable solutions on a large scale for different reuse cycles, spanning from irrigation, via livestock drinking water, to human consumption. Furthermore, goals include assessments of social acceptance for the use of recycled water and the development of integrated approaches combining technological solutions with social-psychological acceptability, economic viability and appropriate governance approaches. Research into the removal of emerging contaminants must consider the cost of the technology vs yield and realistic options for reuse of the recovered water. Please refer to projects funded under previous Water JPI Joint Calls (2013, 2015 and 2016) to avoid any duplication. See Joint Calls on Water JPI website.   * *Sub-theme 2.3. Connecting science to society:*   The aim is to increase understanding of the role of socio-economic approaches to water uses in hydrological cycles. Knowledge building should address stakeholders' and public awareness of water challenges and values, and how perception of policy measures and technological solutions are formed and how stakeholders can be steered towards desirable behaviour. Local and/or regional context (attitude, social norms, cultural context, etc.) should be taken into consideration. The value of improved water stewardship overall should be considered by developing sustainable business models.   * *Sub-theme 2.4. Promoting new governance and knowledge management approaches:*   The aim is to develop innovative water management tools and approaches suitable for decision-making based on an analysis of the limitations of current practices. These approaches should involve the broad participation of stakeholders (including public monitoring, communication and education), multidisciplinary research, and short and long-term water cycle scenarios to support decision-making and the integration of water policy into other policy fields. In effect, governance capacities for implementation of water policies at the local and regional levels should be enhanced.  *Theme 3. Supporting tools for sustainable integrative management of water resources.*  This theme aims to complement the actions developed under the European Strategy Forum for Research Infrastructures (ESFRI) and other European initiatives. Emphasis should be on establishing networks and information sharing among existing research facilities/field labs, analytical methods, monitoring tools and programmes, access to databases and platforms, exploring the use of big data solutions and establishing reliable hydrological standards. Across the globe, there is a large body of knowledge, methodology and data related to hydrology and the water cycle that has the potential of being beneficial for a wide range of the world's regions. The alignment of water-related research and sharing of data and results will serve to avoid duplication of research, support progress based on previous finding, and thus facilitate the establishment of water management policies addressing rapid climatic changes. |

1. **Stakeholder/industry engagement** (*Maximum 250 words)*

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| *Please evaluate the participation of stakeholders/industry on the project and the added value of this participation.* |

### **Recommendations for improvements/amendments of the report** (Please complete Table below)

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1. **General Assessment Comments** (*Maximum 250 words)*

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| *Please include a summary of the key points of this evaluation.*  *Problems identified or specific risks to the projects. As well recommendations/feedback, which could be relevant to the Consortium.* |