IC4WATER Coordination and Support Action

Water International Cooperation

SC5-11-2016: Stepping up EU research and innovation cooperation in the water area

D 2.6

Joint International Cooperation Strategy report

(WP 2)

June 2022

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Table of contents

Water JPI's International Cooperation Strategy

December 2021

Foreword

The Water Joint Programming Initiative for Research & Innovation in the field of water, Water JPI, has started in 2011. Since its inception the international outreach has been key in JPI's interests as water is a worldwide challenge that will be tackled only if addressed globally. Water JPI has adapted with a great agility to the United Nations Sustainable Development Goals (UN SDGs) and to Horizon Europe's policies. To explore cooperation with partners beyond Europe, the Coordination and Support Action (CSA) IC4WATER, International Cooperation for Water, was launched in 2017. The aim of this CSA, that will end in June 2022, is to support the delivery of a strategy for international cooperation for water by the Water JPI. This project has evolved within the five years of its duration, as under the Framework Programme 9 (Horizon Europe), the European Commission has launched partnerships to cofund activities with the Member States. The European co-funded partnership dedicated to water, Water4All, has been elaborated in 2019-2021, and to be launched in 2022. The CSA IC4WATER has evolved to adapt to this new instrument within Horizon Europe. To better serve the research & innovation for water beyond Europe, IC4WATER has extensively explored throughout more than ten workshops cooperation with the several continents/countries/regions, in particular America, Africa, Asia, and the Danube region. The priorities of Water JPI member countries and the European Commission have been a guidance throughout the five years.

The strategy delivered here has been possible thanks to the work of Water JPI's members since 2011. It is also the results of many fruitful meetings, discussions and research pursued by the whole Water JPI's teams over the past ten years.

The Water JPI Coordination & Secretariat team, first based in Spain, then in France, has been extensively involved in this work to establish contacts with international partners of quality, to organize workshops and to achieve this deliverable which is the very last step of IC4WATER. One must acknowledge the efforts of the Water JPI teams and members to open up so many avenues to tackle globally water challenges for the past ten years. Thanks to this aligned participation of Member States, European Commission and individuals, this strategy for international Cooperation for water exists. Let's hope that it will generate new ideas and new ways of collaborating with countries beyond Europe, required to pursue the path and to implement more activities in the near future with Water4All or in a longer run with the next Framework Programme.

In any case, it is indispensable to sustain in the long run a Member States-driven initiative for cooperation in research and innovation in the field of water beyond Europe for a better world whose results and experience are at the service of the UN SDGs.

Véronique Briquet-Laugier

Coordinator of the Water JPI, ANR, France

List of abbreviations and acronyms

AfriAlliance	Horizon 2020 funded project (2016-2021) “Africa-EU Innovation Alliance for Water and Climate”
ANR	French National Research Agency
BONUS	The joint Baltic Sea Research and Development Programme
CSA	Coordination and Support Action
EU	European Union
ERA	European Research Area
ERA-NET	European Research Area Network
ESFRI	European Strategy Forum on Research Infrastructures
EUSDR	European Strategy for the Danube Region
FACCE-JPI	Joint Programming Initiative on Agriculture, Food Security and Climate Change
GPC	High Level Group on Joint Programming
IC4WATER	Horizon 2020 Coordination and Support Action (2017-2022) “Tackling Water Challenges in the International Context”
ICPDR	International Commission for the Protection of the Danube River
IHE Delft	Institute for Water Education
IRD	French National Research Institute for Sustainable Development
JPI	Joint Programming Initiative
OG	Operational Goals
PRIMA	Partnership for Research & Innovation in the Mediterranean Area
RDI	Research, Development and Innovation
SG	Strategic Goals
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SMEs	Small and Mid-size Enterprises
SRIA	Strategic Research and Innovation Agenda
TAP actions	Thematic Annual Programming actions
UN SDGs	United Nations Sustainable Development Goals
Water JPI	Joint Programming Initiative on Water challenges for a changing world
Water4All	Horizon Europe Partnership on Water security for the planet
WatEUr	FP7 Coordination and Support Action (2013-2016) “Tackling European Water Challenges”
WEFE nexus	Water, Energy, Food and Ecosystems nexus
WHO	World Health Organization
WoLLs	Water-oriented Living Labs
WP	Work Package
WRC	Water Research Commission

1. Background

1.1. Introduction

This report contains the Water JPI's International Cooperation strategy. This strategy has been developed within the framework of the IC4WATER Coordination and support Action (CSA), funded by the European Commission and running from 2017 till the end of June 2022 (Figure I). This common strategy report was done within the Task 2.5 "**Establishing the Water JPI International Strategy**" and is based on the results of the outcomes of all IC4WATER Work Packages (WP), strategies and recommendations for cooperation models, overcoming barriers, managing constraints and implementing the most relevant enlargement strategy.

Since its launch in 2011, international cooperation has been a priority for the Water JPI as it provides opportunities for addressing water challenges more effectively. It is through international cooperation that countries put in common their human and financial resources for the implementation of joint activities and the acquisition and transfer of new knowledge, the exchange of information and expertise, and the launch of activities in response to the emerging challenges in the field of water.

This strategy for international Cooperation provides the orientation of the Water JPI as regards cooperation with countries outside the current membership for the **2022-2027 period**, coinciding with the end of Horizon Europe – the 9th Framework Programme for Research and Innovation of the European Union. This cooperation may translate into different forms, including the launch of joint actions with other partners, the application of funding to external calls, agenda-setting for influencing the contents of other water research programmes, or the provision of advice to other running initiatives.

As stated in the IC4WATER proposal, the purpose of WP2 was to "*elaborate the overall strategy for developing the Water JPI international network, building on the connections already/ to be achieved through the WatEUr CSA, the Additional Activities of WaterWorks2015 ERA-NET Cofund and other WPs of this CSA (WP3 to WP5)*". It should be noted that the ultimate use of the document here presented has importantly changed due to latest developments in the Framework Programme and, in particular, to the upcoming launch of the European Partnership Water4All. Hence, **the Water JPI's International Cooperation strategy intends to (i) support Water4All's international cooperation activities (Pillar E) building upon the experience and knowledge accumulated since the launch of the Water JPI; and, (ii) to guide cooperation activities in areas either not tackled by Water4All or considered strategic by Water JPI members**.

The strategy is mainly targeted at current members of the Water JPI and the EU Partnership Water4ll. Its contents may as well be of interest for the European Commission services in charge of international cooperation, the Framework Programme and/or of water policy as well as of countries outside of the Water JPI consortium.

Introduction to IC4WATER

The specific objectives of IC4WATER are:

1. To set up the international RDI cooperation between the Water JPI and beyond Europe countries through different activities.
2. To enable a framework for the Water JPI implementation through a set of activities and iterative coordination.
3. To identify opportunities for future research cooperation with international partners.
4. To enhance the Water JPI networking for future expansion.
5. To develop a more efficient knowledge transfer through the launch of a dedicated knowledge hub.
6. To support water management policies, in particular the post-2015 sustainable development agenda with the UN SDG's implementation.

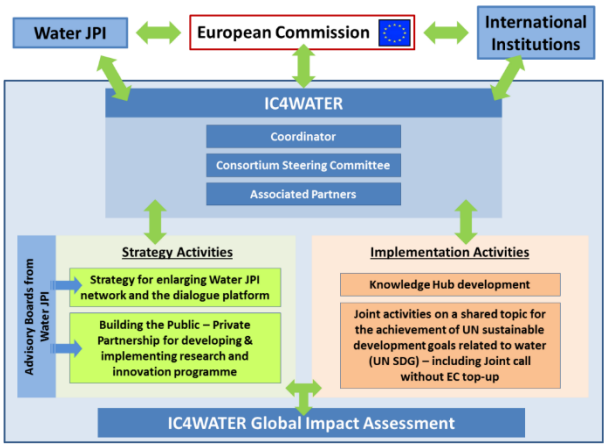

Figure I. Graphical representation of IC4WATER project components and their inter-relations.

1.2. The need for an international cooperation strategy.

Over the past decade the Research Development and Innovation (RDI) landscape has evolved rapidly. Global RDI were until recently dominated by the European Union, the USA and Japan but countries such as Brazil, China, India and South Korea play a more and more important role. As more RDI activities are performed in third countries, the European Union will need to access this knowledge based on the principles of reciprocity, equal footing and positive leadership. To remain a major global player, the European Union must promote itself as a successful partner that attracts talent, while at the same time preserving its economic interests, for instance as regards the protection of intellectual property.

Current grand challenges are global. Properly tackling those challenges calls for coordinated action at the global level as well as the pooling of resources and the full use of available knowledge. The launch of JPIs meant to fill this need and initial impact analyses suggest that much progress has been made by these initiatives in bringing together relevant actors around the identification, and implementation, of relevant activities. Through increased critical mass, JPIs have also allowed maximising the impact of European RDI.

Through its international cooperation strategy, the Water JPI aims to come in support of European and global actions in both addressing current and emerging challenges whilst enhancing the competitivity of EU RDI teams. Thus, past efforts in international collaboration have translated in the integration of a number of countries in strategic joint activities such as South Africa (currently full member and previously funder of WaterWorks2014 and WaterWorks2015) and Canada, Egypt, Taiwan and Tunisia (new funders within WaterWorks2015) in securing the sustainable use of water.

This strategy has the remit to guide Water JPI's international cooperation activities for the next 5 years (2022-2027) in a systematic way by addressing key questions such as "*which countries* the Water JPI should collaborate "*with*", "*when* that collaboration should take place", "*how* it should happen (collaboration modes)", and "*on which* topics". **International cooperation is here defined as RDI activities to be undertaken with countries outside of the current membership**.

As shown in **Figure II**, the strategy is structured around 3 pillars, each of them having specific objectives. Water JPI's international cooperation activities are meant to be a cornerstone to:

- Increase the critical mass in RDI programming.
- Enhance the added value of Water JPI's activities through communication, dissemination and capitalisation of RDI results.
- Propose new frameworks for international cooperation after the end of the Horizon Europe programme (Exit Strategy).

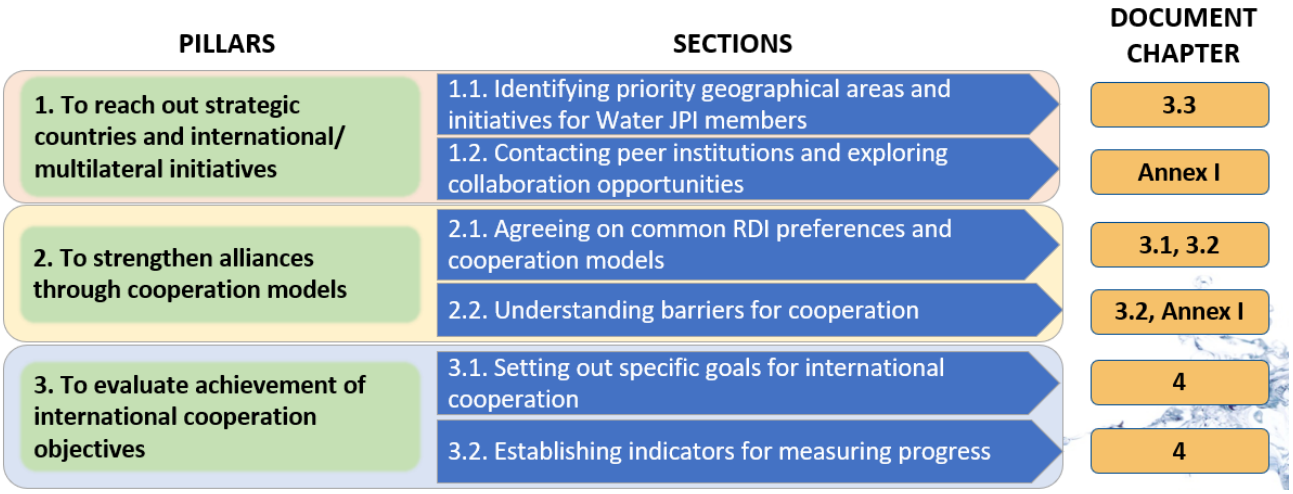

Figure II. Water JPI International Cooperation Strategy.

The publication of this strategy takes place following the official approval of the Commission to launch the EU Co-funded partnership on water, **Water4All – Water security for the planet**. Water4All will be structured around 5 main Pillars, one of which will address international cooperation (Pillar E). **As all Water JPI members will also be part of the Water4All consortium (as full members or observing partners), the content of this document will contribute to the strategic orientations of Water4All**. This will enable the transfer of expertise and knowledge from the Water JPI to Water4All and hence, the saving of financial resources for the benefit of new activities.

The participation of the Water JPI as an observing partner to Water4All will ensure the proper transfer of knowledge and information to partners of the pillar E on "Internationalisation".

The contents of the strategy could also underpin **European Commission's decisions as regards international cooperation** within the context of the 10th Framework Programme. Likewise, information on priority thematic areas (section 3.1), cooperation models (section 3.2) and cooperation barriers (chapter 3, annex I) could be of great use for **other EU initiatives (e.g. Horizon Europe missions) and multilateral initiatives** (e.g., Belmont Forum, Partnership for Research and Innovation in the Mediterranean Area - PRIMA).

2. Methodology

Through the CSA IC4WATER, the Water JPI pursued to progress in the international dimension of the initiative in a **more systematic way**. The development of the strategy has involved the literature review of key strategic documents from the European Commission on international cooperation, a consultation process and the organisation of workshops targeting both European and international organisations, water initiatives, the scientific community and the private sector.

A first **consultation process of Water JPI Governing Board members** was carried out in May-June 2017 in order to identify geographical preferences for RDI activities. The results of this consultation, along with a thorough mapping exercise structured around a group of policy, RDI and economy-related criteria, were used to develop a shortlist of priority areas for the Water JPI (North American countries, the BRICS countries and South Korea, Japan and Singapore). Discussions with the Governing Board, held on the occasion of a meeting in October 2017, also unveiled the need to adapt the list of selection criteria according to the strategy and purpose of the collaboration. Likewise, the Governing Board agreed on the need to adapt the list of strategic priority areas to changes in the Water JPI's roadmap and the lessons learnt. The discussions during the October 2017 meeting and the following recommendations gave a valuable input for the updating of the mapping exercise carried out within IC4WATER (Task 2.2), which was an iteration of the previous mapping exercises (2013, 2014 and 2016) conducted within the WatEUr CSA (http://www.waterjpi.eu/mapping-agenda/water-rdi-mapping).

Key inputs for the strategy come from a number of **international workshops**, organized within the framework of IC4WATER and as part of Additional Activities of the ERA-NET Cofund WaterWorks2015. All these workshops provided the occasion for participants to:

- Continue the discussions with the countries already contacted under previous activities since the Water JPI creation in order to develop long-term partnerships;
- Identify cooperation modalities with existing international initiatives e.g. PRIMA, Belmont Forum, funding agencies/ programme owners.
- Share best practices.
- Intensify networking.
- Reinforce coordination with existing initiatives and activities.
- Establish new relationships for multidisciplinary networking.

Building on the two geographic workshops (one dedicated to Africa and the Mediterranean area and the other one dedicated to America) held in 2017 under the WaterWorks2015 project, another workshop on international cooperation was scheduled to look at opportunities for developing a common strategy for international cooperation with other **European and regional initiatives**. This workshop entitled "**Towards a Common Strategy on International Cooperation**", was held in September 2018. This workshop counted with the participation of representatives from other initiatives (FACCE-JPI, PRIMA, BONUS), the European Commission, stakeholders, and the "*Groupe de haut niveau pour la Programmation Conjointe*" (GPC, High Level Group on Joint Programming) to discuss the state of play of international cooperation and identify common barriers and good practices in international cooperation.

The second "**Towards a Common Strategy on International Cooperation**" workshop took place in June 2019 and **targeted researchers involved in international RDI projects**. The Water JPI invited projects and networks of researchers working with African countries, Australia, Brazil, Canada, China, Georgia, India, Jordan, Pakistan, Republic of Korea, Russia, Singapore, Tunisia, Ukraine and USA. A total of 38 people attended the workshop, including researchers from 19 countries and representatives from several initiatives, including the Water JPI. Also, in 2019, another workshop was held in December. The "**Future Cooperation in Research and Innovation with countries beyond Europe**" workshop targeted International Organisations and institutions beyond EU.

In 2020, a third **workshop with peer-EU Initiatives** took place to discuss and progress the proposed Water JPI International Cooperation Strategy. This workshop gathered representatives from the European Commission, GPC, EU Initiatives (JPIs, BONUS, PRIMA, foreseen leaders of other Partnerships), ERA-LEARN, Water Europe / International Cooperation Working Group, China-Europe Water Platform, Future Earth, as well as the Belmont Forum. A total of 45 participants attended, from 25 countries and 17 initiatives.

Two additional **workshops were held in November 2020 and January 2021, respectively, and aiming at establishing a continuous dialogue with European public institutions, initiatives and organisations** in order to avoid overlap, ensure information flow and foster a multiplicative effect of international cooperation activities. The workshop in November 2020 helped the Water JPI to discern collaboration opportunities and strategic areas in the Danube region whereas the workshop in January 2021 provided a better understanding of cooperation barriers between the Water JPI and the private sector, as well as the potential action pathways for the Water JPI in the SDGs roadmap.

Finally, a side event dedicated to African countries, both from southern Mediterranean countries and sub-Saharan countries, was held in October 2021 as part of the Cairo Water Week. This workshop was organised in collaboration with the PRIMA initiative and the Egyptian Academy of Scientific Research and Technology (ASRT) on "**Strengthening EU-Africa cooperation in water RDI: opportunities and challenges**". The event gathered representatives from the European Commission, AfriAlliance, the French National Research Agency (ANR, in French), Development banks, IHE Delft, the French National Research Institute for Sustainable Development (IRD, in French), Water Research Commission (WRC, South Africa), and the University of Cardiff (UK). The workshop was structured around two high-level panel discussions on **alignmen**t of RDI programmes between Africa and EU and on **social innovation**, to foster a social debate on competing use of water in some regions of Africa, and how to increase capacity development and stakeholders and private sector participation for water RDI. It was targeted at research funding agencies, policy-makers, development banks and international organisations dealing with water management and capacity development, as well as research performing operators.

One of the key findings from previous European Union policies is that Europe has great science but rather poor innovation and hardly any market uptake. In order to change this trend, one of the main goals of the European Commission's Innovation Union Flagship Initiative is to turn innovative ideas into products and services that create growth and jobs whilst addressing Europe's water challenges. As a way to bridge this gap, the Water JPI has launched specific activities within the frame of IC4WATER (WP3) aiming to enable more efficient knowledge transfer, wider dissemination and take-up of research findings. Two workshops and one webinar have been held to develop a common approach, identify drivers and barriers, and set up recommendations on "Business models" to better support innovation and address SDGs: first Workshop in September 2017 with Water JPI members, second Workshop in Brussels with national funding agencies and academia, and Webinar in September 2020 with funding agencies, academia, and industry investors.

A first draft of the Water JPI's international cooperation strategy was presented to Governing Board members on the 10th February 2022. A number of recommendations were made regarding the methodological approach and fully considered in the preparation of the final version. **It should be emphasised that, as agreed with the Governing Board, the strategy here presented does not offer a list of specific criteria to be used for the selection of strategic countries as priorities are highly dependent on the scientific, political and economic context. It was then suggested to rather use the strategy as a catalogue that provides information for each of the countries approached by the Water JPI through international conferences, informal interviews or exploratory workshops.**

3. Implementation

This chapter provides **recommendations as to which water RDI themes and cooperation models should be prioritised by the Water JPI** in the implementation of its international strategy. It also introduces information for more than 35 countries all over the world with which both the Water JPI and the Water4All Partnership could reinforce cooperation. The identification of the priorities outlined below will not preclude the Water JPI from developing activities in different scientific fields or areas as long as the objectives of such activities are well aligned with the overall Vision 2030 (http://www.waterjpi.eu/water-jpi-vision).

All the recommendations below are based on the results of the consultation processes and discussions held during the timeframe of IC4WATER and other supporting projects (in particular, WaterWorks2015 and, to a lesser extent, WatEUr).

3.1. Priority themes

The Strategic Research and Innovation Agenda (SRIA) of the Water JPI, for which a review was completed in 2020, sets out the thematic strategic framework for the initiative (Figure III). The list of thematic priorities identified in the SRIA results from a participatory and consensual process that builds upon a thorough literature review of water-related reports, a public consultation and expert-targeted workshops. **Water JPI members will therefore encourage international cooperation activities in any of the thematic areas identified in the SRIA – 4 main themes (ecosystems, health and wellbeing, water value and usage, and sustainable water management) and 3 cross-cutting areas (UN SDGs, water-energy-food-ecosystems nexus, and climate-neutral circular economy and bioeconomy).**

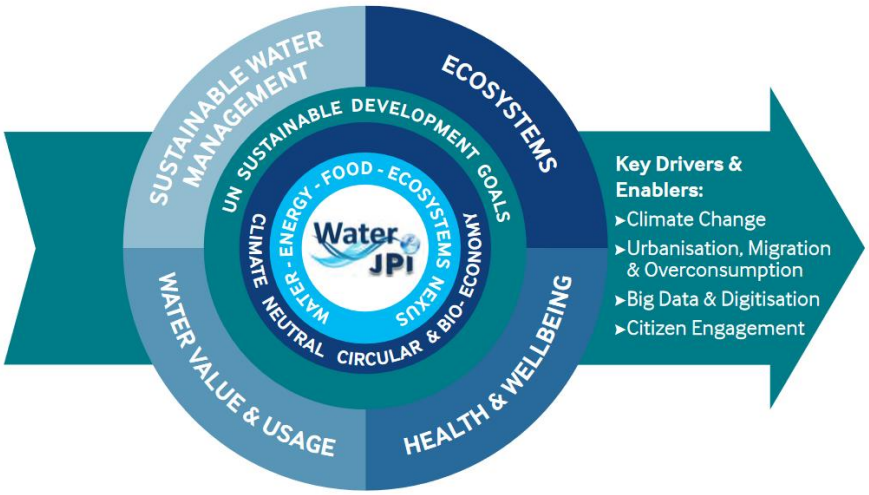

Figure III. Structure of the Water JPI SRIA 2025.

1. **Ecosystems**. Ecosystems offer vital services to society and biodiversity. In the face of global changes (e.g. climate change, rapid population growth, urbanisation, intensive farming practices), their protection and restoration is a must. The Water JPI will support international cooperation activities enabling the acquisition of new knowledge, evidence and innovation solutions in assessing and optimising the structure and function of ecosystem services, ecological engineering and ecohydrology, management and adaptation of ecosystem services to the effects of hydro-climatic extreme events, and integration of the ecosystem services approach in environmental policies and land use planning.

2. **Health and wellbeing**. Ensuring water for all is not only about the provision of a sufficient amount of water for different users and needs; it is above all about securing water of good quality for the protection of human health and wellbeing and ecosystems. Through this theme, the Water JPI will contribute to filling gaps in the monitoring, remediation and assessment of emerging pollutants and associated risks, and in promoting a coordinated resource management strategy.

3. **Water value and usage**. Activities under this theme will lead to generating a circular economy market and to creating a more water-wise and water-smart society where conflicting goals and uses are better understood and counterbalanced. This theme will focus both on technological developments and on new ways of thinking where the public, water users and stakeholders are empowered in the design and implementation of solutions.

4. **Sustainable water management**. The Water JPI is guided by the principles of environmental sustainability, economic efficiency and social equity. Within the sustainable water management theme, the Water JPI looks at all components of the water cycle as well as different strategies for adaptation to global changes through the integration of economic aspects, ecological issues, social analysis and governance frameworks.

Cross-cutting areas:

- UN SDGs.
- WEFE nexus (water, energy, food and ecosystems).
- Climate-neutral circular economy and bioeconomy.

Other themes of interest in international collaboration identified during the IC4WATER Project

Some 827 000 people in low- and middle-income countries die as a result of inadequate water, sanitation, and hygiene each year. Poor sanitation is believed to be the main cause in some 432 000 of these deaths. 785 million people lack even a basic drinking-water service (WHO, 2019). Moreover, more than half of the worldwide population will live in water-stressed areas by 2025. These facts call for rapid responses and better preparedness to current and future challenges. **Social innovation** aims at bridging this gap by offering an alternative approach to traditional policy and economic instruments.

Social innovation is defined as the processes and outcomes, motivated by societal goals, focusing on unsatisfied collective needs (AfriAlliance, 2020). In order to be successful, social innovation takes into consideration the following dimensions: *technology, capacity development, governance structures, interaction and collaboration processes, and business road maps*. The combination of all these different dimensions transcend prevailing organizational models and innovation systems, and lead to new patterns of stakeholder involvement and learning.

Discussions with experts during IC4WATER workshops have revealed the potential role of the Water JPI in **promoting and implementing social innovation projects**. The Water JPI has close contacts with leading organisations and initiatives in social innovation at the international level (e.g. WRC from South Africa, AfriAlliance project) and it has accumulated knowledge and experiences that could be capitalised in future projects. The Water JPI Coordination and Secretariat team will seek opportunities for the future involvement of the initiative in social innovation projects. This involvement could take place through the provision of technological and governance-related solutions from funded projects but also through the direct participation of the Water JPI in interaction and collaboration processes by building upon its experience in past stakeholder consultative workshops and exploratory workshops.

Social innovation

Possible role:

- Provision of solutions from funded projects.
- Encouraging stakeholder involvement and learning through the organisation of stakeholder events.

Where?

- Relevant topic worldwide. Established contacts in Africa.

Funding opportunity:

- Policy Dialogue Platforms.

The Water JPI wishes to contribute to a systemic change in which water management is fully sustainable, new practices in water valuing and use are available, and in which users from different sectors and with different interest share a common and essential resource to life. Achieving these objectives requires technological developments, innovative governance structures and policies, as well as the proper communication and dissemination of research results. Indeed, it is through communication and dissemination that academics, decision makers and the public in general become more aware of water challenges, needs, knowledge gaps and priorities for both the scientific and the policy communities.

Since its launch in 2011, the Water JPI has funded more than 80 projects in the fields of pollutants, sustainable water management, water technologies, circular economy and biodiversity. Within the frame of the development and implementation of its strategic agenda, it has organised stakeholder consultative workshops, exploratory seminars, and expert-based discussions. All this work makes of the Water JPI an important provider of solutions in response to water challenges as well as a facilitator in enabling the uptake of evidence-based results by policy and the private sector. This role cannot be achieved if an appropriate communication, dissemination and exploitation plan is not in place. Debate with experts and participants to IC4WATER workshops suggest that the Water JPI should **strengthen its role in the communication and dissemination of project results** in order to enable the sharing of good practices in research, projects results/ solutions; and knowledge and technology transfer. To this end, the Water JPI will:

- Ensure the regular exchange of information about activities with members of the Water JPI and partner initiatives/ programmes (e.g. Water4All, PRIMA).
- Regularly update the contents of its website, newsletter, flyers and social networks.
- Encourage the participation of the coordinator/ Water JPI members in international conferences, seminars and national information days.
- Write-up of thematic policy briefs, targeting different types of audiences from both EU and abroad.
- Update of the project database, compiling relevant information on all funded projects.

Communication, dissemination and exploitation

Possible role:

- Valorisation of Water JPI project results and other activities at the EU and international levels.
- Better valorisation of water RDI, along with other EU and multilateral initiatives.

Where?

- Anywhere in the world on any of the thematic areas of the Water JPI.

Funding opportunity:

- Policy Dialogue Platforms.
- Horizon Europe's CSA (opportunities within clusters 2 or 6, widening participation work programme)

JPIs emerged to pool national research efforts in order to make better use of Europe's RDI resources through a structured and strategic process. This process results in the first place in a strategic area that lays out commonly agreed priority RDI areas and, at a later stage, in the alignment of JPI's agenda with national RDI programmes – i.e. the integration of JPI's themes in national programmes.

The Water JPI will put at the service of the international community its expertise in **alignment**. Attention will be paid to alignment activities in support of the recent ERA Policy, which highlights the role of strategic coordination in the construction of the Research Area.

Alignment

Possible role:

- Coordination of national water RDI agendas.

Where?

- Anywhere in the world on any of the thematic areas of the Water JPI.

Funding opportunity:

- Horizon Europe's CSA (opportunities within clusters 2 or 6, widening participation work programme)
- Targeted calls for tenders.
- Collaboration with partner initiatives like PRIMA, other JPIs in topics of common interest.

3.2. Envisaged cooperation models for the implementation of the Water JPI's international cooperation strategy

The aim of cooperation models with most relevant partners is to increase the global impact of Water JPI activities through a more efficient RDI coordination at the European and international levels, and the sharing and uptake of knowledge. The following cooperation models have been identified:

1. Participation in CSAs.

2. Launch of Thematic Annual Programming (TAP) actions.

3. EU Policy Dialogues.

4. Influencing agenda-setting.

5. Calls for tenders.

6. Participation in joint events, conferences, workshops, webinars, brokerage events and roadshows.

7. Training and capacity building.

For each of these cooperation models, the description below provides information on possible funding instruments, relevance for the achievement of Water JPI's objectives and attention points that should be considered.

- **Participation in CSAs** (Horizon Europe)

The Horizon Europe programme sets out three types of calls for proposals: Research Innovation Action (RIA), Innovation Action (IA) and CSA. Calls for CSA aim at the dissemination, awareness-raising, communication, networking and coordination/ alignment of RDI activities through the funding of 100 per cent of direct costs and 25 per cent of indirect costs. Whereas most of the Water JPI members cannot participate in RIA and IA proposals in order not to come in competition with their national RDI teams, CSA offer good opportunities for the valorisation of Water JPI's activities and the broadening of the initiative. Furthermore, the participation of third countries is highly encouraged in most of the CSA calls.

The Water JPI Secretariat and Coordination team will thus regularly review the contents of Horizon Europe's work programmes for the identification of CSA calls in any of the fields covered by the Water JPI. As outlined in the previous section, **priority will be given to calls allowing the alignment of national programmes, and the communication, dissemination and exploitation of projects results**.

Likewise, and if approved by the Governing Board, the participation of the Water JPI as an associated partner in CSA led by external organisations will be encouraged.

> Funding instrument for the launch of CSA projects: Horizon Europe – annual calls published in 3 work programmes. CSA fund 100% of direct eligible costs.
>
> Relevance: possibility to fund networking, valorisation, communication, dissemination, alignment and coordination of national agendas.
>
> Attention points: need to fully acquainted with CSA opportunities, time needed for the preparation of a proposal if led by one of Water JPI members.

- **Launch of TAP actions**.

The TAP is a network of national projects focused on specific RDI needs. It relies on the establishment of a network or cluster of excellence, creating a critical mass of research and technological excellence, the integration and sharing of knowledge, infrastructure, data and modelling tools, training and capacity building, as well as improved communication and networking with stakeholders and the scientific community. This network or cluster of excellence will allow coordination between the individual projects, lead to a greater impact at the European level, addressing research gaps and avoiding duplication.

Following the variable geometry principle, participation of Water JPI members is open on a voluntary basis. The selection of national projects is made according to one of the following modalities: 1) Inclusion of the topic selected for the TAP in the national calls of participating funding organisations; 2) participating national research funding agencies identify projects awarded from their most recent national calls or running national projects, which are relevant to the topic.

The launch of TAP actions should then enable the alignment of national programmes without incurring in many additional costs, other than those for the networking of projects. Even though Water4All foresees the launch of TAPs, **the Water JPI may offer opportunities for the implementation of TAPs in thematic areas not covered or insufficiently covered by Water4All**.

> Funding instrument: national calls or CSAs enabling the funding of the preparatory phase.

Relevance: it allows the Water JPI to launch additional calls without incurring in significant additional costs.

Attention points: not to replicate the work to be undertaken by Water4All.

- **EU Policy Dialogues**.

The Policy Dialogue is an instrument of the EU that aims at deepening cooperation and increasing mobility between the EU and partner countries/ regions through regular exchanges on RDI (e.g. long-term priorities, best practices, review of cooperation in existing programmes, identification of concrete areas of mutual interest). The EU has set Policy Dialogues in many of the priority countries/ geographical zones identified by the Water JPI (as described above), including Africa, Brazil, the Balkans, Japan, China, and India.

The Water JPI will build upon the experience accumulated by its South African partner, awarded with a Policy Dialogue project in 2021, for the submission of future proposals.

Funding instrument: EU Policy Dialogue, funded by the EU and targeting international cooperation.

Relevance: support to networking, communication and dissemination activities, exchange on best practices, agreement on common long-term RDI priorities.

Attention points: no clear understanding of the publication dates of these calls.

- Influencing agenda-setting.

The Water JPI will capitalize on its experience in RDI programming, alignment and coordination of national programmes, communication and dissemination of project results to influence agenda-setting in international cooperation. This activity will be led by the Task Force "Interaction with Horizon Europe" and outputs may range from the write-up of strategic position papers, responses to open consultations or the organisation of meetings for the presentation of Water JPI's vision on a particular topic. In this sense, the SRIA provides a good understanding of key areas that should be supported by future RDI activities in order face current societal challenges.

The Water JPI owns a long list of contacts in many countries and it will strive to strengthen those links for future actions. Whenever necessary, it also envisages to carry out agenda-setting activities with other partnering initiatives and multilateral programmes such as PRIMA or the Belmont Forum.

Last but not least, the Water JPI will seek to contribute to Water4All's strategic discussions on international cooperation and it is available to provide its support in the preparation of papers or in the establishment of key contacts with relevant organisations.

Funding instrument: activity to be executed by the Water JPI's Task Force on "Interaction with Horizon Europe", which relies upon the in-kind contribution of its members.

Relevance: ensures the strategic role of the Water JPI in framing future water policies and RDI instruments at the international level. If appropriate, links with other initiatives working at the international level will be sought – notably Water4All.

Attention points: integration of all Water JPI members' vision is a must.

- **Calls for tenders**.

Calls for tenders are specific procedures that procure a wide range of goods and services. Certain international organisations (e.g. Food and Agriculture Organization - FAO, Organisation for Economic Co-operation and Development - OECD) open regularly calls for tenders that are fully aligned with the Water JPI's experience

(for example, communication, dissemination, organisation of stakeholder workshops, set-up of a network of experts). Contacts with representatives from these and other international organisations, mainly through their participation in the Advisory Boards of the Water JPI, will be used for the identification of emerging opportunities.

Funding instrument: calls for tenders open by international organisations, General Directorates of the European Commission.

Relevance: provision of expertise in all the thematic fields addressed by the Water JPI, communication, dissemination, valorisation, networks of experts, alignment, coordination of strategic agendas.

Attention points: need for a consistent follow-up of emerging opportunities.

The Water JPI Secretariat and Coordination team will keep all members informed on a permanent basis about possibilities for implementing any of these cooperation models.

- **Participation in joint events, conferences, workshops, webinars, brokerage events, roadshows and networking events**.

Events provide excellent opportunities for engaging with stakeholders, end-users and other water RDI initiatives, for raising awareness of activities, and for promoting results and key lessons. They also constitute bridge-building occasions to strengthen networks between the Water JPI and other parties. In this context, the Water JPI will participate in events of thematic relevance for the initiative. The promotion of Water JPI's participation in international events may take different shapes and it may range from the organisation of technical seminars, to the holding of joint workshops with other initiatives, the launch of working groups for information exchange and cooperation on issues of common interest, or the presentation of activities in EU and international conferences. The presence of the Water JPI in other initiatives or Advisory Groups will be encouraged (e.g. observer of the European Partnership Water4All, member of the Advisory Board of the EUWATER4ISD Project).

Funding instrument: mainly from in-kind contributions of partners, and internal fees.

Relevance: exchange and valorisation of knowledge and expertise, promotion of activities, networking, raising awareness, showcase.

Attention points: not to duplicate efforts already made within Water4All.

- **Training and capacity building**.

Additional potential areas of cooperation can be developed in support of training and capacity building and, in particular, in the following cross-cutting areas on which the Water JPI has developed good expertise: alignment, impact analysis, international cooperation, science-policy and the use of scientific results in policy-making, stakeholder consultations, and communication.

Funding instrument: not clearly identified at this stage as it depends on the requests received.

Relevance: capitalisation of Water JPI's expertise.

Attention points: it is necessary to better promote Water JPI's activities/ results both in Europe and abroad.

3.3. Cooperation with countries outside of the Consortium and international initiatives

The Water JPI has collaborated with numerous countries. This collaboration has translated into the participation of third parties in joint transnational calls, the joint organisation and participation of the Water JPI in technical seminars, workshops, international conferences and working groups, and the informal exchange of information on activities and results. Initial contacts have been made with many others.

As outlined above (**section 3**), one of the initial purposes of this strategy was to offer an understanding of priority geographical areas according to a number of scientific and economic criteria. Following latest recommendations from the Governing Board during a meeting held in February 2022, it was indicated that **the use of a specific set of criteria should not be taken as the main methodological approach** in the selection of key countries as collaboration should be essentially driven by countries' needs for science and knowledge.

In this context, contents in **Annex I** should be seen as a result of a mapping exercise that provides information on the **scientific landscape and economic situation** in all the countries with which the Water JPI has established some contact or has collaborated. All the data presented below has been extracted from the Water JPI's internal platform and the 2017 mapping activity, led by the Innovation Fund Denmark (IFD, Denmark), and carried out within the frame of the IC4WATER Project. Attention is also given to **cooperation barriers** (as found in the different presentations, minutes and reports saved in the platform) and **main contacts established**.

In addition to structuring future activities of the Water JPI, all this information aims to guide Water4All's activities – in particular as regards Pillar E.

In addition to bilateral and multilateral cooperation with countries outside of the Water JPI Consortium, alliances with other initiatives will be sought in order to increase coordination of activities, the alignment of agendas and expected impacts of joint actions.

The strategic contacts identified by the Water JPI are:

(I) **International Commission for the Protection of the Danube River** (ICPDR): The ICPDR is a transboundary cooperation platform on water management for the Danube river basin. It is formally comprised by the Delegations of all Contracting Parties to the Danube River Protection Convention (DRPC) and it has also established a framework for other organisations to join. The ICPDR strongly supports the participation of stakeholders and end-users in the conceptualisation of policies, the implementation of measures and the evaluation of the impacts of those policies/ measures. It is indeed through public participation that measures and water policies find broader acceptance.

Cooperation with the ICPDR would allow (i) **identifying Danube river basin-based NGOs or civil society representatives** potentially interested in Water JPI activities and with whom future actions could be envisaged (such as public workshops, communication, participation in upcoming seminars); and, (ii) **knowledge exchange and experience sharing on communication and global outreach** actions in order to boost the participation of the general public in the Water JPI.

(II) **DANUBIUS-Research Infrastructure** (RI). It is a distributed environmental research infrastructure listed on the Roadmap of the European Strategy Forum on Research Infrastructures (ESFRI). Its objective is to achieve healthy and sustainable **river-sea systems** through the collection, analysis and modelling of river-sea systems data, and knowledge exchange. Today it has a membership of 17 countries[1], including 3 international organisations/ programmes.

[1] The list of members is available at: http://danubius-pp.eu/consortium/project-partners/

Within the frame of the **WaterWorks2015** project, the Water JPI has worked in the mapping of European Research Infrastructures (RIs). The purpose of this mapping is to, building upon the work of previous initiatives (quite notably that of the MERIL project), offer the research community an overview of existing RIs across Europe for different water-related scientific domains (from river to sea). This information could be of great interest in the development of project proposals. As for programme owners/ managers, this mapping could help them coordinate efforts in the implementation of RIs, thereby avoiding the double funding and allowing the sharing of data. The mapping could also be useful in the identification of possible areas for which future RIs could be required (and that could eventually be the object of the EU ESFRI roadmap/ national roadmaps).

The Water JPI must play a key role in enabling the **coordination and sharing of information emanating and related to RIs**. It is for this reason that the initiative wishes to reinforce its contacts with DANUBIUS-RI.

(III) **European Strategy for the Danube Region** (EUSDR). It is a macro-regional strategy adopted by the European Commission in December 2010 aiming to develop coordinated policies and actions **in the area of the Danube River Basin** around the fields of water, biodiversity, energy, mobility, socio-economic development, education and capacity, culture and identify, and security. The EUSDR is not a funding programme but a coordination network that **encourages cooperation** between countries in the Danube Region, and between the Danube Region and third countries.

Contacts with the EUSDR should allow the Water JPI to be better acquainted with latest developments in water policy and management in the Danube Region, which has been listed as one of the lighthouse areas by the Oceans and Waters Mission and the only one on freshwater. The Water JPI is especially looking forward to strengthening contacts with experts from the Steering Groups on water quality, environmental risks and institutional capacity and cooperation (the Steering Group is an expert body included in the EUSDR's governance). Contributions from these experts could prove particularly useful in the identification of emerging RDI issues in the region and the launch of joint activities such as thematic working groups, networks of experts or the drafting of policy briefs/ position papers.

(IV) **Partnership on Research and Innovation in the Mediterranean Area** (PRIMA). PRIMA is a ten-year initiative (2018-2028) co-funded by the European Commission and participating countries (Algeria, Croatia, Cyprus, Egypt, France, Germany, Greece, Israel, Italy, Jordan, Lebanon, Luxembourg, Malta, Morocco, Portugal, Slovenia, Spain, Tunisia and Turkey). Its purpose is to develop innovative RDI approaches to improve water availability and sustainable agriculture production in the Mediterranean area.

Since its inception in 2018, the Water JPI has aimed at developing strong contacts with PRIMA as both initiatives deal with water issues. In this sense, the Water JPI has carried out a comparative analysis of the strategic agendas of both initiatives in 2018 and it has contributed to the different requests made by the PRIMA Foundation and the European Commission. Cooperation has particularly reinforced since 2021, as demonstrated by the organisation of a PRIMA-Water JPI event within the frame of the Cairo Water Week (October 2021) and the participation of PRIMA in a Consortium coordinated by CNR (Italy), and initially launched by the Water JPI, in response to a Horizon Europe call on widening.

As agreed, the Water JPI will keep on informing the PRIMA Foundation on latest activities and strategic vision.

(V) **European and international funding bodies for expertise**. Building upon its experience in RDI activities, the Water JPI is looking to expand its international portfolio by providing its expertise to European and international funding bodies. Contacts have been made with the Directorate-General Research and Innovation (Unit F – International Cooperation), the European Investment Bank, the World Bank and the Food and Agriculture Organisation of the United Nations (FAO). As described in Section 4.2, this expertise could take many shapes including the appointment of experts to respond to urgent needs in response to calls for tenders, the organisation of workshops or activities in support of agenda-setting both at the European and at the international level, and the write-up of thematic reports.

Table 1 sums up the strategic contacts identified by the Water JPI and their potential contribution to the different activities of the initiative.

Table 1: Identified strategic contacts and their potential main contributions to the Water JPI's activities

Name of the organisation/ initiative	Why is it strategic for the Water JPI?	Water JPI's activities to be reinforced through this contact
ICPDR	Strong experience in public participation/ stakeholder engagement.	Knowledge transfer/ dissemination. Stakeholder's engagement.
DANUBIUS-RI	Flagship RI in Europe in river-sea systems.	Mapping activities. Data and information sharing.
EUSDR	Macroregional strategy in Danube's water policy and management. Steering Groups made up of experts in some of the domains of interest for the Water JPI.	Strategic papers (RDI needs), foresight. Knowledge transfer/ dissemination. Capacity building. International cooperation.
PRIMA	Article 185 for the Mediterranean area dealing with water and sustainable agriculture.	Strategic activities (identification of emerging RDI needs, strategic papers) Mapping activities. Data and information sharing. International cooperation (members from outside Europe). Joint calls.
EU and international funding bodies	Opportunities to expand Water JPI's activity portfolio to expertise actions, amongst others.	International cooperation. Capacity building.

3.4. Cooperation modalities with the economic sector

The ambition of the Water JPI is to find modalities to facilitate collaboration with the economic sector to increase the development of RDI programmes and the take-up of research on water challenges. Efforts within WP3 have allowed teasing out a number of best practices:

- Facilitate co-creation by involving businesses during the whole project cycle. The vision and priorities of the private sector must be taken into account in order to cover their interest and enhance the uptake of results.

- Promote Water-oriented Living Labs (WoLLs) where researchers from different sectors (e.g. social and industry natural sciences) can work together in real life environment. WoLLs are real-life, water oriented and demo-type and platform-type environments with a cross-sector nexus approach, which count on the involvement and commitment of multi-stakeholders (including water authorities) and a certain community. WoLLs provide a "field lab" to develop, test, and validate a combination of solutions (including technologies, their integration as well as combination with new business models and innovative policies based on the value of water).

- Encourage the use of brokers, between capital, industry and research to better connect multiple parties. Most of European SMEs are of small size, so extra support by a broker is required to unleash the innovation potential of these companies.

- There is a tendency to stop-and-go in the different initiatives and a certain lack of long-term investments. It is necessary to support a long-term engagement to ensure proper outcomes and to prevent stop-and-go adverse effects and waste of resources.

- Reduce the administrative complexity of RDI projects.

4. Water JPI strategic map on international cooperation

The Water JPI's Vision 2030 is "**Together for a Water-secure World**". In order to achieve this overall aim, a number of strategic and operational goals have been identified (**Figure IV**). Progress towards the achievement of the operational goals will be measured through SMART indicators (*specific, measurable, achievable, relevant and time-bound*). The periodic evaluation of progress will allow teasing out areas for improvement and contingency measures. The Water JPI Secretariat and Coordination team will monitor progress towards these goals.

For the development of the strategic map on international cooperation, the IC4WATER consortium has taken into account different sources: (i) the overall Vision 2030 document of the Water JPI; (ii) the strategic agenda of the European Partnership Water4All; (iii) the mid-term review of PRIMA (which contains an entire pillar on water management) and, (iv) the implementation of Horizon Europe water calls through the "Oceans and Water" mission and Cluster 6 projects.

As indicated in **Figure IV**, strategic goals refer to specific objectives on international cooperation to be attained by the Water JPI in the next 2-4 years where operational goals define short-term objectives. The level of achievement of Water JPI's goals on international cooperation are measured through a number of SMART indicators, also outlined further below in the text.

Figure IV. Strategic map of the Water JPI's international cooperation strategy.

Strategic Goals (SG)

SG1: To strengthen the role of the Water JPI as a global player in water RDI for safe, clean and sustainable water management.

SG2: To enhance the international dimension of Water JPI's activities and related impacts.

SG3: To contribute to the attainment of the objectives laid out in EU and international policy frameworks, including the Water Framework Directive and the SDGs.

Operational Goals (OG) and related SMART indicators

OG1: Engaging international partners and stakeholders, including potential end-users of Water JPI project results/ solutions.

Since its launch more than 10 years ago, the Water JPI has made much progress in the integration of new partners both in Europe and abroad. Today, South Africa is a full member, Tunisia is an Associated Partner and other countries from outside of Europe, e.g. Canada, Brazil, have participated in specific activities. The engagement of international partners in Water JPI activities results in enhanced cross-border programme collaboration, larger critical mass of resources and increased impact of joint activities.

Other than establishing close contacts with international programme owners/ managers, the Water JPI will seek to liaise with other partners (such as international organisations, United Nations agencies, multilateral water funding programmes, other initiatives) to enable the valorisation, communication and dissemination of results as well as the implementation of new activities.

Indicators for OGI

Indicator 1.1 - Number of international partners (i.e. not only partners) involved in Water JPI activities.

Indicator I.2 - Number of countries involved from the EU and beyond.

Indicator 1.3 - Budget committed (in-kind and in cash) to joint actions with the Water JPI.

Indicator I.4 - Types of stakeholders involved in activities. Level of commitment of stakeholders.

The engagement of end-users will also be privileged in both the design and development of solutions, which should pave the way towards the effective uptake of **Research, Development and Innovation** (RDI) results and the societal relevance of activities.

OG2: Provision of global solutions for a water-secure world

The Water JPI wishes to contribute to addressing global challenges through the generation of sound evidence-based knowledge, innovative solutions, knowledge transfer and uptake of RDI outputs. Collaboration and close communication with relevant stakeholders and end-users of RDI results are key to successfully transfer knowledge and solutions.

Indicators for OG2

Indicator 2.1 - Number of conferences and seminars attended by Water JPI members to promote Water JPI outputs.

Indicator 2.2 - Number and scope of policy briefs and other communication and dissemination tools (e.g. publications, policy briefs, guidelines) published resulting from the Water JPI activities.

Indicator 2.3 - Number of solutions proposed by the Water JPI taken up by end-users.

Indicator 2.4 - Number of patents, licenses and start-ups arising from joint transnational projects funded by the Water JPI.

The wide network of contacts at the international level will facilitate the communication and dissemination of project results to different kinds of end-users (policymakers, water resources managers, society, water and sanitation utilities/ enterprises, etc.). Collaboration opportunities both in Europe and abroad will be sought to enhance the effective uptake of Water JPI results by end-users.

OG3: Contributing to achieving policy objectives at the EU and beyond

It is through the provision of knowledge and solutions resulting from funded activities that the Water JPI also wishes to contribute to the policy objectives set out by the Water Framework Directive, the EU Green Deal and the Sustainable Development Goals (SDGs) and to enable better preparedness in the face of global changes. Members of the initiative will strive to put at the service of the world-wide community its expertise in alignment, agenda-setting and water management for sustainable development and economic growth (water quantity and quality, efficient wastewater treatments, better governance, international cooperation and capacity-building support for developing countries). The Water JPI will support the achievement of SDG6 on water supply and sanitation, SDG2 on zero hunger, SDG3 on good health and wellbeing, SDG11 on sustainable cities and communities, and SDG13 on climate action.

Indicators for OG3

Indicator 3.1 - Number of funded projects that specifically address SDG6 targets (and other SDGs, when relevant).

Indicator 3.2 - Number of projects involved in intersectoral dialogues as a measurement of JPI effectiveness.

Indicator 3.3 - Number of workshops and outputs addressing UN SDG challenges and water-related SDG targets.

OG4: Aligning national agendas

The last operational goal of the Water JPI in international cooperation is the alignment of research agendas. Alignment is defined as "*the strategic approach taken by Member States to modify their national research priorities in the context of Joint Programming, with a view to improving the efficiency of investment in research at the level of Member States and the European Research Area"* (ERA-LEARN 2015).

The Water JPI has successfully brought together members across Europe and South Africa to agree on common and priority RDI areas for a water-secure world. Efforts have resulted in a strategic agenda that was initially launched in 2016 and later on reviewed in 2020. The set-up of "national mirror groups" in some member countries has enabled the alignment between national strategies on water RDI and the contents of the Water JPI's strategic agenda. The launch of Thematic Annual Programming (TAP) actions, networks of national projects focused on specific RDI needs, has come to complement alignment activities.

Alignment with national agendas of third countries will be encouraged in order to increase synergies and enable the optimal use of national research funds.

If requested by members, exploratory activities will be carried out for the identification of research gaps to be ultimately integrated in future strategic papers of the Water JPI. New findings will be communicated to the strategic pillar (pillar A) of the Water4All Partnership.

Indicators for OG4

Indicator 4.1 - Number of third countries with national research strategies aligned with the Water JPI Strategic Research and Innovation Agenda (SRIA).

Indicator 4.2 - Level of recognition of the Water JPI Vision over time at the funding agency/ country level.

Indicator 4.3 – Participation of the Water JPI in alignment activities both in Europe and abroad.

5. Main conclusions and recommendations

Pillar 1. To reach out strategic countries and international/ multilateral initiatives

Conclusions:

- No geographical priority areas have been identified in the strategy. Mapping exercises carried out in IC4WATER provide a good understanding of the scientific and economic situation of a wide variety of countries through the use of specific criteria. However, it has **not been possible to come up with a robust methodology** enabling the prioritisation of countries on the basis of those indicators.
    - Recommendations:
        - R1: To orientate future activities towards the development of a commonly agreed approach. Pay particular attention to the collection of data and comparative analyses. Reflect on the real need to embark on the selection and analysis of criteria instead of pursuing a more "opportunistic" approach for cooperation.
        - R2: To include the Balkans region in the list of countries to be contacted for future cooperation activities. The Balkans region is a geographical priority for the European Commission but only Slovenia is an observing member to the initiative.
        - R3: To complete the mapping exercise for African countries as much data is lacking regarding their RDI investments, publications and research teams.

- Cooperation with international/ multilateral initiatives and organisations has been achieved. The Water JPI rejoices of the recent collaborations with **PRIMA** and the permanent exchanges with **ICPDR** and representatives of the **European Commission**.
    - Recommendations:
        - R4: To maintain these contacts through the regular exchange of information on running activities and strategic plans.
        - R5: To encourage the wide dissemination of Water JPI activities and expertise in the Danube river basin, as it is the only freshwater-based lighthouse area for the Oceans and Water Mission. It would also allow the establishment of key contacts in the area.
        - R6: To resume contacts with the Belmont Forum.
        - R7: To explore opportunities for reinforced cooperation with ASEAN countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam). Many of these countries have not had any contacts with the Water JPI and there is not a clear understanding of the cooperation barriers in those approached by the initiative (Malaysia, Singapore and Vietnam).

Pillar 2. To strengthen alliances through cooperation models

Conclusions:

- The release of the Water JPI's strategy on international cooperation coincides with the official launch of the Water4All Partnership. Being most of the Water JPI members also partners of Water4All, and given the strong priority of funding agencies/ programme managers for the latter, **no additional national funding will be available for the launch of Water JPI's calls for proposals** during the period covered by this strategy (2022-2027). Water JPI activities will focus on lobbying, and the valorisation and communication of running activities in all thematic areas addressed in the strategic agenda.
    - Recommendation:
        - R8: To explore possible thematic gaps in Water4All that could be ultimately taken up by future Water JPI activities for the sake of securing water for all.

- A set of cooperation models has been identified. Some of them entail the preparation of proposals in response to calls (e.g. Horizon Europe CSAs, calls for tenders) whereas other seek to enhance the communication and valorisation of activities (e.g. participation in conferences) or influence future strategic agendas on water research. There are **no clear guidelines as to which cooperation model should be privileged** as it depends on the objectives of the collaboration, the engagement of the different parties and the funding available for the implementation of activities.

- Initial discussions with the European Commission suggest that the Water JPI could play a major role in the implementation of the new ERA Policy.
    - Recommendations:
        - R9: To keep regular exchanges with the European Commission regarding the role of the Water JPI in the ERA Policy.
        - R10: To check regularly opportunities for the participation of the Water JPI in upcoming calls for proposals and calls for tenders as long as it does not interfere with Water4All activities. The Governing Board must approve such participation.

- Cooperation is usually hindered by limited capacity of third parties to launch and manage joint activities.
    - Recommendations:
        - R11: To encourage the participation of third countries in joint activities by showcasing success stories from the past.
        - R12: To enable cooperation through activities that do not imply high investments for participating funding agencies and that could find external financial support, e.g. EU Policy Dialogue.

- One of the main constraints in attaining SDGs and increasing the innovation potential of Europe is the limited uptake of knowledge generated by the research community in the private sector as well as the administrative complexity of RDI projects.
    - Recommendations:
        - R13: To enable inclusive and participatory approaches in which the private sector plays a role in the co-design of projects and co-development of solutions. Such participatory approaches must be enabled from the very early stages of projects. Co-creation and co-design are means to balance out all agendas and adjust expectations from the different involved partners in the initiation of the project.
        - R14: To support the launch of Water-oriented Living Labs (WoLLs) as platforms for the testing and demonstration of innovative solutions.
        - R15: To reduce to a maximum the administrative complexity of RDI projects.
        - R16: To guarantee long-term investments and engagement to ensure proper outcomes and to prevent stop-and-go adverse effects and waste of resources.

Pillar 3. To evaluate achievement of international cooperation objectives

Conclusions:

- Thanks to the expertise and knowledge generated over the last 10 years, the Water JPI can play a major role in the achievement of the objectives set out in European and international policy frameworks such as the European Green Deal and the SDGs.
    - Recommendation:
        - R17: To encourage the participation of the Water JPI in international meetings, conferences and fora.

Other recommendations in the implementation of international cooperation activities:

- R18: **Knowledge transfer and impact** of shared research opportunities, that result in tangible outputs that have mutual benefits for all partners, the environment, society and the economy is of major importance.
- R19: The success of the strategy depends on **equal footing, positive leadership, research and scientific diplomacy, trust and respect** for all partners.
- R20: The Water JPI will facilitate the **access to and sharing of infrastructure, resources, knowledge, funds and expertise**, in order to build strong partnerships and increase the critical mass of researchers.
- R21: **Co-designing, co-development and involving key stakeholders and end users** from the start of programmes is critical to having co-benefits with real impact.
- R22: The long-term vision here presented will be **adapted to emerging priorities and needs**.
- R23: **Reducing the bureaucracy** associated with accessing to RDI funds is a must that will be strongly encouraged at any stage in the launch and implementation of activities.

Annex I. List of countries with which the Water JPI has either collaborated or made some initial contacts.

(1) **Algeria**.

- Contacts: ---
- Water RDI priorities:
  - Integrated and sustainable management of water
  - Water quality
  - Water quantity
  - Irrigation technologies and practices
  - Use of alternative water resources
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in several ERA-NETs on agriculture and climate change. Member of PRIMA.
- GDP per capita (USD): 4055
- Economic growth (%): 1,60
- Investments in RDI: 241
- Investments in water infrastructure: ---
- Water related publications: 1056
- Water related publications per mill. inhabitants: 25
- Number of researchers per mill. inhabitants: 1168
- Number of patents 2007-2016: 82

(2) **Argentina**.

- Contacts: Ministry of Science, Technology and Innovation, CONICET Argentinian Research Council
- Water RDI priorities:
  - Hydrogeology
  - Safe water supply
  - Water and agriculture
  - Floods
  - Droughts and water shortages
  - Arsenic in water
  - Science, technology and innovation for water resource management
- Cooperation barriers: To integrate the international dimension in the national research agenda and the national research priorities in the international cooperation strategy of multilateral initiatives.
- Participation in EU/ multilateral initiatives: Funder of the 2017 Water JPI joint call, funder of numerous ERA-NET and JPI calls.
- GDP per capita (USD): 3927
- Economic growth (%): 2,85
- Investments in RDI: 5045
- Investments in water infrastructure: 1707
- Water related publications: 4442
- Water related publications per mill. inhabitants: 101
- Number of researchers per mill. inhabitants: 1202
- Number of patents 2007-2016: 366

(3) Australia.

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Pending participation in EUPHRESCO.

- GDP per capita (USD): 53799
- Economic growth (%): 3,04
- Investments in RDI: 23129
- Investments in water infrastructure: ---
- Water related publications: 22280
- Water related publications per mill. inhabitants: 898
- Number of researchers per mill. inhabitants: 4539
- Number of patents 2007-2016: 19061

(4) **Brazil**.

- Contacts: CONFAP, FAPESP, Brazilian Ministry of Foreign Affairs, Brazilian National Council for Scientific and Technological Development (CNPq), Brazilian Ministry of Science, Technology, Innovation and Communications (MCTIC), Brazilian National Water Agency (ANA).
- Water RDI priorities:
  - Water governance and water management, including conflicts of uses (from monitoring to planning and management)
  - Urban areas: sanitation issues (treatment of pollutants) and water reuse
  - Water in agriculture: irrigation and salinization of water
  - Water in industrial sectors: water reuse
  - Water quality: impact of landfills, mining residues (acid drainage), removal of metallic ions from groundwater
  - Water and forests
  - Desalinisation
  - Natural disasters and floods
  - Water and climate change
  - Aquatic biodiversity assessment and its sustainable use (conservation)
  - Water export (virtual water)
  - Water education and capacity building
  - Free access to data banks
- Cooperation barriers: Specific procedures applied to Water JPI activities, in particular the Joint Transnational calls. The main concerns were about the call timeline, the 2 steps evaluation procedure for the selection of projects, the type of eligible costs, the need for financial flexibility. It is also necessary to show the added value to Brazilian funders of the cooperation with the Water JPI.
- Participation in EU/ multilateral initiatives: Participation in Water Works 2017 and numerous ERA-NETs.
- GDP per capita (USD): 9821
- Economic growth (%): 0,98
- Investments in RDI: 42001
- Investments in water infrastructure: 9240
- Water related publications: 19771
- Water related publications per mill. inhabitants: 95
- Number of researchers per mill. inhabitants: 881
- Number of patents 2007-2016: 5843

(5) **Burkina Faso**.

- Contacts: Fonds National de la Recherche et de l'Innovation pour le Développement (FONRID)
- Water RDI priorities:
  - Wastewater treatment – reuse
  - Water resource management/ governance
  - Irrigation water management
  - Pollutants in water
  - Climate change and water resources

    - Water safety and public health
    - Water supply desalination and groundwater recharge
- Cooperation barriers: Low level of knowledge on water RDI funding instruments.
- Participation in EU/ multilateral initiatives: Participation in 3 ERA-NETs (FOSC, LEAP-AGRI and ERAFRICA).
- GDP per capita (USD): 642
- Economic growth (%): 6,30
- Investments in RDI: 65
- Investments in water infrastructure: 45
- Water related publications: 55
- Water related publications per mill. inhabitants: 3
- Number of researchers per mill. inhabitants: 47
- Number of patents 2007-2016: 1

(6) **Cameroon**.

- Contacts: ---
- Water RDI priorities:
    - Sustainable use of water in agriculture
    - Water pollutants
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participant in LEAP-AGRI and Article 185 EDCTP2.
- GDP per capita (USD): 1451
- Economic growth (%): 3,55
- Investments in RDI: ---
- Investments in water infrastructure: ---
- Water related publications: 354
- Water related publications per mill. inhabitants: 15
- Number of researchers per mill. inhabitants: ---
- Number of patents 2007-2016: 19

(7) **Canada**.

- Contacts: NSERC, IDRC, IISD-ELA
- Water RDI priorities:
    - Safe water supply
    - Pollutants in water
    - Water resource management/ governance
    - Early warning systems
    - Resilient cities and green infrastructures
    - Water policy and ethics
- Cooperation barriers: Administrative burden and framework conditions, effort and economic costs for developing joint activities, lack of a national vision for water.
- Participation in EU/ multilateral initiatives: Funder of the 2015 Water JPI joint call (Water Works 2015), ERA-NET Cofund calls and Article 185, member of the Belmont Forum. Negotiation in progress regarding the association of Canada to Horizon Europe.
- GDP per capita (USD): 45032
- Economic growth (%): 3,05
- Investments in RDI: 27793
- Investments in water infrastructure: ---
- Water related publications: 25273
- Water related publications per mill. inhabitants: 683
- Number of researchers per mill. inhabitants: 4552
- Number of patents 2007-2016: 35905

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(8) **Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan)**

- Contacts: Parliament of the Kyrgyz Republic, Investment Promotion Agency of the Kyrgyz Republic, Ministry of Energy and Water Resources of the Republic of Tajikistan, Regional Environmental Centre for Central Asia (CAREC), UNECE Turkmenistan, Uzbekistan Academy of Sciences.
- Water RDI priorities:
  - Water quantity
  - Water quality for rural and domestic use
  - Data: collection of data, use and governance of the collected data, development or amelioration of monitoring systems, creation of new datasets and continuation of long-term monitoring programmes, data validation and data exchange, adoption of international/ regional standards and regulation on water quality, conduct water availability estimation and forecasts in basins where data do not exist, development of robust decision support models for end-users, Earth Observation
  - Transboundary water management
  - Ecosystem services and biodiversity in water lands and aquatic ecosystems
  - Irrigation technologies
  - Ground water studies
  - Natural hazards (floods, droughts, mudflows, landslides) and early-warning systems
  - Water purification and re-use
  - Water-energy-food nexus
  - Water and energy saving technologies
- Cooperation barriers: Lack of data or difficult access to available data, methodological gaps in water research, outdated research apparatuses, weak communication between administration and research for an optimal exploitation of research results and vice versa, lack of established networks among the countries for data exchange and joint research, need for training of human capital.
- Participation in EU/ multilateral initiatives: Pending participation of Kazakhastan and Kyrgyzstan in the EUPHRESCO Programme on phytosanitary research and coordination.
- GDP per capita (USD): ---
- Economic growth (%): ---
- Investments in RDI: ---
- Investments in water infrastructure: ---
- Water related publications: 25273
- Water related publications per mill. inhabitants: ---
- Number of researchers per mill. inhabitants: ---
- Number of patents 2007-2016: ---

(9) **Chile**

- Contacts: CONICYT.
- Water RDI priorities:
  - Generate information and basic knowledge for the sustainability of water resources
  - Develop and make available technologies to increase supply and availability of water resources
  - Generate RDI for integrated water resources management
  - Water pollution.
- Cooperation barriers: Call timeline should consider the fiscal year of the participating funding agencies as well as the academic year in the participating countries.
- Participation in EU/ multilateral initiatives: Participation in ERA-NETs in the fields of raw materials. Participation in a JPI AMR call.
- GDP per capita (USD): 15346
- Economic growth (%): 1,49
- Investments in RDI: 1517

- Investments in water infrastructure: ---
- Water related publications: 2514
- Water related publications per mill. inhabitants: 143
- Number of researchers per mill. inhabitants: 430
- Number of patents 2007-2016: 1107

(10) **China**

- Contacts: ---.
- Water RDI priorities:
  - Water and climate change
  - Aquatic biodiversity protection
  - Circular economy
  - Aquaculture
- Cooperation barriers: Key partner for the EU in tackling global challenges but it is also an economic competitor. Need to ensure reciprocity and mutual benefit as well as respect for fundamental values, high ethical and science integrity standards.
- Participation in EU/ multilateral initiatives: None.
- GDP per capita (USD): 8826
- Economic growth (%): 6,90
- Investments in RDI: 370605
- Investments in water infrastructure: 53794
- Water related publications: 67591
- Water related publications per mill. inhabitants: 49
- Number of researchers per mill. inhabitants: 1096
- Number of patents 2007-2016: 192970

(11) **Egypt**

- Contacts: Academy of Scientific Research & Technology, Agricultural Research Centre.
- Water RDI priorities:
  - Water shortages
  - Water quality
  - Water use efficiency, including management of infrastructures
  - Water and land use planning
  - Groundwater management
  - Alternative water sources e.g. desalination
- Cooperation barriers: Need to strengthen capacity building of State RDI organisations.
- Participation in EU/ multilateral initiatives: Member of WaterWorks2015 and WaterWorks2017 and PRIMA. Participation in numerous ERA-NETs in the fields of pollution, food safety, natural ecosystems and agriculture.
- GDP per capita (USD): 2412
- Economic growth (%): 4,18
- Investments in RDI: 6082
- Investments in water infrastructure: ---
- Water related publications: 3205
- Water related publications per mill. inhabitants: 33
- Number of researchers per mill. inhabitants: 665
- Number of patents 2007-2016: 454

(12) **Ethiopia**

- Contacts: ---
- Water RDI priorities: ---

- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: None.
- GDP per capita (USD): 767
- Economic growth (%): 10,25
- Investments in RDI: 787
- Investments in water infrastructure: 197
- Water related publications: ---
- Water related publications per mill. inhabitants: ---
- Number of researchers per mill. inhabitants: 44
- Number of patents 2007-2016: 1

(13) **Ghana**

- Contacts: Science and Technology Policy Research Institute (STEPRI).
- Water RDI priorities:
  - Irrigation water management
  - Pollutants in water
  - Water supply desalination & groundwater recharge
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in LEAP-AGRI.
- GDP per capita (USD): 2046
- Economic growth (%): 8,14
- Investments in RDI: 276
- Investments in water infrastructure: ---
- Water related publications: 536
- Water related publications per mill. inhabitants: 18
- Number of researchers per mill. inhabitants: 38
- Number of patents 2007-2016: 9

(14) **India**

- Contacts: Department of Science and Technology of India (DST) Ministry of Science and Technology-IMRCD W
- Water RDI priorities:
  - Integrated wastewater treatment technologies and management
  - Water quality monitoring
  - Water purification for safe drinking
  - Water use efficiency in agriculture
  - Urban water management including water reclamation and reuse
  - Water purification, water quality and health issues
  - Wastewater treatment for safe reclamation and reuse
  - Integrated water resources management
  - Flood routing, forecasting and management
- Cooperation barriers: Need to define a consensus-based strategy that articulates the priorities of both the EU and Indian partners; poor knowledge of administrative modalities for cooperation.
- Participation in EU/ multilateral initiatives: Participation in ERA-NETs and JPIs calls (AMR).
- GDP per capita (USD): 1942
- Economic growth (%): 6,68
- Investments in RDI: 48063
- Investments in water infrastructure: 3554
- Water related publications: 22581
- Water related publications per mill. inhabitants: 17
- Number of researchers per mill. inhabitants: 156

- Number of patents 2007-2016: 13753

(15) **Iran**

- Contacts: ---
- Water RDI priorities:
  - Flood routing, forecasting and management
  - Sustainable water management
  - Hydrological extreme events (droughts, water shortages, flooding)
  - Protection of aquatic ecosystems and biodiversity
- Cooperation barriers: Diplomatic issues between Iran and EU.
- Participation in EU/ multilateral initiatives: None.
- GDP per capita (USD): ---
- Economic growth (%): ---
- Investments in RDI: ---
- Investments in water infrastructure: ---
- Water related publications: ---
- Water related publications per mill. inhabitants: ---
- Number of researchers per mill. inhabitants: ---
- Number of patents 2007-2016: ---

(16) **Ivory Coast**

- Contacts: Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (MESRS)
- Water RDI priorities:
  - Water resource management / governance
  - Pollutants in water
  - Water Safety and Public Health
  - Water supply desalination & groundwater recharge
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in several ERA-NET schemes (FOSC, LEAP-AGRI, BiodivScen, ERAFRICA).
- GDP per capita (USD): 1537
- Economic growth (%): 7,70
- Investments in RDI: 788
- Investments in water infrastructure: 370
- Water related publications: 204
- Water related publications per mill. inhabitants: 8
- Number of researchers per mill. inhabitants: 69
- Number of patents 2007-2016: 13

(17) **Japan**

- Contacts: ---
- Water RDI priorities:
  - Water pollution.
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in a few ERA-NETs on plant sciences and ICT. Funder of a JPI AMR call.
- GDP per capita (USD): 38428
- Economic growth (%): 1,7
- Investments in RDI: 169554
- Investments in water infrastructure: ---
- Water related publications: 22430

- Water related publications per mill. inhabitants: 178
- Number of researchers per mill. inhabitants: 5328
- Number of patents 2007-2016: 458697

(18) **Jordan**

- Contacts: Higher Council for Science and Technology (HCST), Scientific Research and Innovation Support Fund
- Water RDI priorities:
  - Integrated Approach to Water Resources Management, including transboundary management
  - Groundwater Recharge
  - Innovations in Irrigation Water Management
  - Water Safety and Public Health
  - Integrated Waste Management
  - Databases and Information Systems for Water Resources and Environment
- Cooperation barriers: Limited administrative capacity and financial sustainability; absence of strategic planning of projects; weak stakeholder engagement in the identification of RDI priorities and the design and implementation of projects.
- Participation in EU/ multilateral initiatives: Member of PRIMA and ERA-NET MED.
- GDP per capita (USD): 4129
- Economic growth (%): 1,97
- Investments in RDI: 263
- Investments in water infrastructure: ---
- Water related publications: 1044
- Water related publications per mill. inhabitants: 104
- Number of researchers per mill. inhabitants: ---
- Number of patents 2007-2016: 68

(19) **Kenya**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in ERA-NETs FOSC and LEAP-AGRI.
- GDP per capita (USD): 1594
- Economic growth (%): 4,87
- Investments in RDI: 788
- Investments in water infrastructure: 370
- Water related publications: 1208
- Water related publications per mill. inhabitants: 24
- Number of researchers per mill. inhabitants: 225
- Number of patents 2007-2016: 58

(20) **Lebanon**

- Contacts: ---
- Water RDI priorities:
  - Integrated and sustainable management of water
  - Water quality
  - Water quantity
  - Irrigation technologies and practices
  - Use of alternative water resources
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Member of PRIMA.

- GDP per capita (USD): 8808
- Economic growth (%): 1,53
- Investments in RDI: ---
- Investments in water infrastructure: ---
- Water related publications: 484
- Water related publications per mill. inhabitants: 81
- Number of researchers per mill. inhabitants: ---
- Number of patents 2007-2016: 55

(21) **Malaysia**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: None
- GDP per capita (USD): 9951
- Economic growth (%): 5,90
- Investments in RDI: 9728
- Investments in water infrastructure: 291
- Water related publications: ---
- Water related publications per mill. inhabitants: ---
- Number of researchers per mill. inhabitants: 2024
- Number of patents 2007-2016: 2714

(22) **Mexico**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in ERA-NET LAC targeting South America; pending participation in the ERA-NET EUPHRESCO on phytosanitary research.
- GDP per capita (USD): 8910
- Economic growth (%): 2,04
- Investments in RDI: 11519
- Investments in water infrastructure: 2394
- Water related publications: 7609
- Water related publications per mill. inhabitants: 61
- Number of researchers per mill. inhabitants: 224
- Number of patents 2007-2016: 2411

(23) **Morocco**

- Contacts: Institut Agronomique et Vétérinaire Hassan II (IAV Hassan II), Institut National de la Recherche Agronomique
- Water RDI priorities:
  - Wastewater treatment - reuse
  - Water resource management / governance
  - Irrigation water management
  - Pollutants in water
  - Climate change & water resources
  - Salinity risks
  - Early warning & monitoring systems
  - Droughts and water shortages
  - Use of alternative water resources.

- Cooperation barriers: Institutional reforms are needed to enhance the capacity building of national organisations.
- Participation in EU/ multilateral initiatives: Participant in several ERA-NET schemes and member of PRIMA. Negotiation in progress regarding the Association of Morocco to Horizon Europe.
- GDP per capita (USD): 3007
- Economic growth (%): 4,09
- Investments in RDI: 1483
- Investments in water infrastructure: ---
- Water related publications: 1159
- Water related publications per mill. inhabitants: 33
- Number of researchers per mill. inhabitants: 1020
- Number of patents 2007-2016: 329

(24) **Nigeria**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: None.
- GDP per capita (USD): 1968
- Economic growth (%): 0,81
- Investments in RDI: 1374
- Investments in water infrastructure: 602
- Water related publications: ---
- Water related publications per mill. inhabitants: ---
- Number of researchers per mill. inhabitants: 38
- Number of patents 2007-2016: 40

(25) **Peru**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in two ERA-NETs (ERA-NET LAC and CORNET).
- GDP per capita (USD): 6571
- Economic growth (%): 2,53
- Investments in RDI: 407
- Investments in water infrastructure: 1745
- Water related publications: 548
- Water related publications per mill. inhabitants: 17
- Number of researchers per mill. inhabitants: ---
- Number of patents 2007-2016: 112

(26) **Russia**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: Need for increased reciprocity and level playing field, and respect of fundamental rights and values. Current diplomatic issues will clearly hinder cooperation with Russia.
- Participation in EU/ multilateral initiatives: Participation in numerous ERA-NETs in the areas of materials, animal health, plant sciences, biotechnologies, physics, and climate.
- GDP per capita (USD): 10743
- Economic growth (%): 1,55
- Investments in RDI: 40330

- Investments in water infrastructure: ---
- Water related publications: 5761
- Water related publications per mill. inhabitants: 39
- Number of researchers per mill. inhabitants: 3094
- Number of patents 2007-2016: 9261

(27) **Rwanda**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: None.
- GDP per capita (USD): 748
- Economic growth (%): 6,06
- Investments in RDI: ---
- Investments in water infrastructure: 57
- Water related publications: ---
- Water related publications per mill. inhabitants: ---
- Number of researchers per mill. inhabitants: 12
- Number of patents 2007-2016: 2

(28) **Senegal**

- Contacts: Ministère de l'Enseignement Supérieur et de la Recherche (MESR)
- Water RDI priorities:
  - Pollutants in water
  - Salinity risks
  - Early warning & monitoring systems
- Cooperation barriers: Need for improved investment planning in the water sector; need for enhanced capacity-building; inadequate public finance management.
- Participation in EU/ multilateral initiatives: Participant in ERA-NETs FOSC and LEAP-AGRI.
- GDP per capita (USD): 1329
- Economic growth (%): 7,15
- Investments in RDI: 149
- Investments in water infrastructure: 87
- Water related publications: 369
- Water related publications per mill. inhabitants: 24
- Number of researchers per mill. inhabitants: 362
- Number of patents 2007-2016: 32

(29) **Singapore**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: None.
- GDP per capita (USD): 57714
- Economic growth (%): 3,62
- Investments in RDI: 10069
- Investments in water infrastructure: ---
- Water related publications: 2401
- Water related publications per mill. inhabitants: 429
- Number of researchers per mill. inhabitants: 6729
- Number of patents 2007-2016: 8239

(30) **South Korea**

- Contacts: ---
- Water RDI priorities:
  - Water quality
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in 3 ERA-NETs in the fields of materials and engineering, the Eurostars programme and a JPI AMR call. The European Commission is currently discussing with South Korea the participation of the country as an associated country to the Horizon Europe programme.
- GDP per capita (USD): 29742
- Economic growth (%): 3,06
- Investments in RDI: 169554
- Investments in water infrastructure: ---
- Water related publications: 11851
- Water related publications per mill. inhabitants: 231
- Number of researchers per mill. inhabitants: 6856
- Number of patents 2007-2016: 140514

(31) **Taiwan**

- Contacts: Ministry of Science and Technology
- Water RDI priorities:
  - Water and climate
  - Food security and water
  - Pollutants in water
  - Aquatic ecosystems and biodiversity
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in numerous ERA-NETs in the areas of materials and battery technologies, cancer, neuroscience, aquatic ecosystems and biodiversity, pollutants, urbanization and energy. Member of the Article 185 “Active and Assisted Living”. Taiwan was a member of the Water Works 2016 project.
- GDP per capita (USD): ---
- Economic growth (%): ---
- Investments in RDI: ---
- Investments in water infrastructure: ---
- Water related publications: 7041
- Water related publications per mill. inhabitants: 298
- Number of researchers per mill. inhabitants: ---
- Number of patents 2007-2016: 10681

(32) **Thailand**

- Contacts: Hydro and Agro Informatics Institute – Ministry of Science and Technology
- Water RDI priorities:
  - Energy production from water resources
  - Loss of hydrological connectivity
  - Conservation and protection of aquatic ecosystems and biodiversity
  - Flooding risks
- Cooperation barriers: Enhanced support for policy and regulatory activities; need to empower human capital; need to improve exchanges on knowledge, information and best practices. Overall need for strengthened capacity building.
- Participation in EU/ multilateral initiatives: Member of the Southeast Asia – European Joint Funding Scheme for Research and Innovation.

- GDP per capita (USD): 6595
- Economic growth (%): 3,91
- Investments in RDI: 5138
- Investments in water infrastructure: 1406
- Water related publications: 3233
- Water related publications per mill. inhabitants: 49
- Number of researchers per mill. inhabitants: 964
- Number of patents 2007-2016: 782

(34) **Tunisia**

- Contacts: Ministry of Higher Education and Scientific Research, Institution for Agricultural Research and Higher Education (IRESA)
- Water RDI priorities:
  - Conservation and restoration of aquatic ecosystems and biodiversity
  - Pollutants in water
  - Water quantity
  - Water use efficiency
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in numerous Era-NETs in the fields of natural ecosystems, food security and Euro-Mediterranean cooperation. Participation in the Water JPI Water Works 2015 and 2017. Member of PRIMA. An association agreement to the Horizon Europe programme has been signed with Tunisia. The agreement is expected to enter into force shortly.
- GDP per capita (USD): 3464
- Economic growth (%): 1,96
- Investments in RDI: 827
- Investments in water infrastructure: ---
- Water related publications: ---
- Water related publications per mill. inhabitants: ---
- Number of researchers per mill. inhabitants: 1800
- Number of patents 2007-2016: 69

(35) **Uganda**

- Contacts: ---
- Water RDI priorities: ---
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: Participation in the ERA-NET LEAP-AGRI and the Article 185 “EDCTP”.
- GDP per capita (USD): 606
- Economic growth (%): 3,86
- Investments in RDI: 114
- Investments in water infrastructure: ---
- Water related publications: 342
- Water related publications per mill. inhabitants: 9
- Number of researchers per mill. inhabitants: 26
- Number of patents 2007-2016: 9

(36) **USA**

- Contacts: NSF, NASA/ Data Cube, NOAA/ infrastructures, US-EPA, US Geological Service, Euraxess North America, USDA-NIFA
- Water RDI priorities:
  - Water challenges in relation to climate change (water availability, natural disasters)

    - Environment and human health, including risk assessments
    - Exposure to pollutants
    - Innovation on Food – Energy – Water Systems
    - Research infrastructures, including the connection of Earth Observation and local measurements on water, Long-Term Ecology Sites, Long-Term Agricultural sites, Critical Zone Observatories, National Ecology Observatories Network (NEON)
    - Ecosystem services
    - Water related data: precipitation, evaporation, hydrological and ecological forecasting, water quality
    - Big Data
- Cooperation barriers: Differences in alignment of research priorities and goals; difficult for agencies to understand the "common virtual pot" funding model; unable to be co-applicants to joint calls; international cooperation is not a goal or priority. Pending questions about knowledge transfer to the private sector.
- Participation in EU/ multilateral initiatives: Participation in ERA-NET Cofund and JPIs joint calls.
- GDP per capita (USD): 59531
- Economic growth (%): 2,27
- Investments in RDI: 476460
- Investments in water infrastructure: ---
- Water related publications: 127041
- Water related publications per mill. inhabitants: 389
- Number of researchers per mill. inhabitants: 4255
- Number of patents 2007-2016: 637257

(37) **Vietnam**

- Contacts: Embassy of Vietnam in France
- Water RDI priorities:
    - Water use efficiency
    - Pollutants in water
    - Water governance
- Cooperation barriers: ---
- Participation in EU/ multilateral initiatives: None.
- GDP per capita (USD): 2432
- Economic growth (%): 6,81
- Investments in RDI: 1777
- Investments in water infrastructure: ---
- Water related publications: 929
- Water related publications per mill. inhabitants: 10
- Number of researchers per mill. inhabitants: 673
- Number of patents 2007-2016: 118