

The Water Joint Programming Initiative: towards a sustainable instrument to tackle Global Challenges & the UN Sustainable Development Goals

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Abstract: *The Joint Programming Initiative on Water, Water JPI, “Water challenges for a changing World”, is an intergovernmental initiative and a strategic umbrella for the alignment of water policy and RDI in Europe and beyond. With the vision “Together for a water-secure world”, the Water JPI has been very active in building links with countries outside Europe. Bringing solutions to the field of water requires international cooperation, this is why the Water JPI included international partners in most of its activities. To delineate its international strategy, the Water JPI launched the initiative IC4WATER in 2017, a coordination and support action funded by the European Commission.*

The Water JPI facilitates a systemic approach to bring concrete solutions to sustain the quality and quantity of freshwater on our planet. The Water JPI delivers tools and solutions to tackle Global Challenges. The Water JPI’s added value lies in its vital role in the alignment of research agendas and in influencing the European and international research agenda.

This paper provides a general overview of key current and future activities and it offers a critical view of its role as a tool for the implementation of cooperation activities in Europe and abroad. Building upon the experience accumulated in its first 10 years of experience and a SWOT analysis, this paper provides a set of conclusions and recommendations that should be put forward to enable the long-term sustainability of the Joint Programming Initiative for freshwater.

Theme 4. Regional and Sectoral Cooperation for Water Security / Sub-Theme 4.1. Cooperation and integration in shared waters.

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1. WATER JPI, AN INITIATIVE TO TACKLE GLOBAL CHALLENGES FOR A CHANGING WORLD.

The European Joint Programming Initiatives (JPIs) are inter-governmental collaborations between EU Member States and the European Commission. JPIs were created to tackle major societal challenges and mutual economic benefits. Ten JPIs currently exist in the fields of the environment, health and cultural heritage to sustain broader international cooperation in Research Development and Innovation (RDI) programming.

The Joint Programming Initiative on “Water Challenges for a Changing World”¹ has the ambitious goal to address the systemic challenges related to water. Formally approved by the European Research Council in December 2011, the Water JPI is about achieving sustainable water systems for a sustainable economy in Europe and beyond. The Water JPI’s common vision², *Together for a Water-secure World*, aims to tackle water

challenges through its shared mission of jointly enabling “smart” water solutions for a changing world.

This year 2021 marks the 10th anniversary of the Water JPI. This is the perfect timing for making an in-depth assessment of the achievements made so far by the initiative, but also of the difficulties encountered for the implementation of activities. This year marks as well the beginning of the new Framework Programme of the European Commission, Horizon Europe³, which will support amongst others a new project on water that will last 7 years and that will bring together more than 70 entities from across Europe and abroad, Water4All⁴. It is therefore a time when the Water JPI needs to think about its future action plan whilst aiming to valorize the work carried out so far and defending its strategic position in the European and international research and innovation landscape.

The purpose of this paper is to inform readers of most relevant activities of the Water JPI since its launch in 2011 and to come up with a number of recommendations for ensuring the long-term sustainability of a Water JPI-like initiative that builds upon the knowledge acquired, contributes to reducing RDI fragmentation in Europe and beyond, and avoids the duplication of funding and RDI efforts to tackle water challenges, and achieve the UN SDGs, and in particular, SDG6⁵.

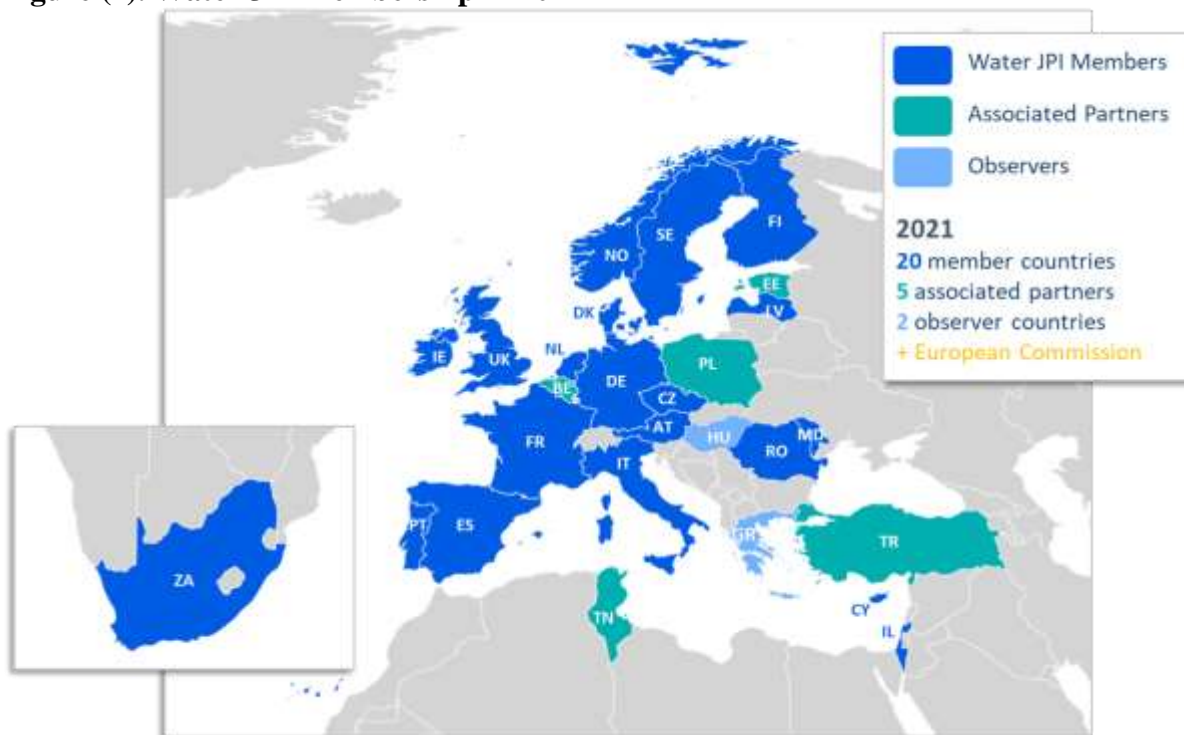
The following chapter briefly describes main activities of the Water JPI in coordinating national priorities, supporting the alignment of activities and the creation of networks of experts, and enhancing international cooperation. Chapter 3 focuses on the priorities and activities that will be undertaken in the 2021-2027 period, which corresponds to the period covered by Horizon Europe. The chapter 4 provides a critical analysis of the performance of the Water JPI. These findings prove extremely useful to the Water JPI as it provides an objective assessment of main strengths of the initiative, its weaknesses, and opportunities for the future. Conclusions and recommendations are provided in the final chapter of the paper.

We are firmly convinced that the contents of this paper can play a vital role in the conception of future instruments for research and innovation both in Europe and outside of Europe. Although it is focused on water, key lessons and recommendations can be extended to any other scientific domain as water RDI shares most of its concerns with other fields.

2. MEANS AND ACTIVITIES OF THE WATER JPI TO TACKLE THESE GLOBAL CHALLENGES

As of 2021, the Water JPI counts twenty full-member countries, five associated partners and two observer countries from Europe and beyond, including Israel, Norway, Republic of Moldova, South Africa, Tunisia & Turkey (**Fig. 1**). The European Commission is acting as a non-voting member. In addition, nine countries have been associated to joint activities: Brazil, Bulgaria, Canada, Egypt, Lithuania, Morocco, Slovakia, Switzerland and Taiwan.

Figure (1). Water JPI membership in 2021



The Water JPI has gathered an important critical mass, adding up to 88% per cent of the European national funding available for water research and innovation activities. This critical mass has allowed the implementation of joint activities including the calls for projects, the creation of networks of experts, alignment activities, the organization of exploratory thematic workshops and the set-up of strategic thematic groups. **The Water JPI is a unique instrument that is not only funding projects, but is also a strategic platform for enhancing collaboration in its multiple facets.**

Positioned as a strategic umbrella for joint activities⁶ the Water JPI has succeeded in the setting of common water research and innovation priorities across member countries, reflected in the strategic agenda of the initiative (see below). The Water JPI has achieved alignment of national strategies; and set up new forms of collaboration (Thematic annual programming⁷ & Knowledge hubs) and partnership across continents and sectors. Finally, Water JPI has driven scientific excellence with mission-oriented joint actions and provided effective links between research/knowledge with global policies.

All activities developed by the members of the Water JPI are meant to alignment as a way to avoid duplication, and strengthen the water research and innovation field. **To align national programs and policies, the Water JPI developed a common vision and a SRIA from its inception.** These exercises led to three SRIAs over the past ten years. The common vision is at the horizon 2030, and the latest SRIA 3.0 is for 2025. Moreover, Water JPI achieved alignment by implementing joint actions undertaken by its member and associated countries fostering the coordination of research programmes and activities around jointly identified strategic priorities. This alignment is also achieved by sharing work and resources towards common strategic priorities consistent with the common vision and the SRIA².

2.1 Coordination of national strategic agendas.

Addressing global challenges in the field of water entails the development of a strong common vision amongst partner countries and a shared strategic research and innovation agenda, SRIA². As a programming initiative, the Water JPI provides all the grounds, from the launch of joint activities to fund research and innovation projects, to bringing solutions to the field of water. Adopted in 2020, the latest Water JPI SRIA 3.0² lays out the strategic vision of partners until 2025, structured around four pillars: **ecosystems, health and wellbeing, water value and usage, sustainable water management**.

The Water JPI's SRIA has been co-designed with main water stakeholders. The active participation of representatives from water associations, research and performing organisations, enterprises, water utilities, water management entities and international organisations has permitted to integrate different views and priorities. The SRIA is hence the backbone of the Water JPI and it has been the main reference document in the development of the strategic agenda of the upcoming Water4All project⁴.

2.2 Calls for projects.

The funding agencies and ministries launched under the umbrella of the Water JPI seven calls for proposals in which it gathered the following countries outside Europe: Brazil, Canada, Egypt, Israel, Morocco, Norway, Switzerland, Taiwan, Tunisia, Turkey and South Africa (Table 1).

Key figures are: 6 completed joint transnational calls, 83M euros coming from the national funding agencies/ministries and, in 4 calls, the European Commission. The Water JPI has funded 88 funded projects and 439 partners from public or private institutions. These joint activities have contributed to developing a bottom-up network of scientists from mainly public institutions.

Table (1). Water JPI's Joint transnational calls: topics and international participation

Year	Total number of Funders	International funders	Topics of the Calls
2013	10 countries	<i>Water JPI funding countries</i>	Emerging water contaminants
2015	15 countries + European Commission	Israel and South Africa	Waste water treatment and Water reuse
2016	22 countries + European Commission	Canada, Egypt, South Africa, Taiwan, Tunisia and Turkey	Water challenges in agriculture, forestry and freshwater aquaculture
2018	12 countries	Brazil, Egypt, and South Africa	Water related UN Sustainable Development Goals – SDGs
2019	18 countries + European Commission	Brazil, Egypt, Israel, South Africa and Tunisia	Sustainable management of water resources
2020	26 countries + European Commission	Brazil, Israel, South Africa, Taiwan, Tunisia and Turkey	Aquatic pollutants
2020	27 countries + European Commission	Brazil, Morocco, South Africa, Taiwan and Tunisia	Restoration and conservation of the ecosystems

The Water JPI is currently working on a framework for measuring the political, socioeconomic and environmental impact of funded projects. Preliminary results reveal that the Water JPI has acted as a facilitator amongst countries, having promoted collaboration in a

number of strategic issues. The present open science policy in Europe enables stakeholders to be better aware of Water JPI’s projects results, to exchange data and knowledge, and to valorize activities.

2.3 Alignment activities: the case of the Thematic Annual Programming action – TAP Action.

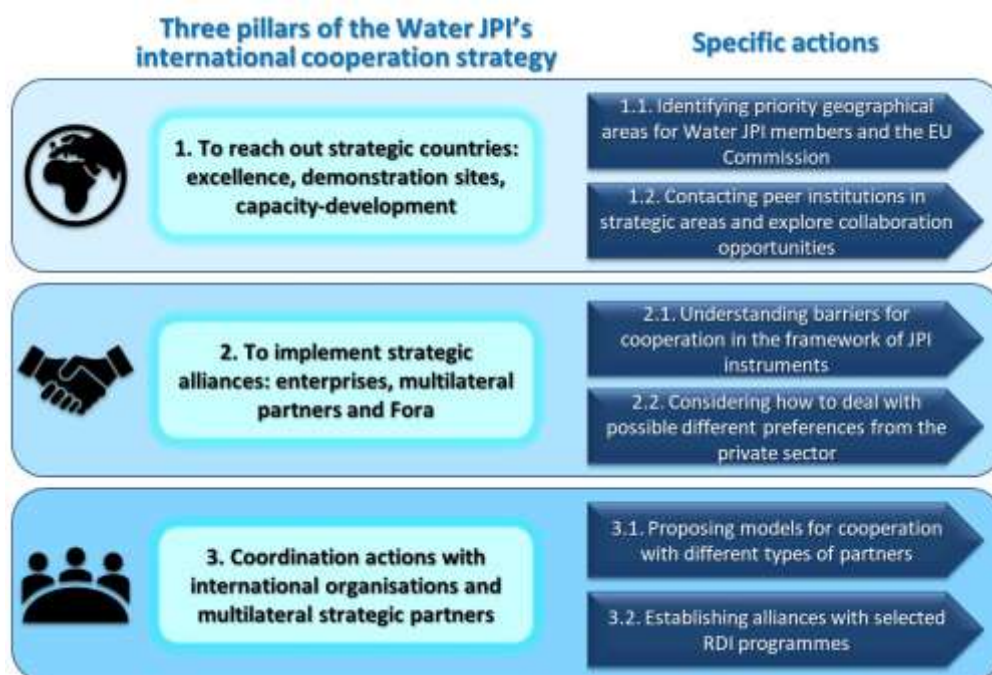
The Thematic annual programming action, TAP action is a tool dedicated to alignment. TAP actions consist of coordination of individual projects across member countries to trigger networking, exchange of information on approaches, methods, databases and results. Participating funding organisations include the same topic in their own national calls. The TAP action allows the development of synergies in RDI, and avoids duplication.

One successful example is the TAP Action for Ecosystem Services: AQUATAP-ES. This first Water JPI TAP action, launched in 2019 on Developing Approaches for Assessing and Optimising the Value of Ecosystem Services delivered a paper and a policy brief highlighting that the integration of Ecosystem services into policy is key for the sustainable management of aquatic resource. A showcase event on “Aquatic ecosystem services on the science-policy-practice connection: challenges and opportunities” is organized on June 22nd 2021, to present the key achievements of the network.

2.4 International outreach of Water JPI

In 2014, the Water JPI focused on bringing on board activities with strategic third countries. Water JPI’s international strategy is illustrated in **Fig. 2** which shows the three pillars of the strategy: **to expand** its network of countries outside Europe, **to implement** strategic alliances with public and private partners, **to develop** coordinated actions with multilateral partners to reach the UN Sustainable Development Goals (UN SDGs).

Figure (2). Water JPI’s International Cooperation Strategy



Water diplomacy has been defined as “the use of diplomatic instruments to existing or emerging disagreements and conflicts over shared water resources with the aim to solve or mitigate those for the sake of cooperation, regional stability, and peace”⁹. Importantly, in that perspective of cooperation for the sustainable development goals, water diplomacy potentially opens an innovative approach of Science Diplomacy with socio-economic elements, interdisciplinarity and cross-sectional actors’ cooperation.

The example of the workshop on transboundary cooperation in the Danube region¹⁰. This one-day workshop, organized in breakout sessions to in November 2020. The Danube river basin homes more than 80 million people from 19 countries. This typical example of water diplomacy pointed out that civil society is not sufficiently informed and that communication is an important player for the water RDI sector. One of the weaknesses of Water JPI is the communication. Communication is reckoned not to be sufficiently spread digitally and increasing awareness amongst stakeholders and civil society will help in fighting water scarcity and pollution.

This is in that perspective that the Water JPI organized and moderated ten exploratory workshops in the international cooperation, and the JPI’s partners have addressed the different dimensions of international cooperation, exploring different continents, the private and the public sectors, different themes (from ground to surface water) and asking the question of the societal outreach and impact. The proceedings of each workshop can be found on the Water JPI website⁹.

Water governance: a working group initiated by Water JPI¹¹

Based on the question: How can the Water JPI contribute to the UN SDGs in Europe and beyond? This working group gathered experts in water governance. Good governance is crucial to sustainably manage water. However, it is not easy to set forth commonly agreed principles of good governance as it is a complex concept that encompasses policy and strategic issues, communication aspects, funding, capacity development and societal values—to cite just a few. Taking into consideration the knowledge and experience accumulated since its launch in 2011 through different activities, the Water JPI has submitted to the CWW a paper to propose a framework for structuring good water governance and it spells out specific areas for which research and innovation are recommended.

2.5 Science and policymakers dialogue

The member countries of the Water JPI elaborated several position papers under Horizon 2020. These position papers were targeted to the European Commission and the Member states to increase the visibility of RDI actions in the field of water in a cross sector and multidisciplinary perspective.

Dissemination and knowledge transfer are key to the Water JPI’s activities. Policy briefs were published in the framework of Thematic Annual Programming actions (see above), Knowledge Hubs and the pilot joint transnational call. The aim of these briefs is to inform and increase awareness of the stakeholders of topics such as the UN SDGs or Ecosystem services.

The Knowledge Hub, KH, is a knowledge sharing, transfer and dissemination tool. Knowledge hubs are thematic networks consisting of selected research groups and experts within a defined area of research targeted at stakeholders. These knowledge hubs are typically set up following joint call activities and contribute to the strategy activities of the Water JPI. **The successful example of the KH on UNSDGs (Water4SDG)**, launched in

December 2019 addressing the global water challenges posed against achieving UN Sustainable Development Goals (UN SDGs) under the theme “New Water under Water Scarcity”¹².

2.6 Synergies with other initiatives

As the freshwater is crucial for human living and related activities, the Water JPI anchored its cooperation across existing initiatives. The Water JPI launched several activities jointly with other Joint Programming Initiative such as JPI Oceans¹³ and JPI AMR¹⁴ for Aquatic Pollutants. For the restoration of ecosystems and biodiversity, the Water JPI is associated to the European initiative BioDiversa¹⁵, a joint call for research proposals was launched in 2020. Moreover, for agriculture, the Water JPI and the FACCE JPI¹⁶ are collaborating for joint calls and results valorisation. The Water JPI is currently establishing strong links with other initiatives such as PRIMA which is dedicated to research and innovation with Mediterranean countries. Within the USA, the Water JPI has established strong links with the Cleveland Water Alliance¹⁷ a model of cluster working with academic, industrial and government sectors.

3. WATER JPI’s ACTION PLAN (2021-2027)

For the next Framework Programme, Horizon Europe that just started in 2021, the Water JPI has elaborated its action plan (Fig. 3). First, until 2025, the Water JPI is the strategic umbrella of EraNets and support projects, activities that begun under Horizon 2020. These activities also encompass **the valorization of completed projects** of the 6 completed calls, as well as the coordination and support action IC4WATER. IC4WATER will end in June 2022 and will deliver a **strategy for international cooperation** that is still under elaboration (Figure 2). In particular, during the CWW 2021, the Water JPI is organizing the event on *Strengthening EU-Africa cooperation in Water RDI: opportunities and challenges* that will feed its international strategy to be delivered to the European Commission next year.

The Water JPI will continue playing a role in **alignment activities**, seeking to coordinate national research and innovation strategies and setting common priorities. As part of its international cooperation strategy, the Water JPI promotes the widening of its activities towards European states not currently present in the consortium. The Water JPI is thus considering to put together a proposal in response to a “Widening participation call” from the Horizon Europe programme – Work programme 2021-2022. This proposal should allow enhancing alignment with countries from the Balkans region although opportunities for enlargement to third countries are also being explored.

In the same vein, the Water JPI will look at **lobbying** activities in order to influence the European agenda-setting in water research and innovation. We will in particular aim to contribute to reflections on the potential launch of a Knowledge Innovation Community on water (water KIC) and to the structure and contents of the 10th Framework Programme. These lobbying activities will be carried out with other JPIs or other EU initiatives, as required. The execution of lobbying activities would strongly benefit from foresight actions in order to identify emerging research needs in the domain of water. The feasibility of foresight exercises across JPIs targeting urban agriculture, water, health and international cooperation is also in the action plan of the Water JPI. Such foresight exercises are highly relevant to accompany decision makers and funders, whether national, Europeans or international.

Finally, the **Water JPI will valorize the knowledge of its experts by contributing to expertise projects**, which are periodically launched by sectoral units of the European Commission, national agencies and international organisations.

Figure (3). Water JPI’s action plan under Horizon Europe 2021-2027.



4. LESSONS LEARNED FROM THE WATER JPI: TOWARDS A SUSTAINABLE INTERNATIONAL INITIATIVE IN THE FIELD OF WATER

To foresee a long-term initiative, it is important to grasp the stakes, the challenges and to analyse the strengths and weaknesses of the Water JPI. Hence, the SWOT analysis of the Joint Programming Initiative was completed early 2021 in the framework of the workshop *Exploring opportunities for the scaling-up of the JPI activities for water challenges in Europe and beyond*¹⁰. Based on the past 10 years of successes and obstacles to reach the Water JPI’s ambitious goals, this SWOT analysis is tackling the opportunities and threats that a sustainable intergovernmental initiative on freshwater will encounter in its establishment towards the end of the co-funded project Water4All under Horizon Europe, in 2027.

Amongst the weaknesses, the participation of the private sector was pointed out. Indeed, there are less than 20% of the funded projects by Water JPI that have an enterprise (SMEs or Large enterprises) in their consortium. However, without the private sector there will be no creation of value, nor creation of jobs. Moreover, the presence of public-private partnerships in water research and innovation is a real advantage to accelerate the transfer of solutions to the public. Two key recommendations arise from the different workshops held by Water JPI’s members: to facilitate co-creation by involving local partners and businesses during the project cycle from the start; and to promote living labs where researchers from the industry, the social sciences, and the natural sciences can work together in real life environment.

Living Labs allow targeted interventions with a cross-sector nexus approach in real world and/or realistic environments and require close collaboration with the private sector.

Table (2). Swot analysis of Water JPI: a joint programming initiative for alignment and international inclusion

Strengths	Weaknesses	Opportunities	Threats
The Water JPI membership accounts for 88% of all European public RDI annual expenditure on water issues.	Joint transnational calls are organized with a virtual common pot. This mean of allocating budget can block the funding of excellent proposals. In some cases, the virtual common pot does not allow to fund the entire list of selected proposals.	Horizon Europe with: i/ Funding to accompany new activities: -Cooperation with African countries; -Impact assessment; -Common vision with neighbouring initiatives The future Knowledge and Innovation Community – KIC for Water and Oceans, is a great opportunity for the water sector and its JPI.	Horizon Europe and its development of new projects such as the partnerships. Although, Water4All is not an intergovernmental initiative, it is very attractive as it is co-funded by the EC.
The Water JPI has developed a SRIA in coordination with the agendas of other initiatives to be able to launch joint calls on topics of common interest. Alignment of the national SRIA agendas result into the set-up of topics, knowledge hubs (KH) and thematic annual programming (TAP) actions.		The Water JPI is an initiative also focused on alignment activities with EU neighboring countries. This initiative is meant to play a strong role in EU agenda setting post FP9.	
Synergies with other initiatives: common vision with FACCE-JPI; joint calls with several initiatives (JPI AMR; JPI Oceans; FACCE-JPI; BiodivERSA)	Low participation of the private sector in all Water JPI activities. The initiative has worked for the past 10 years mainly with public entities.	Synergies of activities with other JPIs, Articles 185, Partnerships, KIC, such as knowledge hubs, joint calls, exploratory workshops, capacity development.	
Participation of non-EU countries in Water JPI activities are facilitated: flexibility in adding in MoUs countries sharing the common vision and the SRIA.	All the countries, EU or non-Eu have different national eligibility criteria. Sometimes it hinders the process and the speed of activities and calls publications.	- Valorisation of research and innovation results. - Impact assessment of activities, research projects, etc.	
Capacity of the Water JPI to bring together thematic experts / working groups / advisory boards / high-level panel discussions / to gather World Bank, UN, OECD, etc.	The visibility of Water JPI should be increased with a strong strategy for digital communication		
Lobbying in agenda settings, in framework programmes and the delivery of Policy Papers.		French Presidency of European Council.	

5. CONCLUSIONS AND RECOMMENDATIONS

Building upon the experience accumulated since its launch, one of the objectives of the action plan developed in this paper is for the Water JPI to **become a long-term and sustainable initiative**. Hence, establishing alignment tools, broadening to additional countries, opening to the economic sector and including the civil society are all key actions to achieve the implementation of sustainable initiative with the Water JPI.

To prepare this implementation, this paper intends to make some recommendations all established upon the experience of the Water JPI, its SWOT analysis and the workshops with experts and stakeholders.

Attracting the private sector in Water JPI's activities is one the cornerstones of the valorisation of funded projects: the Water JPI gathered three recommendations to strengthen the public-private partnership (PPP) in a win-win situation. **The first recommendation** is to promote and enable the transfer of previous results of the Water JPI to different types of users (primarily policy makers, water utilities, enterprises). KHs and the TAP instrument could be further exploited to attain this objective. The mapping of RDI priorities for the private sector is key to enhance the participation of the private sector in Water JPI activities. Hence, the establishment of a dialogue platform will help in tackling these priorities. **To this end, one recommendation** is to allocate the role of facilitator between the public and private sectors to the Water JPI. The Water JPI memberships would be a means to ensure the long-term sustainability of such a facilitating platform. **The last recommendation** would be to include in the Water JPI's Advisory Boards (ABs) large enterprises that are not directly involved in the field of water. Multinational Companies are all using water and most of them are heavily engaged in SDGs through environmental **corporate social responsibility schemes**. The Water JPI must welcome several of them and make sure to keep its independence. By establishing rules of participation, their presence in the ABs would allow a more global outreach of Water JPI activities as well as **raising societal awareness of water challenges**.

A strong recommendation the Water JPI pleads for a better and more systematic valorisation of research and innovation project results, which relates to the first recommendation in the PPP. This recommendation lies into the launch of a collaborative platform with other initiatives on water. It invites representatives of all these initiatives to reflect on funding opportunities and **the possible structure of such a communication platform**.

Broadening its outreach and communication to the civil society and stakeholders, such as Farmers' association, is key for the societal impact of water preservation and fighting water scarcity. Hence, **to be inclusive is a strong recommendation** of the Water JPI. Public participation is at the heart of the successful implementation of solutions for water policy and management. As a consequence, **increasing awareness towards the public** and bringing forward best practices in water management is one of the cornerstones of a sustainable long-term initiative on freshwater. To that regard, corporate social responsibility of multinational companies will be a tool to achieve this awareness.

With these recommendations, the Water JPI, as an intergovernmental initiative, can become a long-term sustainable initiative under the conditions to remain highly flexible, inclusive and independent.

Acknowledgements

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