IC4WATER Coordination and Support Action

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

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Report on Impact Assessment of Water JPI Activities

(WP 6)

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List of Abbreviations

AB	: Advisory Board
AKA	: Academy of Finland
AMR	: Antimicrobial Resistance
CSA	: Coordination and Support Action
DG CLIMA	: The Directorate-General for Climate Action
DG INTPA	: The Directorate-General for International Partnerships
DG ENV	: The Directorate-General for Environment
DG RTD	: The Directorate-General for Research and Innovation
EC	: European Commission
ECHA	: European Chemicals Agency
EIPs	: European Innovation Partnerships
EJP	: European Joint Programme
EP	: European Partnership
ERA	: European Research Area
ERA-LEARN	: Support platform for the research and innovation partnership community
ERA-NET	: Funding instrument supporting public–public partnerships
EU	: European Union
FACCE-JPI	: Joint Programming Initiative on Agriculture, Food Security and Climate Change
FAO	: Food and Agriculture Organization
FET	: Future and Emerging Technologies
GB	: Governing Board
GPC	: High Level Group on Joint Programming (i.e. Groupe de haut niveau pour la Programmation Conjointe)
GWD	: Groundwater Directive
H2020	: Horizon 2020 Programme
IG3-report	: Implementation Group 3: Monitoring & Evaluating JPIs, Final Report
IHP	: Intergovernmental Hydrological Programme
IWA	: International Water Association
JPI	: Joint Programming Initiative
KI	: Key Issue
MB	: Management Board
MS	: Member States of the European Union
PBTs	: Persistent, Bioaccumulative and Toxic Chemicals
PFASs	: Per- and polyfluoroalkyl substances
PRIMA	: Partnership for Research and Innovation in the Mediterranean Area

P2P	: Public to Public Partnerships
PMOCs	: Persistent and Mobile Organic Chemicals
R&I	: Research and innovation
RDI	: Research, development and innovation
REACH	: Improving water security for the poor - research programme
RI	: Research Infrastructures
SAG	: Stakeholder Advisory Group
SDGs	: Sustainable Development Goals
SMART	: Framework used to identify quality indicators (i.e. Specific, Measurable, Achievable, Relevant and Time-bound.
SMEs	: Small and medium-sized enterprises
SRIA	: Strategic Research and Innovation Agenda
STB	: Scientific and Technological Board
TAP	: Thematic Annual Programming action
TF	: Task Forces
ToR	: Terms of Reference
UN	: United Nations
UNEP	: UN Environment Programme
Water JPI	: Joint Programming Initiative on Water challenges for a changing world
WFD	: Water Framework Directive
WHO	: World Health Organization
WssTP	: Water supply and sanitation Technology Platform (Water Europe since 2019)

Acknowledgements

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Foreword from the Panel

The EU communication *'Towards Joint Programming in Research'* (2008), laid the foundations for the creation of ten Joint Programming Initiatives (JPIs). The JPIs were designed to address the main societal challenges that Europe had to face, such as health, environment, and culture, and were accompanied by high political ambition and rationale for the structure of the ERA. In this framework, the Joint Programming Initiative *"Water Challenges for a Changing World"* (Water JPI) was established (2011) as a European platform to address the major global societal challenges in the water area.

In 2021, following a Water JPI Governing Board decision, the Evaluation Panel was assigned the task to evaluate the performance of the Water JPI and the impact created, during the ten years of its existence, and in addition, to explore future perspectives. The assessment has been based on a qualitative approach with respect to the 5+1 Dimensions. The Panel identified several Key Issues for each Dimension and considered the extent to which progress has been achieved towards scientific and societal impact and the degree to which Water JPI has been able to mobilise co-investment and alignment actions.

The methodology includes an analysis of key documents and data and a broad consultation with representatives of the Governing Board, Member States and Associated Countries, Advisory Boards, the European Commission, the research community and other key stakeholders. The assessment also provides an evaluation of the Water JPI's performance against the Key Issues, based mainly on an exercise of recording qualitative actions. Performance has been indicated either as success, ordinary or room for improvement, increasing the understanding of different areas where a successful, satisfactory or limited degree of progress has been achieved. To properly assess the level of success, one must acknowledge the difficulties that existed when the Water JPI and other similar initiatives were established. Building trust and encouraging new forms of multi-level cooperation among Member States and Associated Countries without a specific institutional or legal framework, and the creation of a European research community with other non-EU countries to address water issues, was not a common practice in the late 2010s.

The active involvement of so many local, regional, national and European water-related 'players' (ministries, funding organisations, research performing organisations, private sector, international organisations, etc.), the establishment of a well-structured governance system and an efficient and effective Secretariat, the alignment of strategy, policy priorities, programmes and competence, the reduction of fragmentation in water research in Europe and beyond, the implementation of a broad spectrum of common actions, such as joint calls fostering scientific excellence and knowledge hubs facilitating joint learning, the mobilisation of investments, the extending links to other initiatives, and the promotion of initiatives to consolidate international cooperation, may seem like conventional steps today.

Obviously, the degree of successful implementation is not the same for all of the above-mentioned issues. Our analysis offers evidence that the most significant weakness of the Water JPI was the inability to ensure that the research community delivers what societal stakeholders really need. In addition, it became clear that even when there were valuable results, the appropriate channels to influence the factors that determine water policy were not in place. With the exception of an influence on the EC's views on water priorities, the science–policy interface still remains a strong challenge at the national and European levels.

The establishment of an effective mechanism to promote and monitor the valorisation of projects' results is crucial in achieving the goals. Research outputs should be translated into policy advice and dedicated communication and knowledge transfer strategies should enhance the dissemination and global outreach. In addition, the Panel recommends the establishment of a monitoring mechanism with a reflexive approach, as a continuing function that provides ongoing feedback for both the level of progress and achievement of objectives and the use of allocated funds.

The Panel concludes that the overall impact of the Water JPI is positive, even if this effort did not reach the level of initial ambition. The level of ambition had been set very high from the outset, both by the MS and the EC. The idea of Joint Programming requires, by default, the setting of ambitious goals to be attractive and able to inspire a high-level vision. However, it has been proven that it also requires strong commitment and support from both the MS and the EC, which as it turns out in our case did not reach the level that was required by the objectives set. That is why the foremost recommendation of the Panel is to ensure the effective and active high-level commitment of all—MS, EC and other stakeholders—to continuously and firmly support future efforts.

As for future perspectives, the Panel is in favour of a clear decision that will be aligned with the new approach for the rationalisation of the partnerships landscape under the Horizon Europe Programme. The launching of the European Partnership Water4All should be seen as a first-class opportunity to bring the Water JPI to another level by further strengthening the knowledge transfer of research outputs to pragmatic—and actual—working deliverables and results based on sound science. It serves to complement and update the mission, not to cancel the Water JPI's contribution and success. A results-based rather than a research-driven approach is now the prevailing priority on the European R&I scene, for a better response to real-world needs. This is the main goal of the Horizon Europe Partnership Water4All.

The MS and the EC should ensure that the significant experience and knowledge gained, and the structures, relationships and links developed through the Water JPI, will be transferred to the new partnership Water4All. These should be the cornerstone to build new joint efforts. Despite the difficulties and weaknesses identified, it is believed that joint European and international action is the only way to meet the water challenges.

The Evaluation Panel

Leonidas Antoniou (Chair), Jennifer Cassingena Harper, Abida Durrani, Steven Eisenreich, Eeva Furman, Juliette Lassman, Andrea Rubini.

Executive Summary

The European Joint Programming Process was initiated in 2008 with a Communication of the European Commission (EC) and subsequent Conclusions of the European Council. Ten Joint Programming Initiatives (JPIs) were established with the aims to respond to societal challenges, and to increase the efficiency of national research and innovation investments by enhancing and improving cross-border collaboration, coordination, and integration of national activities.

The Joint Programming Initiative *"Water Challenges for a Changing World"* (Water JPI) was established in 2011 as a European platform to address the major global societal challenges in the water area and to have strong contribution to the reduction of fragmentation, mobilisation of skills, knowledge, and resources, with a view to strengthening Europe's leadership and competitiveness in water research and innovation.

After 10 years of active multifaceted operation in 2021, following a Water JPI Governing Board decision, the Evaluation Panel was assigned the task to evaluate the performance of the Water JPI and the impact created during the ten years of its existence, and in addition, to explore the future perspectives.

The evaluation framework includes a set of common important Dimensions, namely alignment, internationalisation, enhanced knowledge production, governance, and contribution to the societal challenges, which were identified by the Task Force for the assessment of all JPIs. In addition, the Panel added an additional Dimension concerning the Future Perspectives of the Water JPI.

The impact evaluation process included two main phases. The first phase "Self-evaluation" was implemented by members of the Water JPI network in the period between autumn 2020 and summer 2021 and included extensive preparatory work by the Water JPI partners including definition of the indicators and measurements, update of maturity maps, selection of key documents and gathering of data, design, and implementation of the survey to the Governing Board members.

The second phase **"**External Evaluation**"** was carried out by an external international Evaluation Panel of experts between September 2021 and February 2022. This phase included the review and analysis of the substantial body of documentary evidence, preparing and conducting the interviews with identified key persons and stakeholders' representatives, discussion of Key Issues including the successes, bottlenecks, lessons learned and the recommendations, evaluation of the main conclusions and formulation of the key recommendations for the future and finally the preparation of the current Impact Assessment Report.

The overall assessment of the Evaluation Panel classifies the following aspects of the Water JPI as having a positive impact:

- Building trust and encouraging of new forms of multi-lateral cooperation, among MS and EC. It is important to note that this cooperation was built at the state level, without a strong institutional or legal background.
- The creation of a European research community with the participation of research groups from non-EU countries to address water issues - 439 partners participated in joint proposals submitted in the six Calls for Proposals of the Water JPI.
- The active involvement of local, regional, national and European water-related stakeholders, such as ministries, funding R&I organisations, research performing organisations, industry and international partners.
- The establishment of a well-structured governance system and an efficient and effective Secretariat. As it turned out, the driving force for the most successful aspects of the Water JPI are related to the role, capacity, and effectiveness of the Secretariat Team.
- The reduction of fragmentation on water research in Europe and beyond, and the alignment of strategy, policy priorities and programmes.
- The successful implementation of a broad spectrum of common actions, such as the mobilisation of co-investments (83 MEUR), the launching of six joint calls fostering scientific excellence (88 joint projects), and the organisation of two Thematic Annual Programming actions and two Knowledge Hubs facilitating joint learning. Special mention should be made to the high level of the Knowledge Hubs, which as recognised by all, contribute to significant impact on policy setting.
- The extending links to other initiatives, and the promotion of initiatives to consolidate international cooperation, is considered as an example of good practice by other similar initiatives.
- The influence on the EC's views on water priorities.

The four key recommendations for the future stem from the conclusions of the entire evaluation study. They are:

Strong and Long-term National and EC Commitment is crucial for successful and prosperous work. However, the current assessment showed that there was a lack of sufficient national support, at least from some countries, in terms of volume and share of efforts, investment and other forms of commitment. The commitment should relate both to the allocation of resources corresponding to the ambitious goals and to the undertaking of initiatives to ensure sustainability.

Translation of research results into new solutions is a critical factor. The second key recommendation is the introduction of a specific Valorisation Strategy to bridge the gap between science and policymaking and between research and practical exploitation of results. The analysis offers evidence that one of the weaknesses of the Water JPI has been the inability to ensure that the research community delivers what societal

stakeholders really need and that there are appropriate channels in place to influence the factors that determine water policy.

The third key recommendation is related to the establishment of a Monitoring and Evaluation Mechanism in a reflexive manner, as a function that provides continuous feedback for both the level of progress towards the achievement of objectives and the use of allocated funds. The Panel concluded that there was no established and structured evaluation process to provide credible and useful information that allows the lessons learned to flow into the decision-making process. The assessment shows that this approach left gaps that were difficult to fill at a later stage.

The final, and overarching, recommendation of the Evaluation Panel is that the EC, the Member States, as members of the Water JPI should be invited to jointly consider their longer-term strategy to address the water challenges in Europe and beyond, in the framework of the European Partnership Water4All. The MS and the EC should ensure that the significant experience and knowledge gained, and the structures, relationships and links developed through the Water JPI, will be transferred to the new partnership. These should be the cornerstone for building the new joint efforts.

1. Introduction

1.1 Background

The European Joint Programming Process was initiated in 2008 with a Communication of the European Commission (EC) and subsequent Conclusions of the European Council. Ten Joint Programming Initiatives (JPIs) were established with the aims to respond to societal challenges, and to increase the efficiency of national research and innovation investments by enhancing and improving cross-border collaboration, coordination, and integration of national activities.

The attractiveness of Joint Programming lies in the potential of JPIs to develop a more effective approach to make significant impact on the identified grand societal challenges, directly or indirectly, through joint and targeted research and innovation strategies, programmes, and activities on a transnational level. The value added to national level activities lies in greater critical mass and less fragmentation in Europe's efforts to tackle the selected global challenges.

The Council of the European Union decided to launch the Joint Programming Initiative *"Water Challenges for a Changing World"* (Water JPI) on 6 December 2011 as a contribution to the reduction of fragmentation of efforts by Member States and mobilisation of skills, knowledge, and resources, with a view to strengthening Europe's leadership and competitiveness on water research and innovation.

The rationale for the existence of a JPI on Water is the nature of challenges related to water, which cannot be fully addressed by any individual partner country alone, and the systemic role of water for life, ecosystems, and society. Although the national and EC Framework Programmes have provided relevant funding to European water research, the wide variety of situations and issues to be tackled and their complex dimensions have limited the deployment of successful technologies and policies.

The Water JPI was designed to be sensitive to national, regional, and municipal water problems, thus responding to the large variability in European water issues. Among the research, development, and innovation (RDI) benefits of the Water JPI, five have a clear European dimension:

1. Aligning the national RDI agendas, optimising their scope and the resulting funding efficiency; effectively covering the wide variety of European water environments.
2. Increasing cooperation among European professionals.
3. Designing, building, and sharing large research and development facilities (e.g. experimental treatment plants).
4. Creating, maintaining, and cooperatively exploiting networks of open-field experiments and scientific observatory systems (e.g. experimental watersheds).

5. Multiplying the scientific impact of European research, increasing its relevance and scientific leadership.

These benefits, considered as objectives, have evolved during the lifespan of the Water JPI due to evolution in the knowledge and consideration of environmental challenges, global agendas, and new policies. Although they are still valid, international cooperation and alignment with the United Nations Sustainable Development Goals (UN SDGs) has also become crucial. The Water JPI targets citizen well-being in Europe and beyond. The knowledge produced by this JPI is intended to serve the purpose of reinforcing Europe in the international context, but with membership and activities not restricted to Europe. Thus, significant impacts can be envisaged in the scientific and water policy communities, as well as in developing countries

1.2 Methodology

1.2.1 Scope of the Impact Assessment

Several initiatives and actions have been undertaken to provide monitoring and evaluation frameworks for strategic guidance and as tools for learning, such as JPIs to Co-Work, ERA-LEARN, High Level Group on Joint Programming (GPC), Implementation Group 3 Final report (IG3-report), and GPCs Framework conditions. In addition, the individual JPIs have been developing their own, specific, monitoring and evaluation frameworks to ensure steering and decision making in each case, through the Task Force for the Monitoring and Evaluation of the JPIs. This Task Force was created in early 2017, with participation of all ten JPIs with the objective of harmonising the monitoring and evaluation framework of the JPIs. This common framework is needed to develop a methodology adapted to the nature of the challenges and impacts of the JPIs. The impacts differ in nature and in time scale depending on the actions. Most of the impacts are long-term / global impacts that are more difficult to attribute to the specific activities and networks due to the hierarchy and multiple contributions.

Implementation Group (IG3) was established in 2016 within the GPC with the objective of building the criteria framework for the evaluation of possible new proposals for the JPIs and for evaluation of the current ones alike. The framework was based on the following criteria: topic, engagement, governance and results, outcomes, and impacts. GPC's task was not strictly to evaluate JPIs, but to provide input for the evaluation framework and criteria, as well as recommendations on how to perform an evaluation. The GPC also provided inputs to the EC for questions such as the EC support to the JPIs and via its supporting instruments (CSAs and ERA-NETs).

Following the 2016 Evaluation report, an exercise between the GPC, JPIs, and the EC to co-construct a long-term strategy template for the JPIs was carried out. The main qualitative results showed positive aspects regarding the relevance of topics, structural aspects, governance, activities carried out and international collaboration. More challenging issues were detected in terms of the inclusion of private partners, national commitments, phasing out of support provided by the EC and geographical coverage

versus widening issues. GPC indicated the interest of transversal aspects, including alignment, governance and impacts at national level. Suggestions of what could be monitored and evaluated in this respect are: adaptation of national priorities, representative efficiency (e.g. mirror groups), or impact on policy, synergies with other initiatives and international cooperation.

The ERA-LEARN 2020 project, funded by EC to support Public to Public Partnerships (P2Ps), dedicated a specific task to monitoring and impact assessment, which aimed to implement a more integrated and systematic framework for monitoring and assessing the impact of P2P networks and associated co-funded projects. ERA-LEARN developed guidelines, documents, and tools, where evaluation is considered in a wide sense, focusing also on intervention's effectiveness, mostly based in the Logical Framework Approach.

The Water JPI developed its own impact assessment system, particularly for its specific activities, but mostly based on the tools provided by ERA-LEARN and following closely the frameworks given by the Task Force on Monitoring and Evaluation of the JPIs. Impact assessment has been implemented to monitor progress of JPIs, verify and characterise the problems, identify the underlying causes, assess the actions needed and analyse the advantages and disadvantages of available solutions. Monitoring and evaluation of the Water JPI should assess if the efforts made since launching have well oriented to address the challenges and objectives reflected in the Water JPI Vision 2030 Document and Strategic Research and Innovation Agenda (SRIA), and how the different activities implemented have contributed and have generated impacts.

The Vision 2030 document reflects that the definition of a framework of evaluation is intrinsic to the definition of objectives. Therefore, together with objectives a series of indicators was defined for better monitoring and measurement of the achievement of the mission. Constant evolution in water challenges and activities of the Water JPI leads to changes in the scope of impact assessment exercises. For the current impact assessment exercise, the framework developed within IC4Water CSA will be considered.

The IC4Water CSA included a specific work package (WP6 – Global Impact Assessment) with the aim to perform the impact assessment of the Water JPI and its activities according to the extent of their response to scientific, innovation, societal, technological, ecological, and economic water challenges. The overall purpose was to provide a framework and guidelines for the evaluation and impact assessment of the Water JPI and its activities, particularly those relating to international cooperation.

The first tasks regarding impact assessment in IC4Water were the review of the existing systems for impact assessment of joint actions and JPIs, and based on it, the development of guidelines for impact assessment of Water JPI progress. This was a learning by doing exercise due to the simultaneous existence and evolution of different initiatives and actions for the evaluation of partnerships. The Water JPI developed a series of workshops during 2017 to 2019 under IC4Water CSA and WaterWorks2014

ERA-NET Cofund, concealing the need in these supporting projects to develop an impact assessment system and share good practices.

The workshops contributed to better understand and address the question of the impact assessment and its methodology on different levels (from specific activities to transnational collaboration programmes), ensure wide involvement of countries across the JPI and its supporting projects, as well as provide the continuity of this activity beyond the duration of a single instrument. Specific outcomes of the workshops were:

- the revision of the state-of-the-art in impact assessment,
- the revision of examples of the application of the existing impact assessment systems,
- the definition of the initial framework for the implementation of the impact assessment system in the Water JPI with regards to the efforts required for its implementation, and
- the definition of initial indicators for the evaluation of the Water JPI.

The guidelines elaborated were based on the logical framework analysis proposed by ERA-LEARN, as it was considered to fit the purpose for the evaluation of the activities of the Water JPI. In addition, partnership evaluation elements were included as recommended by Task Force for the Monitoring and Evaluation of the JPIs. Following the recommendation of the Task Force was relevant because it helped to align the methodology to that of the rest of JPIs and future benchmarking exercises. An ambitious evaluation guidelines document was generated as a Deliverable 6.1 in H2020-funded CSA IC4WATER. The evaluation panel was given access to this confidential document and has applied it in a simplified but representative way.

1.2.2 Evaluation Framework

The evaluation framework includes a set of (five) common important Dimensions which were identified by the Task Force for Monitoring and Evaluation of JPIs. A group of high-level experts (including members of Advisory Boards, experts used in joint call evaluations etc.) was nominated to assess the added value and the global impact (both scientific and societal) of the Water JPI activities and actions to the water community.

The Evaluation Panel decided to keep the five Dimensions as the basis of its work. In addition, to comply with its mandate, the Panel added an additional Dimension (+1) which concerns the Future Perspective for the Water JPI, in view of the Horizon Europe Programme, and in particular the development of the European Partnership Water4All (Figure 1). The Panel applied a slightly differentiated approach, as far as the lower level of analysis is concerned. Thus, the Panel analysed the 5+1 Dimensions based on the most important relevant *"Key Issues"* (KIs), instead of the *"Indicators"* suggested by the

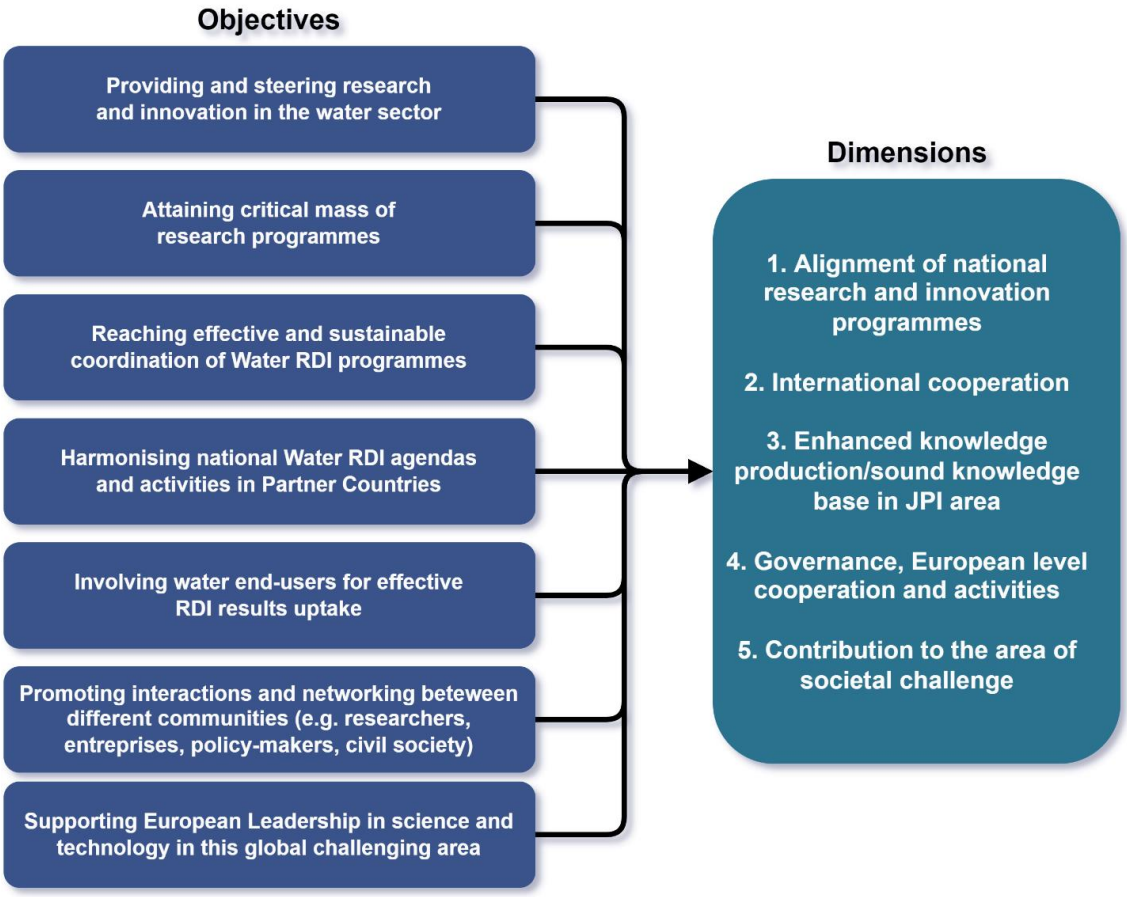

Figure 1. Water JPI objectives and Dimensions for the Basis of Evaluation.

Guidelines. Key Issues mostly correspond the indicators with only minor differences. However, as the Key Issues have been adapted to be more in line with the Panel's conclusions on the context and the priorities of Water JPI, some of them differ substantially from "*Indicators"*.

The evaluation process included two main phases (Figure 2). The first phase "Self-evaluation" was implemented by members of the Water JPI network in the period between autumn 2020 and summer 2021, and included preparatory work by the Water JPI partners:

- Definition of the indicators and measurements based on the D6.1. "Guidelines for Monitoring and Impact Assessment" of the IC4Water project.
- Update of maturity maps, selection of key documents and gathering of data.
- Design and implementation of the survey to the Governing Board members.
- Preparation of the second phase (naming and inviting Panel members, interviewees etc.).

The second phase **"**External Evaluation**"** concerns the evaluation carried out by an external international Evaluation Panel of experts (Panel) between September 2021 and February 2022. This phase included:

- Review and analysis of the substantial body of documentary evidence by the Panel members.

- Preparing and conducting the interviews with identified key persons and stakeholders' representatives, including a representative of the EC.
- Discussion of Key Issues including the successes, bottlenecks, lessons learned and the recommendations for each one of the 5+1 Dimensions.
- Evaluation of the main conclusions and formulation of the key recommendations to the relevant stakeholders.
- Preparation of the current Impact Assessment Report

Besides the two-day panel meeting the Panel members met on several occasions to review evidence, discuss, and formulate their conclusions and recommendations. All meetings were held online due to the restrictions imposed by the COVID-19 pandemic. The panel was supported substantially by the Academy of Finland (AKA) staff. The AKA staff assisted by selecting and providing data and key documents, preparing the agenda, and participating in the Panel's meetings, following the interviews, validating the analysis of the Panel, and writing parts of the report. Finally, the evaluation process was completed with a launch event in May 2022.

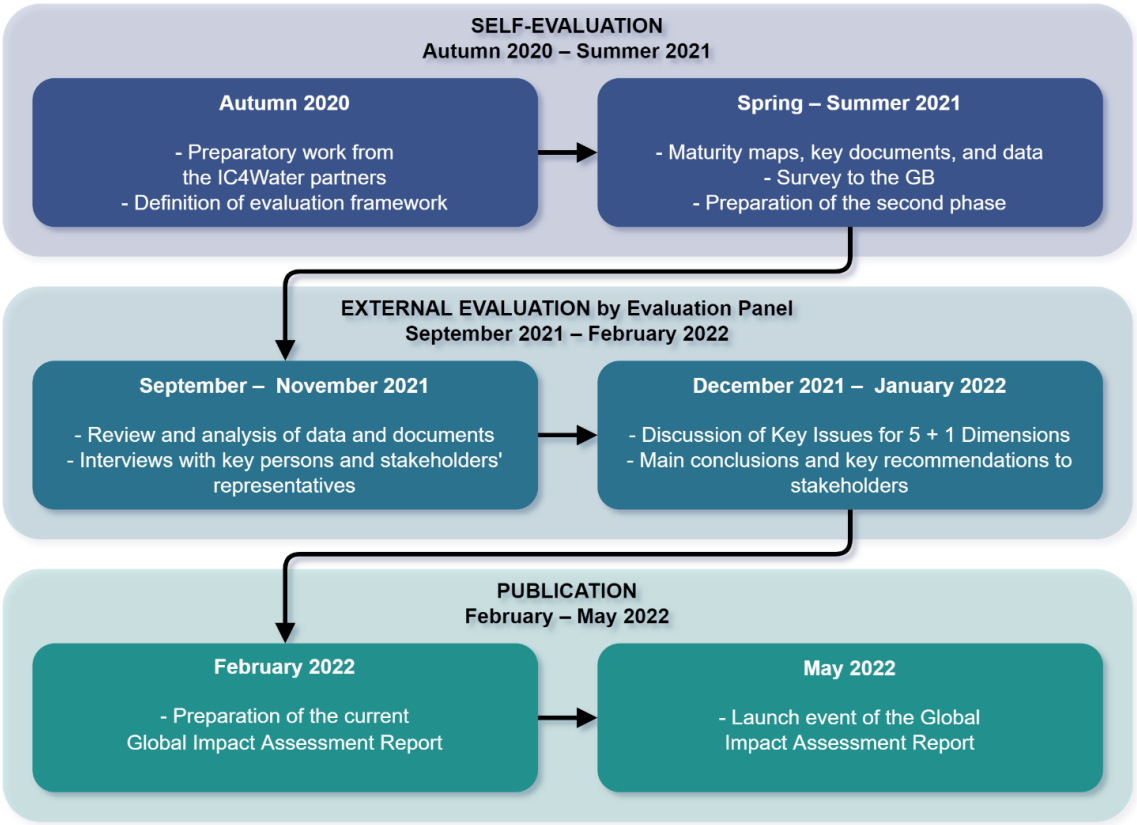

Figure 2. The evaluation process consisted of two main phases: self-evaluation and external evaluation completed by the Evaluation Panel. After the two evaluation phases the final stage included the preparation of the Global Impact Assessment report and the launch event organised in May 2022

2. Evolution of Water JPI

2.1 Vision and Objectives

The vision and objectives of the Water JPI are related to water constituting a precious natural resource, vital for life and essential to most life processes and living organisms, to societal advancement and, equally, to innumerable economic, cultural, commercial, and productive activities. The initial vision of the Water JPI was to tackle the ambitious challenge of *"achieving sustainable water systems for a sustainable economy in Europe and Abroad"*. Therefore, the Water JPI deals with research in the field of water and hydrological sciences, in a context of pan-European and global environmental challenges related to the availability of water in sufficient quantities and adequate quality. The targets were on sustaining human and economic development as well as on maintaining the essential functions of our water ecosystems, through an integrated holistic approach to water resource management.

The Water JPI Vision 2020 document, published in 2011, provided the context to the activities of the Water JPI responding onto the challenges, and defined main objectives to be achieved:

- Involving water end-users for effective RDI results uptake;
- Attaining critical mass of research programmes;
- Reaching effective, sustainable coordination of European water RDI;
- Harmonising national water RDI agendas in partner countries;
- Harmonising national water RDI activities in partner countries; and
- Supporting European leadership in science and technology.

Over the years, trends and challenges have changed, and the Vision 2030 document, published in 2020, highlighted the stakeholders' consultation outputs proposing *"Together for a Water-secure World"* with a shared mission *"Jointly Enabling 'Smart' Water Solutions for a Changing World"* as the new ethos for the Water JPI. Although initial challenges are still valid, research and innovation in water needs are faced with additional challenges in relation to, for example, changes in agriculture practices, where 70% of freshwater is consumed, adaptation to climate change with increased extreme events (droughts and floods), new contaminants of emerging concern with a focus on antimicrobial resistance and the need to recycle and reuse water to meet the increasing demands. The Vision's horizon year of 2030 also aligns with the target year for achieving many of the SDGs, particularly those directly or indirectly related to water.

The Vision 2030 also takes into consideration changes in key water policies within the EU, driving changes in the Water JPI objectives. A fitness check of the Water Framework Directive was completed in December 2019, along with its associated directives (Groundwater Directive and Environmental Quality Standards Directive) and the Floods Directive, showing that they are still relevant, but delays in the implementation of the directives by Member States has resulted in less than half of the EU's water bodies

receiving good status. The European Commission adopted a proposal for a revised Drinking Water Directive in 2017, updating the quality standards and approach to water quality monitoring. Between 2017 and 2018, preparatory work for an evaluation of the Bathing Water Directive was completed, and 2018, the European Commission proposed new rules to encourage and facilitate water reuse in the European Union, however, enacting such policy on wastewater reuse is proving to be challenging. Finally, the Vision 2030 also considered the European Green Deal, adopted for the European Union in December 2019, terming a new growth strategy based on clean products and technologies.

In this context, a new set of objectives were formulated for Vision 2030. They included indicators for monitoring the activities, covering the gaps in the implementation, and learning from good practices. The new seven objectives, covering and expanding the previous ones are the following:

- Engaging stakeholders;
- Broadening the partnership;
- Contributing to policy development and implementation;
- Supporting and enhancing the research and innovation community;
- Stimulating innovation and value of research outputs;
- Contributing to achieving the UN SDGs; and
- Adopting the Water JPI Vision and SRIA at the national level.

2.2 Strategic Research and Innovation Agendas

The strategy of the Water JPI is based on the Vision and the Strategic Research and Innovation Agenda (SRIA), usually referred to as the “backbone” of the Water JPI. The vision provides with general and specific objectives to be achieved, as indicated above. The purpose of the SRIA is to lay down guiding principles and identify research priorities for the future, while making them openly accessible to the various stakeholder groups including policy makers, regulatory agencies, researchers, end users (such as water enterprises, water utilities, and river basin management bodies) and the public. The SRIA sets out specific RDI research themes and sub-themes and identifies areas where RDI actions are required. The research themes and priorities are identified through a transparent process involving the membership and advisory boards and are also opened for consideration to stakeholders through dedicated workshops and consultations.

The SRIA is a roadmap for future water related RDI actions in Europe, including, but not limited to, the Water JPI actions. To this end, it identifies areas in which RDI actions are required. Given the central role of SRIA in strategy and activities, the Water JPI has paid special attention to frequent update. The subthemes and actions have evolved as water challenges and Water JPI objectives have themselves evolved and four versions of SRIA have been published so far. Versions 0.5, 1.0 and 2.0 maintained a common structure of themes:

- Maintaining Ecosystem Sustainability
- Developing Safe Water Systems for Citizens

- Promoting Competitiveness in the Water Industry
- Implementing a Water-wise Biobased Economy
- Closing the Water Cycle Gap

The last version of the SRIA (3.0) was released in 2020, and it will be revised in 2025. As in the case of Vision 2030, SRIA 3.0 considers the changes in key policies that have occurred since 2011, such as the ongoing water trends and challenges in both a European and a global context, expansion of the Water JPI membership and increased collaboration agreements and partnerships. SRIA 3.0 identifies four core research themes: 1. Ecosystems, 2. Health and wellbeing, 3. Water value and usage, and 4. Sustainable water management.

Considering the scope and complexities of the four core research themes of the Water JPI, also UN SDGs, Water-Energy-Food-Ecosystems paradigm, and Climate-neutral circular economy and bioeconomy have been identified as key cross-cutting issues. These cross-cutting issues apply across all the research themes, as well as drivers and enablers that both drive change and enable solutions. The SRIA also outlines the expected impacts of research across the themes and key policies.

The strategy defined in the Vision and the SRIA materialises in the Water JPI Implementation Plan, which sets out a roadmap for guiding the operations. In particular, the Implementation Plan focuses on the development of the Water JPI, presents priority items that are to be implemented, permits planning ahead for agreed joint activities, lists specific goals, and outlines the efforts to be deployed. Implementation plans are released every three years to define the Water JPI actions that address the key research priorities.

2.3 Governance and Roles

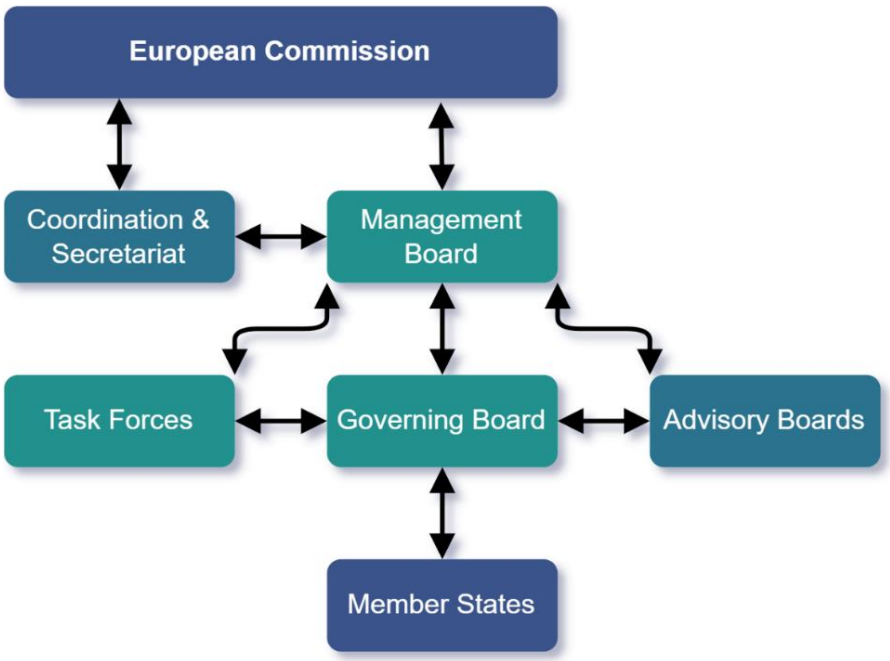

Figure 3. The main bodies of Water JPI Governance structure are Governing Board, Management Board, Advisory Boards, Task Forces, and Coordinator and Secretariat, who each have distinct roles.

The Water JPI functioning is based on a solid governance structure adapted to the needs of the partnership. The main bodies in the Governance structure are (Figure 3): GB, MB, AB, Task Forces (TF), and Coordinator and Secretariat. The proper functioning of the bodies is secured thanks to well-defined roles and rules, as reflected in the terms of reference, which have been revised frequently to address new needs or changes in the governance structure.

GB is the decision-making body, which seeks advice from the MB, the ABs and TF. The MB supports the GB in all aspects concerning the preparation and implementation of decisions. The TF are conceived as “ad-hoc” groups. They are set up to respond to specific technical, scientific, or administrative demands of the GB and/or the MB. The JPI Coordinator and Secretariat will organise the routine management and implement the tasks assigned to it by the GB and the Management, reporting to them both. The basic governance structure of the Water JPI has experienced few changes in its lifespan, mostly affecting the participation of members in the GB, the TF, and the ABs.

The major change in membership took place in 2018, where different membership levels were defined to reflect engagement of members. Currently, partner countries participating in the Water JPI can access to three levels of membership: observer, associated partner, and full member.

Despite the different levels, the functioning is highly inclusive, and the GB has achieved a relevant record of decisions made by general approval and consensus, showing the existence of well-established dialogue procedures. The GB is also composed by a Chair and a Vicechair, and the chairs of the ABs and the TFs are invited to the meetings, all of them without vote. The MB is composed of natural persons, and it includes the Chair and the Vice-Chair of the Water JPI; GB members coordinating ongoing supporting project(s); TF leaders who will report back on progress made, and additional MB members upon expression of interest and approval by the GB for 2-year mandates.

The Abs give advice to the GB and MB on specific issues as requested. Two bodies of the AB, the Scientific and Technological Board and the Stakeholder Advisory Group perform

There are three levels of membership that Partner Countries have been able to participate in Water JPI activities, from to the lowest level of engagement to the most:

- **Observer**: for those having mutual interest in funding research and innovation in Water challenges and willing to know more about Water JPI activities with an engagement on a pilot joint action;
- **Associated Partner**: for those which began a successful cooperation with the Water JPI and are willing to engage more by committing to the Water JPI Vision and means of getting involved in more than one joint multilateral action; and finally
- **Full member**: for those which have strong commitment to the Water JPI Vision and Missions, a history of successful cooperation with the Water JPI and want to get involved in more than one joint action and to contribute to the JPI strategy and functioning. Full member status gives access to voting at the GB with the corresponding duties of contributing to JPI functioning via fees and/or in-kind).

these tasks. The GB decides on the size and membership of these bodies according to its needs, appointing members for three years.

The JPI Coordinator is selected by the MB and elected by the GB for a mandate of at least 3 years with the possibility of reappointment and is appointed by the GB member hosting the Coordination and Secretariat team. The Water JPI adopted this model for a higher efficiency and coordination with the Secretariat. The Coordinator is responsible for the organisation and realisation of JPI activities, in collaboration with the JPI Secretariat. The Water JPI has always maintained a permanent staffed Secretariat. The Water JPI Secretariat reports to the Coordinator and provides technical support to all the bodies, the Chair and the Vice-Chair, taking care of the administrative implementation of JPI internal instruments. The Water JPI also established the possibility of satellite institutions to decentralise some of its activities (e.g. communication).

2.4 Member States Involvement

When the Water JPI was officially launched in 2011 there was in total thirteen Full Member countries and seven Observer countries (Figure 5). Throughout the years Water JPI has expanded and changed (Figure 4) and in 2021 (Figure 6) with twenty Full Member countries, five Associated Partners and three Observers, the membership accounts for 88 per cent of all European public RDI annual expenditure on water issues. Even though the primary mission of the JPIs is to promote collaboration between European Member States, international cooperation has become a secondary priority, in particular for supporting the European leadership in water science and technology. Water JPI has also cooperated with nine additional countries in joint actions: Bulgaria, Brazil, Canada, Egypt, Lithuania, Morocco, Slovakia, Switzerland, and Taiwan. Water JPI has also contacts with Argentina, Chile, India, Vietnam, Thailand, and the United States.

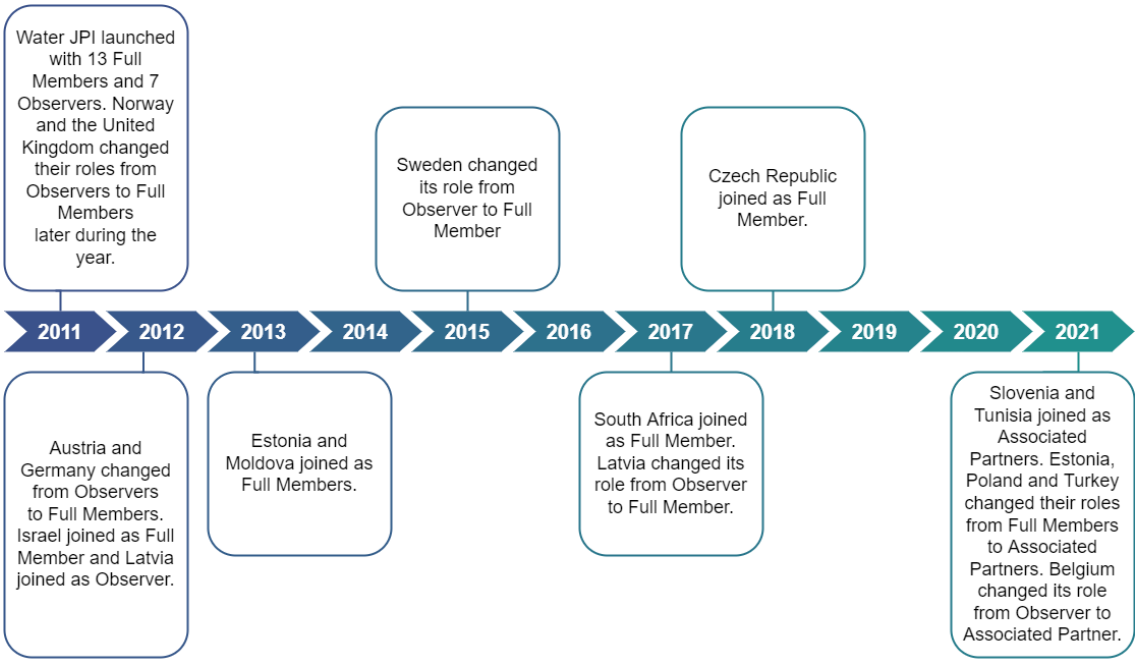

Figure 4. Since its start in 2011, Water JPI has expanded and changed throughout the years.

Figure 5. At launch 2011 Water JPI had thirteen Full Member countries and seven Observer countries. Later in the same year Norway and United Kingdom became Full Members.

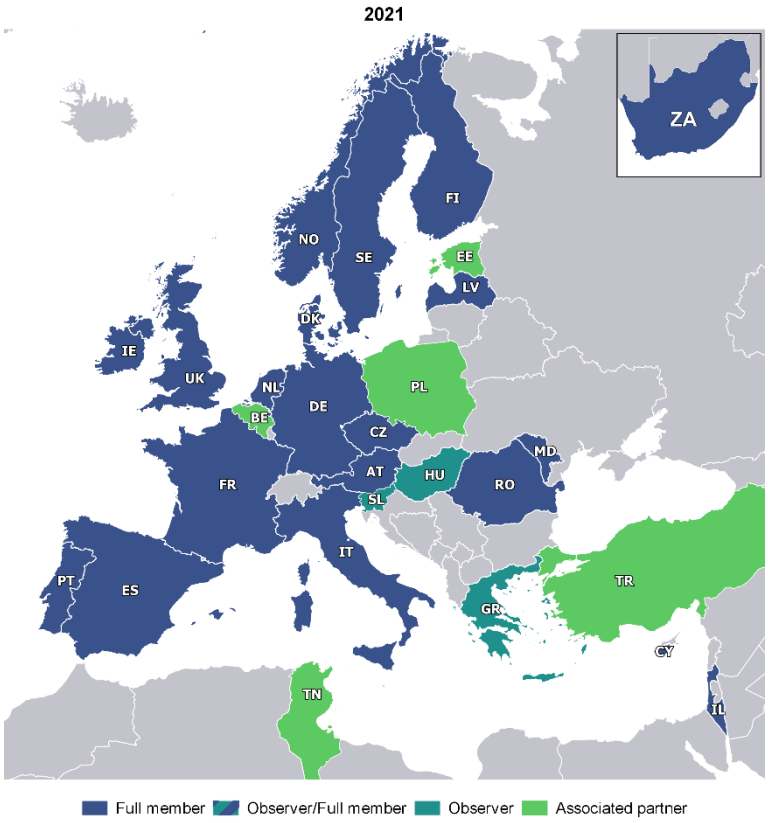

Figure 6. In 2021 the Water JPI counts in total twenty Full Member countries, five Associated Partners and three Observers.

2.5 Main Achievements and Milestones

This section collects main achievements and milestones (Figure 7) in the ten-year existence of the Water JPI, and some related to preparatory work, showing continuity in activity and evolution. It is not an exhaustive inventory but intended for reflecting the high level of activity and evolution.

The first key achievement of Water JPI was the creation of a consortia with a relevant membership. According to a mapping exercise carried out after the launch, the Water JPI partnership collectively represented 88% of European public RDI investment in water-related research. Although this aspect of mapping has not been updated, Water JPI has maintained this size since the initial partnership was launched, and even new members have been involved. The structure of the partnership provides an opportunity for synergies and enhanced cross-border programme collaboration resulting in a larger critical mass of resources and increased impact of research.

Currently, the Water JPI comprises 28 Partner countries (Figure 6), with all of them involved in at least one activity. Even though the primary objective was to promote cross-border collaboration of European Member States, international cooperation has rapidly emerged as a secondary priority, especially for supporting the European leadership in water science and technology. Likewise, increasing International Cooperation has been increased in coherence with the global nature of the challenges on water. Membership has grown including non-EU countries, and actions developed have involved countries not members of the Water JPI with a wide geographical distribution, including Africa, North and South America and Asia.

Water JPI has a well-defined governance and management model that has served to guarantee proper functioning. The governance structure has been revised several times to improve efficiency, representativeness and commitment of the members, and progress towards higher sustainability. This last has not been completely achieved, but important progress has been made. The commitment of members with in-cash and in-kind contributions are indicative of the value that member countries find in Water JPI partnership.

Water JPI activities have contributed to progress towards alignment of national research programmes and agendas, which is a crucial priority enabling the optimal use of national research funds. Representative examples of this progress in alignment are the release and update of vision, implementation plans and strategic agendas, build on agreement and reflecting the common vision necessary to address common challenges. Some member countries have stated national structures such as mirror groups to define national strategies in relation to Water JPI.

The core document supporting the activities of the Water JPI has been the SRIA. Four versions of the SRIA have been launched following transparent and participatory mechanisms and reaching a high level of consensus among partners. Along the way SRIA has aligned with relevant international agendas such as UN SDGs. The SRIA sits under the Water JPI Vision, but not limited to, the Water JPI actions. The latest version,

Water JPI SRIA 2025 released in 2020 has been a relevant contribution to the SRIA of the new partnership Water4All.

The organisation of calls for funding research projects has been one of the main activities in the Water JPI. Seven calls have been launched mobilizing over 100 M€ and funding more than 100 international projects that have involved hundreds of research groups. High continuity of calls and coherence of topics has been achieved, becoming a reference for researchers and technology-based companies working in the field of water. Coordination and support actions (CSAs) and ERANET-Cofunds supporting the calls and leadership of task have rotated, showing high level of involvement of Water JPI members and countries associated.

The Water JPI has become relevant actor in the RDI funding panorama, at least at European level. Mutual recognition with other initiatives addressing challenges related to water has materialised in joint calls with FACCE, AMR and Oceans JPIs, and Biodiversa. These collaborations have resulted in joint calls addressing in a comprehensive way RDI topics in the border among the domain of the different initiatives.

The Water JPI has constantly engaged with stakeholders through consultations, workshops, evaluation panels, Knowledge Hubs and Thematic Annual Programming actions (TAPs). In a more formal way, they have been incorporated to the governance through a Scientific and Technological Board and a Stakeholders Advisory Group, which have been consulted for more informed management and strategic decisions. Thus, engaging stakeholders has been essential to ensure that the Water JPI addresses the needs of society, develop practical solutions, and new knowledge is effectively transferred to end-users and adopted. The Water JPI established a JPI Communication & Dissemination Strategy to reach a vast range of water-related research and innovation stakeholders in Europe and abroad through various communication channels and facilitate the engagement of the public at large.

Completion of a comprehensive water RDI mapping, including the creation of a Projects Database has provided the most up-to-date inventory of existing water-related research projects, enabling linkages among research institutes, and increasing awareness on research activities in the water sector. Interaction with the EC has been pursued to enhance knowledge and capacity that strengthens the EU leadership in water RDI activities and support their national alignment.

Water JPI has been instrumental in the definition and design of the Horizon Europe partnership Water4All. Water4All will give continuity throughout Horizon Europe to the efforts previously made by the Water JPI to address Water Challenges through RDI activities and involving stakeholders. As a result of the consultation, the establishment of the European Partnership “Water Security for the Planet” (Water4All) as a Co-funded Partnership was agreed. The main goal of the Water4All is to “upgrade” water as a central priority of national and European public policies. The general objectives include:

- addressing the current and increasing water issues in the context of global changes,
- strengthening the scientific evidence for new policies and updating existing ones,
- ensuring a more rapid translation of R&I into concrete applications and uptake by relevant managers and citizens,
- supporting efficient collaboration and integration of European Union (EU), MS, and international players, and
- increasing implementation of solutions and therefore global impacts.

The major expected impacts are related to the protection of water resources and ecosystems and strengthening of biodiversity, enhancing resilience, mitigation and adaptation of water systems to climate change, pooling public and private resources and aligning a shared and co-developed SRIA, developing new instruments for cooperation, across stakeholders, sectors and scales for developing future actions, enhancing cooperation across sectors, with multi-stakeholder engagement and empowerment and reinforcing the EU's role in the international water agenda.

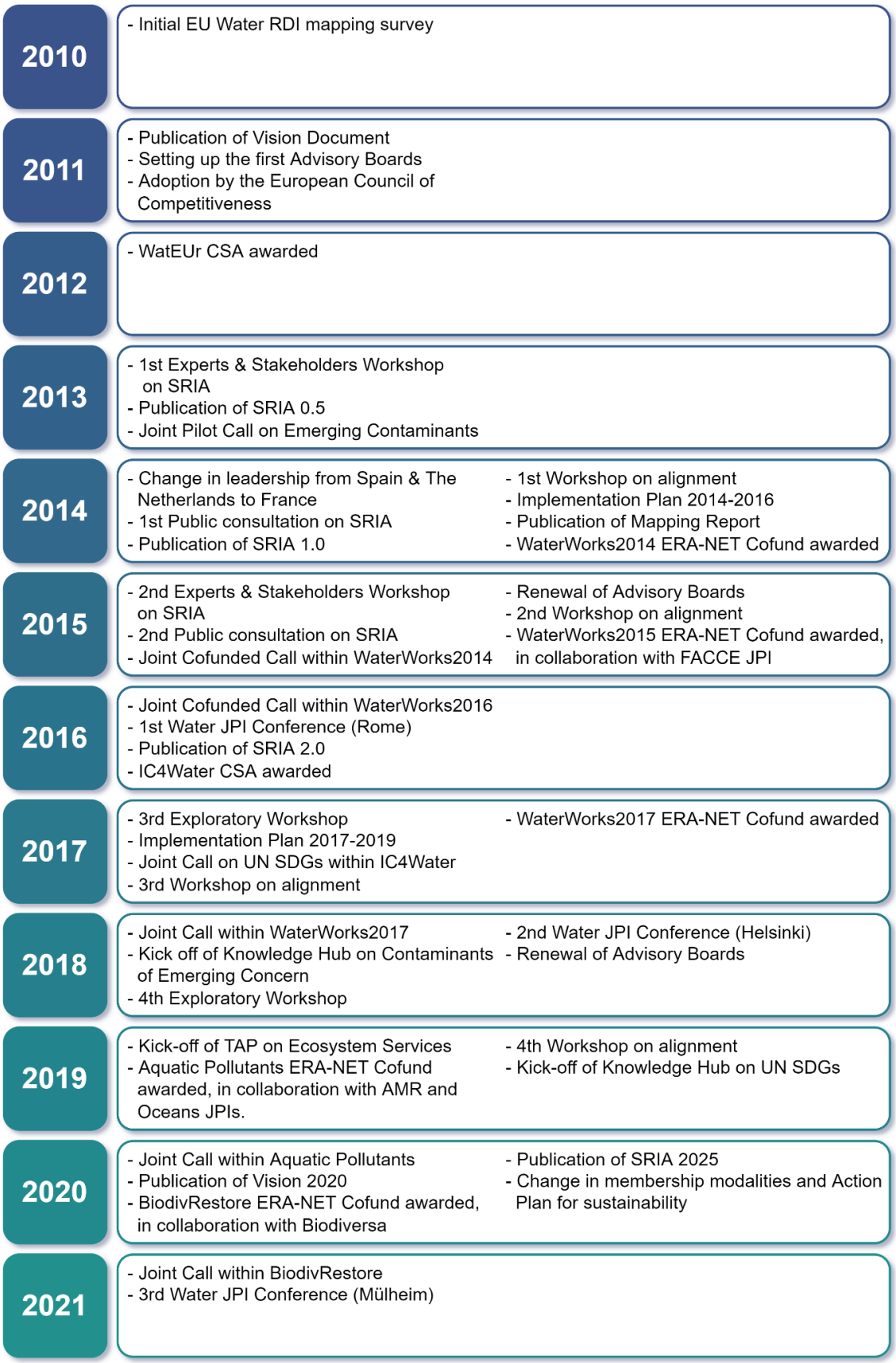

Figure 7. Main milestones during the existence of the Water JPI, and some related to preparatory work.

2.5.1 Joint Calls

The Water JPI provides funding via competitive Joint Calls for transnational collaborative water RDI projects (Table 1, Figure 9). To date (Figure 8), five Joint Calls have been launched (2013, 2015, 2016, 2017, 2018) including three Joint Calls with support of the EC as part of the Horizon 2020 ERA-NETs Cofund WaterWorks2014, WaterWorks2015 & WaterWorks2017 and two Joint Calls implemented within the Coordination and Support Actions WatEUr and IC4Water. The three Joint Programming Initiatives (JPIs) on Water, Oceans and Antimicrobial Resistance (AMR) also launched the AquaticPollutants Joint Call in 2020. Finally, Biodiversa and Water JPI launched the BiodivRestore Joint Call in 2020-2021. The number of countries participating the calls varied from 10 to 27 (Figure 9). Each of the calls funded 7 to 22 consortia including researchers from at least three different countries (Table 1). Project funding was highly competitive, and therefore not all countries participating in the calls had projects funded in the end.

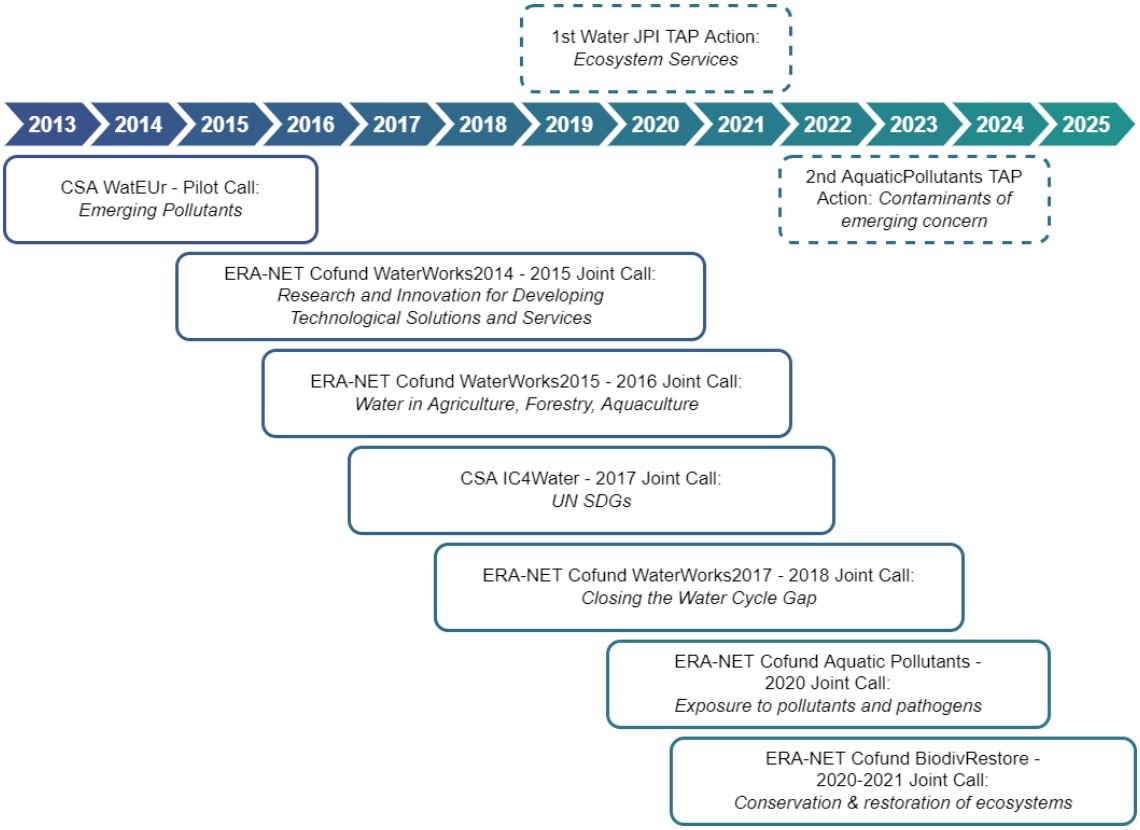

Figure 8. Timeline of Water JPI calls and TAP Actions.

Table 1. Water JPI has organised in total seven calls which have had 10 to 28 participating countries and funded 7 to 22 projects.

Call	Call theme	Countries participating in the call process/with funded projects	Budget (M€)	Projects funded
Pilot Call 2013- CSA WatEUr	Emerging Water Contaminants - anthropogenic pollutants and pathogens	10/10	9.7	7
Joint Call 2015 - WaterWorks2014	Developing technological solutions and services for water treatment, reuse, recycling and Desalination, Water resources management, and to mitigate impacts of extreme events	15/15	15.2	16
Joint Call 2016 - WaterWorks2015 with the FACCE-JPI	Sustainable management of water resources in agriculture, forestry and freshwater aquaculture sectors.	22/22	18.0	21
Joint Call 2017 – CSA IC4Water	Water resource management in support of the United Nations Sustainable Development Goals (UN SDGs)	12/8	6.8	8
Joint Call 2018 - WaterWorks2017	Closing the Water Cycle Gap – Sustainable Management of Water Resources	19/19	15.2	18
Joint Call 2020 - AquaticPollutants with JPI Oceans & JPIAMR	Risks posed to human health and the environment by pollutants and pathogens present in the water resources	27/22	20.0	18
Joint Call 2020-2021 - BiodivRestore with Biodiversa	Conservation and restoration of degraded ecosystems and their biodiversity, including a focus on aquatic systems	28/22	21.3	22

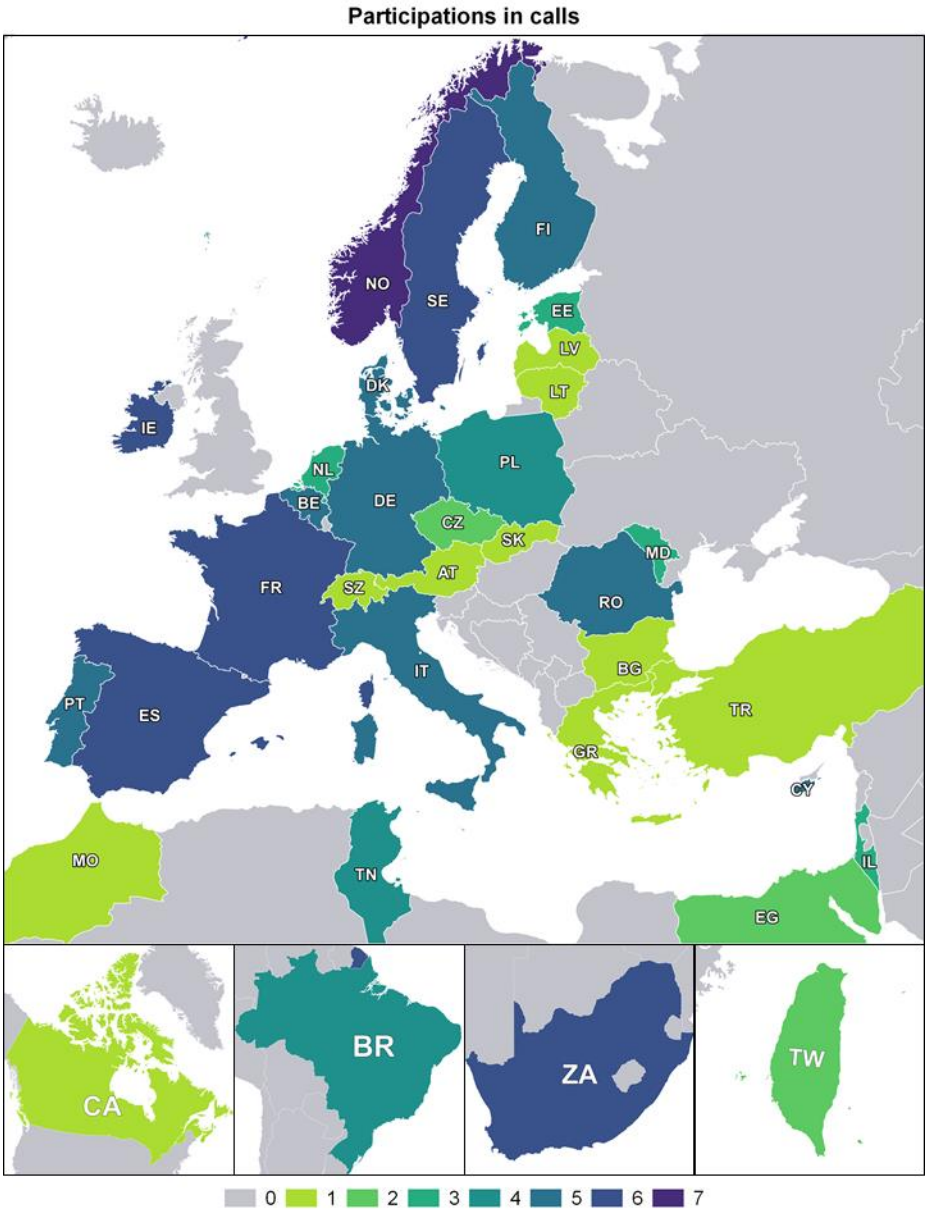

Figure 9. The number of participations (with funded projects) in the Water JPI calls: CSA WatEUr 2013 Pilot Call, WaterWorks 2014 Joint Call, WaterWorks 2015 Joint Call, CSA IC4WATER 2017 Joint Call, WaterWorks 2017 Joint Call, AquaticPollutants 2020 Joint Call and BiodivRestore 2020-2021 Joint Call. At the time of evaluation, BiodivRestore final funding decisions were still pending. Canada, Brazil, South Africa and Taiwan are at different scales.

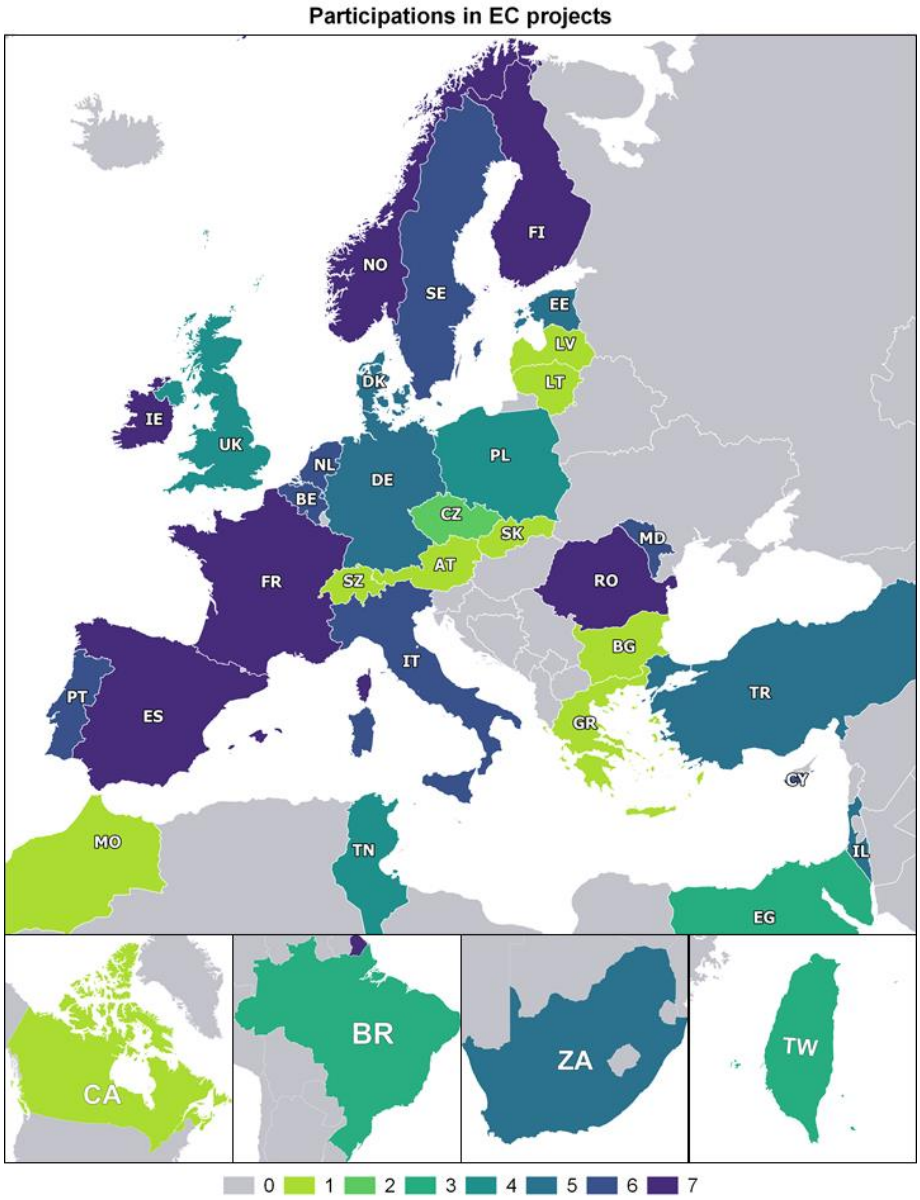

Figure 10. Participations on EC projects in different calls. Canada, Brazil, South Africa and Taiwan are at different scales.

2.5.2 Knowledge Hubs

Knowledge Hubs are thematic networks comprised of researchers that are built around defined scientific questions and targeted to stakeholders. In Water JPI, knowledge hubs have been set up following joint calls. The aim of a knowledge hub is to improve communication and networking with stakeholders and the scientific community. Knowledge hubs enable establishment of a critical mass of research and technological excellence, integration and sharing of knowledge, infrastructures, data, and modelling tools as well as training and capacity building. Typical outputs from a knowledge hub

include peer-reviewed publications, foresight exercises, input into the update of the SRIA, exchange of good practices and policy briefs.

Within Water JPI, two knowledge hubs have been created: Water JPI Knowledge Hub on Contaminants of Emerging Concern and Water JPI International Knowledge Hub on UN SDG, Water4SDGs.

Water JPI Knowledge Hub on Contaminants of Emerging Concern was launched in 2018 and continued to February 2020. It organised four workshops and produced several outputs, including policy briefs, press releases and infographics. The seed group consisted of 23 experts from 11 countries.

Knowledge Hub on UN SDGs was launched in 2019 and came to an end in December 2021. It included 15 water experts with diverse backgrounds, representing 8 countries. First output of the knowledge hub was a policy brief addressing the water scarcity challenges threatening the UN SDGs was published in 2020. In addition, infographics and a position paper have been produced.

Key recommendations deriving from the Knowledge Hubs emphasise that knowledge hub activities should be inclusive and communicative to other initiatives in order to foster knowledge transfer and SRIA alignment. Importance of facilitator support and time management was considered crucial, as was sustainable budget to ensure continuity.

2.5.3 Other Activities

2.5.3.1. Thematic Annual Programming

Another main thematic activity of the Water JPI is the Thematic Annual Programming (TAP), which is a network of national projects focussed on specific RDI needs. TAP focuses on main objectives of the Water JPI relying 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

The first Water JPI TAP call and selection of new national projects took place in late 2018. SRIA 2.0 subtheme 1.1. “Developing Approaches for Assessing and Optimising the Value of Ecosystem Services” was identified and six research projects from four FPOs (FI, IE, NL and ES) took part of it. The outcomes of the TAP AQUATAP-ES include a Policy Brief entitled: ‘’Integration of the ecosystem services approach into policy & practice is key for the sustainable management of aquatic resources’’ (October 2020), a paper on UN Sustainable Development Goal dedicated to SDG6 entitled: Ecosystem Services Approach and Natures Contributions to People (NCP) Help Achieve SDG6 (January 2021) and Briefing Note on: Decision Support Systems for managing Aquatic Ecosystem Services (July 2021).

The second TAP “AquaticPollutants TAP Action” was launched in January 2022 and it will run until December 2024 on a general theme “Measuring of inputs and taking actions to reduce CECs, pathogens and antimicrobial resistant bacteria in the aquatic ecosystems (inland and marine)”. AquaticPollutants TAP Action focuses in particular on multidisciplinary approaches defined in collaboration of the three participating JPIs on Water, Oceans and Antimicrobial Resistance.

2.5.3.2 Working Groups

A Working Group (WG) on “Operational Sustainability of the Water JPI” was set-up in 2016 to ensure continuity and the sustainability of the Water JPI coordination and secretarial activities. In the first place, a WG was mandated to prepare the separation of the coordination and secretariat (C/S) team from the chairmanship to avoid a transition phase every 2/4 years and to move to a more sustainable operational model. Water JPI GB approved the separation in its meeting (GB9) in Vienna 2016. Thereafter, the main purpose of the WG was to secure the maintenance and finance of the coordination and secretariat activities which led to the partner fee-based budgeting model in 2019 supported by identified in-kind activities.

3. The Stakeholders' Perspectives

The perspectives of the main stakeholders, with a substantial involvement in the development process of the Water JPI, are presented in this Chapter. More specifically, the following sections include qualitative feedback from:

i. a survey with the participation of Members of the Water JPI GB
ii. narratives prepared by participants of various Water JPI actions and activities, including governance, the secretariat, project coordinators, and members of the call secretariat involved in the Water JPI Calls for Proposals and other activities; and
iii. the interviews with nine key persons who have been actively involved in the development process of the Water JPI.

The Survey, the Narratives and the Interviews are presented as a descriptive analysis of the feedback received from these three groups.

3.1 Survey to Governing Board Members

An online survey amongst GB members was conducted in May 2021. The survey questionnaire comprised of 33 questions, two of which concerned background information, 19 were statements to score on a scale and 12 open-ended questions. GB members were asked to assign a score from a given scale[1] indicating the extent to which they agreed with a statement. In addition, an opportunity to supplement the answers with free text was provided.

Questions were designed to reflect the various dimensions and indicators that were identified by the TF on Monitoring and Evaluation of the JPIs. These dimensions included alignment of national, European, and international research and innovation programmes and resources, international cooperation, enhanced knowledge production, governance and contribution to the area of societal challenges.

Responses were received from 17 countries (response rate of 68%): 16 Full Members and one Associated Partner of Water JPI. Ten (59%) of the respondents represented a Funding Agency and seven (41%) represented a Ministry or Ministry Department. The full version of the questionnaire and the Report prepared by Academy of Finland are presented in ANNEX II.

3.1.1 Governance, Organization and Decision Making

The first group of questions focused on governance, organisation and decision making. Emphasis was given to the internal processes of Water JPI, mainly coordination, flow of information and decision making. The respondents found the decision-making process of Water JPI very efficient (Figure 11a), with 88% agreeing to a large or very large extent to the statement. More specifically, the process was considered transparent and inclusive, and the related documents were well-prepared. It was also noted that the commitments of the members to the Water JPI strategy and the work of the TF on

[1] *In most questions a six-point Likert scale was used to measure the agreement with various statements: 1= not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent. Even-point scale was used to avoid "neither agree nor disagree" answers, which would not be informative.*

Interactions with Horizon 2020/Horizon Europe, played a key role in ensuring a continuity with the new European Partnership Water4All.

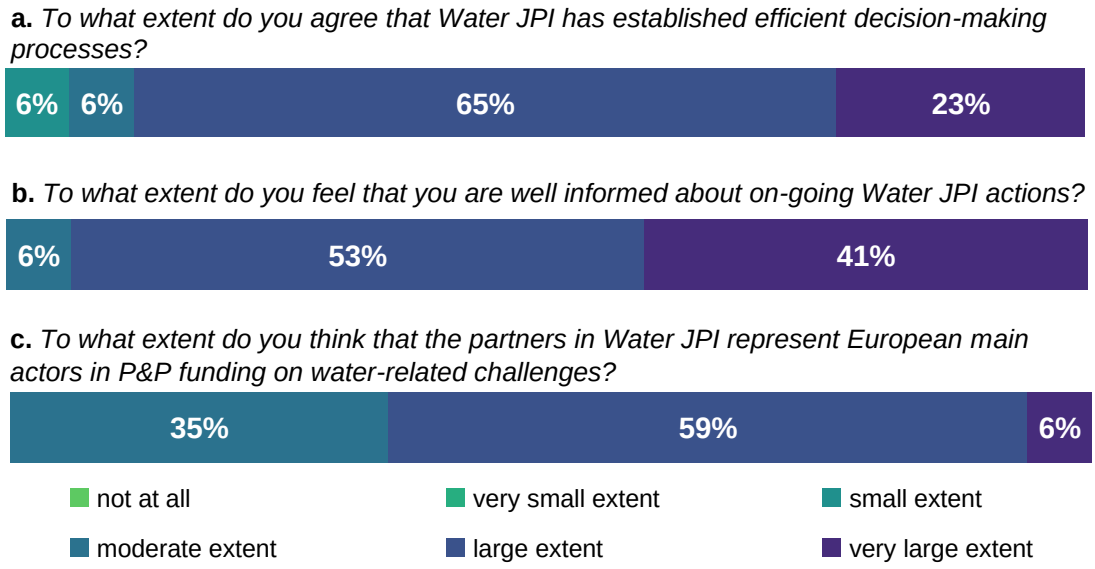

Figure 11. GB members were asked to evaluate the decision-making, information flow and relevant representation of European water-related actors: **a.** Extent that Water JPI has established efficient decision-making processes (n=17) The vast majority of the GB members (65%) thought that Water JPI has established efficient decision-making processes at large extent. **b.** GB members evaluated the extent they receive enough information about on-going Water JPI actions (n=17). Most members (94%) felt that they had been well informed at large or very large extent. **c.** Extent that Water JPI partners represent European main actors in P&P funding on water-related challenges (N=17). Most GB members (59%) thought that the Water JPI partners represent European main actors at large extent.

When GB members were prompted to suggest improvements for the decision making, better inclusivity was one of the aspects identified. One suggestion was to include more Water JPI voting members in the working groups and TFs, as this would foster exchanges among voting members before the GB meetings. In addition, mobilisation of more countries in the MB and TFs would benefit and facilitate the implementation of GB decisions by sharing the workload. Other main comments were related to communication. Some respondents mentioned that the information package in preparation of the GB meetings could be simplified. Better signposting of topics for discussion and topics for decision was suggested, with any decision-making items clearly presented and with sufficient background information. Some members wished to receive more information on proposed resolutions and outcomes of the meetings.

GB members were very satisfied with the information provided about on-going Water JPI actions, 94% of them declaring as being informed to a large or very large extent (Figure 11b). Concerning the internal communication, GB members found the meeting minutes and communication by email most useful. Better use of the intranet and the importance of keeping the information up to date was mentioned several times. It was suggested that draft documents could be prepared using intranet or a shared cloud-based service or workspace for increased transparency and timeliness.

Representation of Water JPI among EU funding on water-related challenges was considered relatively high (Figure. 11c). All GB members thought that Water JPI partners represent European main actors in P2P funding on water-related challenges to at least moderate extent, and 65% to a large or very large extent.

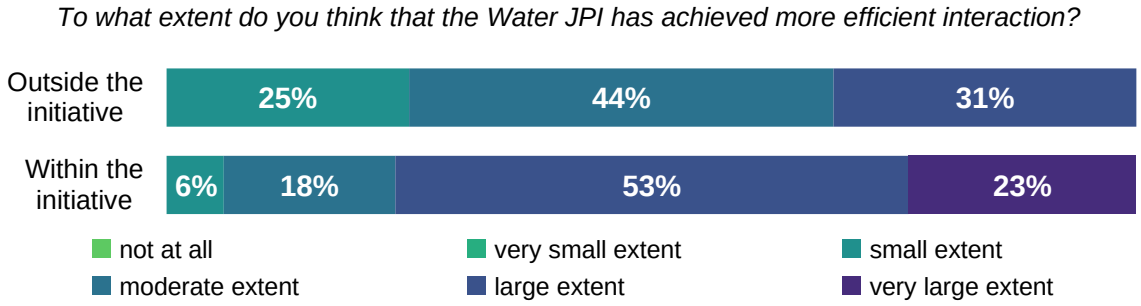

Figure 12. Level of interaction outside (n= 16) and within (n=17) the Water JPI. Majority of the GB members thought that the Water JPI has achieved more efficient interaction outside the initiative at moderate extent (44%) and within the initiative at large extent (53%).

According to GB members, Water JPI has improved the interaction especially within the initiative (76% large to very large extent) and to a lesser degree outside the initiative (Figure 12). SRIA and the implementation plan can be considered as key documents of any JPI. The Water JPI SRIA is a reference document that is orientating the EU strategy on water and is also used as a reference point by some Water JPI member countries to define their national strategy. Although GB members mentioned that there is some room for improvement relating to the development of SRIA and implementation plan, 77% agreed to a large or very large extent that the processes have been effective and efficient (Figure 13).

Main suggestions to improve the process included: (i) encouraging new collaborations via direct invitations to funding agencies, (ii) broadening the participation of consortium countries with other types of entities relevant to the Water JPI scope, (iii) focusing on the results with emphasis on common problems and climate adaptation, (iv) organising national workshops to improve the SRIA process, (v) better involvement of ABs, and (vi) greater involvement of partners in the implementation of actions.

For better building on common interests/needs the GB members suggested:

- Focus on common EU-level problems and increased consideration of non-EU Water JPI member priorities to ensure and promote international cooperation.
- Exchange between ministries to influence the national strategy and public policies, for countries lacking specific strategic agenda for water and national coordination.
- Intensify efforts to ensure that the consultation process reaches all members of Water JPI.
- Optimal synchronization of various actions (expert workshops etc.) taking into consideration the timing of related processes at national, regional and local level.
- Improvement of interaction among partner countries (share knowledge and ideas, networking tools/platforms, etc.).

To what extent do you agree that the processes to develop the SRIA and implementation plan are effective and efficient?

Figure 13. GB members evaluated the effectiveness of the SRIA process (n=17), and the great majority (71%) evaluated the SRIA process to be effective at large extent.

3.1.2 Alignment of National Research Strategies

The second part of the questionnaire (Questions 12-23) focused on the ability of Water JPI to facilitate the necessary decision procedures for alignment of national research strategies. The current SRIA2025 seems well-aligned with national water-related priorities. All GB members considered that SRIA2025 (3.0) reflects the water-related priorities of their country at least to moderate extent, with 59% finding large and 18% very large extent of reflection (Figure 14). One GB member wrote the following:

> *"It might look like a contradiction, but, in my view, at the EU level, the less local you go down, the better. The rationale is addressing common problems in a coordinated manner or using common tools to tackle local problems. Singular tools to face very local problems do not seem to respond to a European level strategic agenda."*

When this was compared against different themes (Figure 15), the alignment was most effective for themes "*Safe water systems for citizens"* and "*Ecosystem sustainability and Human well-being"* and less so for theme "*Competitiveness in Water Industry".* Some GB members felt that the role of *"Climate Change"* should have been emphasised even more, and that *"Hydropower"* and the *"Need to manage water resources"* were somewhat overlooked, despite the importance of hydropower in many European countries.

To what extent does the SRIA2025 reflect the water-related priorities of your country?

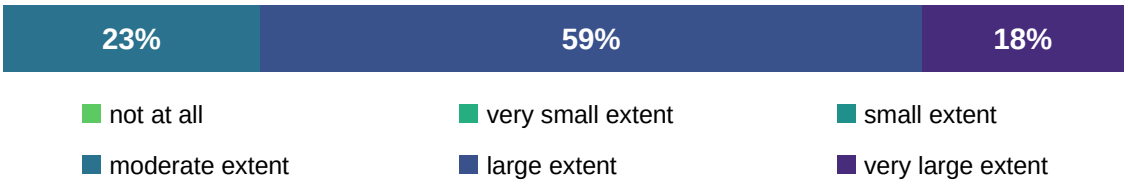

Figure 14. GB members were asked to evaluate the relatedness of SRIA 2025 and national water-related priorities (n=17). All members evaluated that SRIA2025 reflects the water-related priorities of their countries at least to a moderate extent, and the majority of GB members evaluated that it reflects it to a large extent (59%).

Effectiveness of alignment of national research strategy in relation to SRIA 2.0 themes

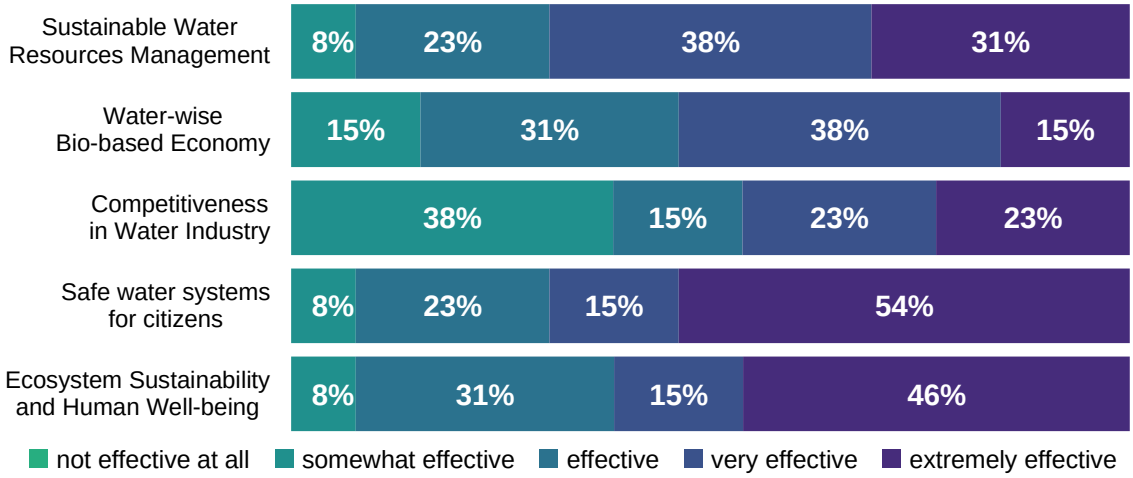

Figure 15. The effectiveness of alignment of national research strategy and SRIA 2.0 themes (n=13). On average GB members found the theme "Safe water systems for citizens" to be most effective, with 54% evaluating to being extremely effective. The theme "Competitiveness in Water Industry" was found to be least effective on average, with 38% evaluating it somewhat effective.

Regarding the research outputs, SRIA 2.0 has met the expectations of member countries especially well for theme "*Safe water systems for citizens"*. Lowest scores/grades were given for theme "*Competitiveness in Water Industry"* (Figure 16). Due to its nature, SRIA provides a broader picture of thematic priorities in an inclusive way. On the contrary, national research programmes often have a more focused approach on a few selected topics of national concern. At national level, SRIA can be better utilised to increase the alignment of national strategies with the global or EU agenda. In other words, for the national research programmes that strive for supporting researchers' capacity beyond local challenges, SRIA can provide a good guideline.

To what extent has the Water JPI met the expectations of GB member countries regarding research outputs in the SRIA 2.0 themes?

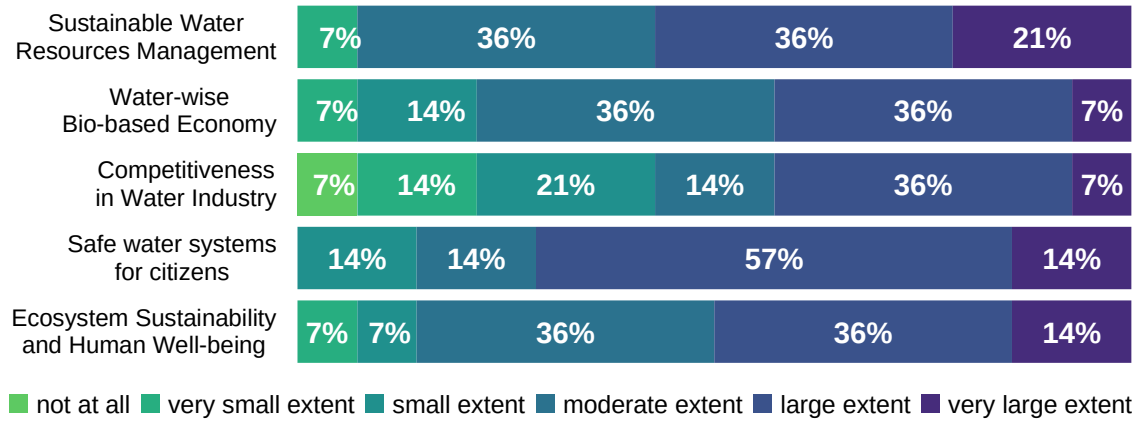

Figure 16. The GB members had varying opinions on the extent to which the Water JPI has met the national expectations regarding research outputs in different SRIA 2.0 themes (n=14). Most members thought that the theme "Safe water systems for citizens" had met expectations to a large or very large extent (71%). The theme "Competitiveness in Water Industry" had the only response where the GB members evaluated the theme as not meeting expectations at all (7%).

a. *To what extent has Water JPI SRIA influenced the focus of national research programmes of policy agendas?*

b. *To what extent has the Water JPI SRIA influenced the focus of national policy agendas and research programmes?*

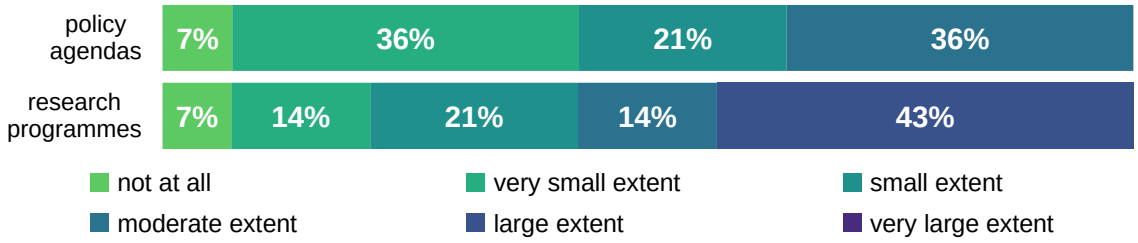

Figure 17. GB members were asked to evaluate the extent of Water JPI SRIA influence: **a.** The extent that Water JPI SRIA has influenced the focus of national research programmes or policy agendas (n=16). The GB members had very varying opinions on the questions as answers varied from not at all to very large extent. The biggest category was that Water JPI SRIA has influenced the focus of national research programmes or policy agendas at small extent (31%). **b.** The influence of Water JPI SRIA on national research programmes and policy agendas (n=14). On average the GB members evaluated that the Water JPI SRIA has influenced more on research programmes (43% at large extent) than on policy agendas, which was evaluated to have influences at lower extent.

How research programmes are decided and what kind of processes lead to defining the policy agendas vary greatly between countries. This is reflected in various responses to the questions about the influence of Water JPI on national research programmes and policy agendas (Figure 17). In many cases, the Water JPI SRIA has helped in defining national research priorities or has led to the launch of specific research programmes.

In some countries, research agendas are decided by national public consultation, and the influence of SRIA cannot be measured. Thus, the influence of SRIA on national policy agendas is hard to assess and mostly indirect or limited. The funding agencies are mostly not involved in drafting policy agendas and can only issue recommendations. It was also mentioned that since policy agendas are shaped more by the local challenges and priorities, it would be too ambitious to expect that SRIA could have a strong influence. Furthermore, in some cases there was alignment at organizational level rather than national level.

Few GB members were in favour of the inclusion of all stakeholders in the process and the establishment of national “mirror groups” as the mechanism to elaborate the consultation. Some GB members observed a mismatch in the planning of national research programmes versus SRIA. In some cases, especially in funding agencies with no specific water programmes in place, there is a “*competition*” for research topics and often a lack of resources.

Regarding national collaboration, 77% of GB members stated that Water JPI has increased stakeholder co-operation to at least a moderate extent (Figure 18a). Increase in research collaboration was even higher, with 88% indicated at least moderate increase

(Figure 18b). When considering Water JPI's role in avoiding duplication and/or filing gaps in water-related research, answers were mostly split between small (31%), moderate (25%) and large (25%) extent (Figure 18c).

a. *To what extent has Water JPI increased national stakeholder co-operation?*

b. *To what extent has Water JPI increased national research collaboration in the water*

c. *To what extent does the Water JPI contribute to avoiding duplicates and filling gaps between member countries?*

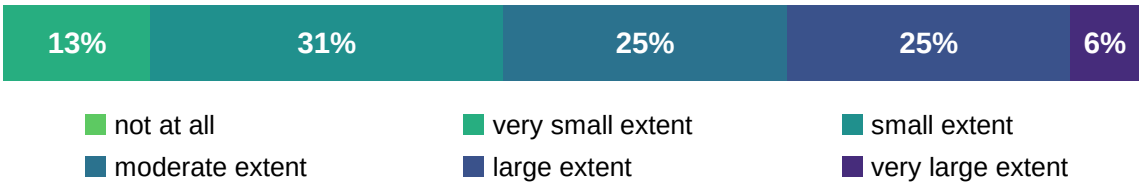

Figure 18. GB members were asked to evaluate national collaboration: **a**. More than half (53%) of the GB members evaluated that Water JPI has increased national stakeholder co-operation at moderate extent (N=17). **b.** More than half (53%) of the GB members evaluated that Water JPI has increased national research collaboration in water section at moderate extent (N=17). **c.** The GB members were also asked to evaluate the extent Water JPI contributes to avoid research duplicates and in filling gaps between member countries. Opinions of the members varied as 31% evaluated the extent as small, 25% as moderate and 25% as large (N=16).

3.1.3 Water JPI Joint Actions

The next section of the questionnaire (Q24-Q25) was related to the effectiveness of different instruments and activities of the Water JPI. The responses of GB members were generally very positive, especially towards ERA-NET Cofund and Joint Calls (Figure 19).

GB members identified several new kinds of actions that could be implemented by Water JPI in the future. Many respondents particularly recommended events involving stakeholders, policy makers, end-users, and the society, to achieve greater effectiveness in the transfer of research results and methods or technologies produced in the context of actions funded by the Water JPI.

Other suggestions related to the:

- need to improve collaboration with the relevant EC directorates: Environment (DG ENV), International Partnerships (DG INTPA, formerly known as DEVCO) and Climate Action (DG CLIMA),
- establishment of technology and innovation acceleration and exchange platforms,
- development of mobility actions for PhD and early-career researchers,
- improvement of research capacity and skills on knowledge transfer, and
- broader interaction with selected water intensive sectors (e.g. construction, textile, agriculture, energy).

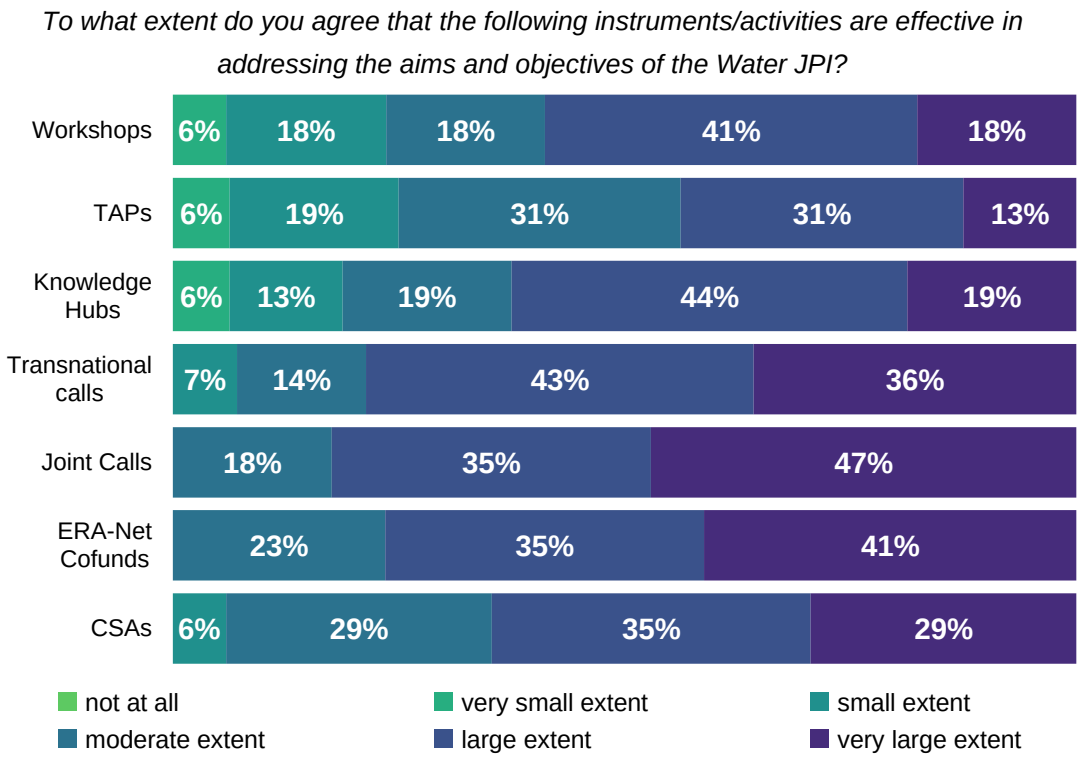

Figure 19. The GB members also evaluated the extent that different instruments and activities have been effective in addressing aims and objectives of Water JPI. The GB members found Joint calls (82 % evaluated to be effective at large or very large extent, n=17) and ERA-Net Cofunds (76 % evaluated to be effective at large or very large extent, n=17)) to be most effective. In contrast on average the GB members found TAPs (25 % evaluated to be effective at very small or small extent and 31 % at moderate extent, n=14) to be least effective.

Many GB members are looking for more emphasis on securing the valorisation of results coming out of funded projects. They consider the Knowledge Hubs as one of the best instruments to enhance the uptake of results, that deserve more attention and funding in order to reach a higher level of optimal function.

3.1.4 Internationalisation

This section concerns the international cooperation with countries beyond Europe. According to the opinion of the GB members, Water JPI has succeeded in widening activities (Figure 20a and 20b). Most of them, found the inclusion of non-EU partners very beneficial (76% considered it to be beneficial to large or very large extent) (Figure 20c). Water-related challenges are global, making the cooperation beyond Europe extremely important.

Positive comments on cooperation beyond Europe are as follows:

- International cooperation activities have the potential of building the critical mass needed to provide an effective response to major societal challenges and enabling Europe to participate more effectively in agenda setting at international level.

- The aim of achieving the UN SDGs by 2030 is international in scope and therefore, it is very important that the actions of EU countries are more visible at international level.
- The involvement of important non-EU countries should be envisaged, but also a greater connection with the UN organizations that deal with water in various capacities, such as Food and Agriculture Organization (FAO), UN Environment Programme (UNEP), World Health Organization (WHO) and with international research associations on water such as International Water Association (IWA) and the Intergovernmental Hydrological Programme (IHP).
- Efforts towards enhancing the collaboration with China and India should be continued.

Few members had some reservations about cooperation beyond Europe. They acknowledged that the cooperation with some countries is interesting, and they have given very valuable input to the JPI Water. However, there are so many other important initiatives beyond Europe that Water JPI needs to reach out to. This creates the need for a decision to avoid duplicating what already exists. Another commenter mentioned that cooperation with far away countries facing very different problems seems interesting for scientific diplomacy, but it is not necessarily as efficient in terms of collaboration among researchers.

GB members also gave suggestions on how to increase the collaboration beyond Europe:

- Collaboration with Brazil and South-Africa has worked well; maybe lessons learned from these collaborations could inform/benefit further discussions with new potential members.
- Consideration of hosting some activities in non-EU countries to raise the profile of Water JPI outside Europe.
- Inclusion of specific activities responding to the needs of non-EU countries.
- Link with relevant regional platforms in other continents to leverage on their existing platforms and networks. This could be done through joint activities and funding of joint projects.
- Consideration of establishing regional hubs hosted by leading water institutions in the EU priority countries.

a. *To what extent do you consider that Water JPI has succeeded in extending activities and incorporating partners outside of Europe?*

b. *To what extent do you consider that Water JPI has gained visibility and become relevant at the international level?*

c. *To what extent do you consider the inclusion of international partners in Water JPI actions to be beneficial?*

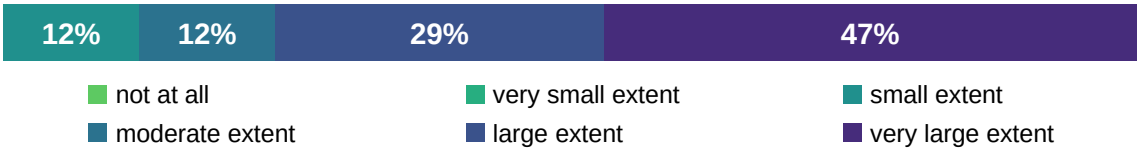

Figure 20. GB members were asked to evaluate the inclusion of international cooperation beyond Europe: **a**. More than half of the GB members evaluated that Water JPI has succeeded in extending activities and incorporating partners outside Europe at large extent (53 %), n=17. **b.** GB members were asked to evaluate the extent that Water JPI has gained visibility and relevance at international level. Most of the members considered the extent as small (29%) or moderate (41%), n=17. **c.** Most GB members considered that including of international partners in Water JPI actions to be beneficial to large (29%) or very large extent (47%), n=17.

3.1.5 Future of Water JPI

The final section of the questionnaire focused on the future expectations of Water JPI. GB members were also asked to describe the impact that Water JPI has achieved so far. Regarding the future of Water JPI (Figure 21), many of the respondents commented that the relation with EC and the new Water4All partnership should be clearly defined.

How do you see the future of Water JPI?

Figure 21. All GB members found the future of Water JPI to be at least somewhat relevant and the most (47%) found Water JPI to be highly relevant in the future, n=17.

On the other hand, some GB members found it difficult to see both initiatives running simultaneously. Water JPI is considered as a good basis for the new partnership and an exit strategy, which demonstrates the sustainability of the initiative. It is also important to recognise that Water JPI has evolved into an independent organisation, not dependent

on EC. Water JPI members have managed to establish a permanent structure that can pursue actions for the alignment and the valorisation of R&I funded projects.

GB members identified possible future roles and activities of Water JPI as follows:

- development of new areas of R&I, including frontier research,
- focusing on the development of high technologies,
- focusing on the development of small and medium-sized enterprises (SMEs),
- establish a robust strategy to bring more partners from EU partner countries, and
- improve visibility outside Europe by partnering with non-EU regional platforms and strategic networks.

GB members express the hope that Water JPI will stay as a strategic network of funding organisations that listens and responds to the needs of the wider water community at global level. In general, JPI's role in aligning thematic priorities across national research programmes was considered formidable and challenging. Without these external incentives, countries might be reluctant to change their research agendas. By making small steps together, Water JPI was considered able to eventually focus the research on the challenges of climate change.

Considering the limited lifetime of the Partnership Programmes under the Horizon Europe Programme, the GB members thought that JPIs should remain as established networks for the future. The lessons to be learnt from the Partnership Programmes during the next seven years, could also yield adaptation strategies for the JPIs. One GB member commented about the importance of Water JPI:

> *"The importance of the JPI for me was exchanging ideas with peers from different countries, intimate recognition of the processes within Horizon 2020 (H2020). It inspired me and led me to make major changes in the way we work at the ministry."*

According to the GB members, the impact of Water JPI has been both social, economic, and international (Figure 22). There has been good impact at the level of research activities and possible improvements both in the context of the policy and at international level. One of the most obvious impacts has been the increase of collaboration both nationally and internationally. Water JPI has brought together relevant actors and created an opportunity to discuss water research issues between a large number of Member States and beyond Europe.

It has also engaged stakeholders in ABs and within the research projects. Structuring of water domain stakeholders and main research funding actors in EU has led to the maturity of the community (enlargement of the membership including member states as well as associated countries to Horizon 2020 and South Africa).

In terms of research, Water JPI has increased research collaboration and knowledge transfer through Joint Calls and activities such as Knowledge Hubs and Thematic Annual Programming actions (TAPs). The research projects have produced not only scientific

publications but also policy briefs. Some projects are likely to produce licenses that will have direct impact on the industrial sector (including agriculture). The common SRIA process and the publication of SRIA is a major achievement that has resulted in better identification of relevant research themes and strengthened the water research.

However, it was noted that there is not enough perspective on projects that have been funded by the Water JPI and activities implemented so far. The initiative is still young and about to start valorising R&I project results and assessing the impacts (including societal aspects) of first actions implemented jointly. GB members also felt that Water JPI has been very active and been able to fund very high-quality collaborative projects. The development of the European Partnership Water4All, demonstrates the mobilisation of all Water JPI members, successful connections with the European Commission and the development of interactions with the private sector.

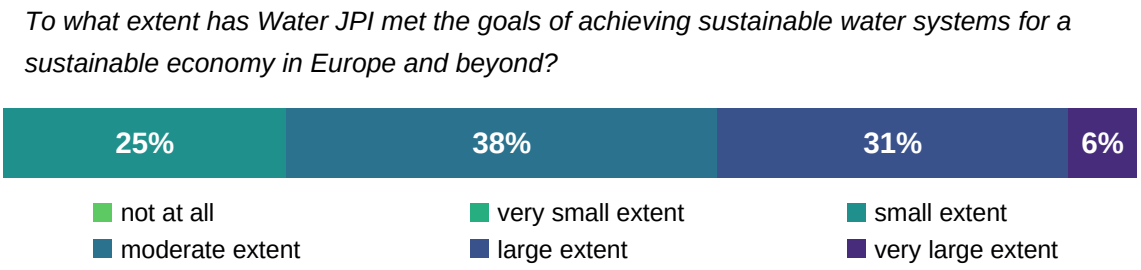

Figure 22. The opinions of GB members varied about the extent the Water JPI has met its goals of achieving sustainable water systems for a sustainable economy. Most GB members thought that the goals have been met to a moderate (38%) or large extent (31%), N=16.

3.2 Narratives

To supplement the in-depth interviews (described in section 4.3 Interviews) and to gain a broader view of Water JPI actions and activities, short free-form narratives were requested from selected participants (see ANNEX II). Altogether, nine narratives were received, which cover most of the Water JPI's dimensions and provided somewhat limited but very practical examples of the successes and shortcomings of Water JPI activities and processes from the perspective of those involved in their coordination and implementation. Overall, the experience from Water JPI and the established network was seen as essential for setting the foundation for Horizon Europe co-funded partnership Water4All.

3.2.1 Governance and alignment

In accordance with the GB survey results and the interviews, the role of Water JPI in strengthening the cooperation and establishing and maintaining the network in the field of water was considered very significant. This major success could be at least partly attributed to the efficient governance of Water JPI, including the governance structure and processes that were continuously improved, simplified and adapted. The role of the

management board was considered a key element in Water JPI governance, possessing an optimal connection to coordination and secretariat, and (indirectly) to GB.

Efficient coordination between member countries and Water JPI allowed the development of thematic and alignment activities, such as Knowledge Hubs, platforms for open data and access, mobility, and research infrastructures, workshops, conferences and means of influencing policy makers, such as position papers and policy briefs, demonstrating impact on the society. Furthermore, actions to facilitate public to private partnerships helped establish best practices and avoid wasting resources. One author commented on the impact of Water JPI on freshwater RDI:

> *"Before the foundation of Water JPI, RDI for the fields related to freshwater were dispersed. In 10 years of existence, the Water JPI created an entire community of funders around the freshwater's RDI and increased the awareness of policymakers and decision-makers for the importance of dedicating resources to this field."*

Some authors had also identified weaknesses in governance. Specifically, the connection between the Advisory board and the GB could have been stronger. The chairs of AB subgroups had been invited as observers to GB meetings, but the rest of the board members might not have acquired as complete a view of the discussions and decisions at the GB.

In addition, the authors hoped for better dissemination towards the society and improved communication strategies within the Water JPI governance structure and from members to their national communities. This reflected the different level of involvement and commitment of GB members and the member countries, which was brought up by several authors, and was speculated to be due to lack of resources of their agencies or ministries or the presence of competing interests.

The varying level of commitment also contributed to another challenge in coordination of actions. Overall, large number of countries in Europe and abroad participated the calls, but participation was uneven, and some countries committed low budgets. Fidelity of core countries was acknowledged as critical and had allowed continuity for Water JPI actions. Maintaining the contribution of partners in the future (in the era of Horizon Europe and the new partnership) was seen as a challenge.

Alignment of national RDI agendas and programmes was regarded as an ambitious objective that was at least partially achieved. SRIA development was considered essential in identifying and addressing water challenges, and for scoping the calls and other Water JPI activities. Furthermore, SRIA of Water JPI was seen to have clearly influenced the SRIA of Water4All.

3.2.2 Enhanced knowledge and contribution to challenge

Promoting high quality science and the application of its results for solving societal challenges in the water field is one of the key objectives of Water JPI. Narratives focusing

on enhanced knowledge production provided an overview of the impact of joint calls from the perspective of researchers and the call secretariat.

Joint calls organised by Water JPI together with other JPIs (FACCE-JPI, Oceans, AMR) or network (Biodiversa) were found to be a particularly successful way of funding interdisciplinary science aiming at solving complex, global challenges, fostering holistic research and thereby creating synergies and real impact. Successful coordination of joint calls depended on joint scoping and identification of common research questions in SRIAs of all participating JPIs. Although requiring more time and careful planning throughout the process, this approach had many advantages at the end: the scientific community targeted by the call was enlarged compared to calls organised by single JPI and this brought together both funding organisations and the expertise of different JPIs. Best practices could be shared and knowledge transfer between different JPIs and the call secretariat was facilitated, setting a foundation for future cooperation.

Some challenges were also identified. The nature of the joint call did not seem clear to all projects, and communication between Water JPI and other JPIs after the projects were funded could have been better organised. The general coordination of the joint call required more effort. In addition, the development of the call text was more complicated due to the need of adaptation to different SRIAs. Due to the interdisciplinary nature of the calls and the broader thematic range the evaluation process proved more difficult.

The project coordinators and partners highlighted the impact of funding through joint calls for their personal research careers, but also for the science. The funding through Water JPI had provided new networking opportunities and wider visibility for their research in the international research scene, resulting in more opportunities and business. The research projects funded by Water JPI were not isolated entities, but instead had synergies and connections with previous international and local research projects of the project coordinators and partners.

Impact of the research performed were also considered clear, the authors providing examples of how the results of the research were shared with water companies and regulatory agencies and therefore used to improve water quality and safety in Europe. Overall, joint calls were perceived as a valuable tool for optimizing and coordinating research efforts in European laboratories working on various water-related challenges, offering a holistic, multidisciplinary problem-solving approach to the research teams.

Project coordinators and partners also identified scope for improvement. Some felt that the budget did not compensate the coordination efforts enough and called for a better equilibrium in sharing the funds between partners. Others found the funding format complex. The partners felt mainly responsible to their national funding agencies, the requirements of which were different from one another, and this was thought to weaken the position and role of the project coordinator. The call management was considered very efficient, but allocation of personal project officers to keep close contact with the coordinators would have been beneficial.

Water4SDGs Knowledge hub launched by Water JPI managed to deliver several activities and outputs, including workshops, a policy brief, and a position paper, and contributed to the UN World Water Development Report 2022. In addition, several research gaps were identified. This represents a way of translating research findings into applicable policy recommendations. Furthermore, the knowledge hub had an influence on the Water4All, its SRIA development and new knowledge hubs, but also beyond water community (exchange of ideas with JPI Urban Europe). One author commented about Water4SDGs the following:

> *"Water4SDGs Knowledge Hub has been an important learning process both for the Water JPI community and the researchers who contributed to its activities."*

Challenges related to knowledge hubs were the same as with Water JPI in general: the level of engagement or commitment varied. Reasons for this might be related to clashing agendas, and to limited resources in both personnel and expertise in some thematic areas. In addition, expected outputs i.e., what could be realistically achieved were considered overambitious.

3.3 Interviews

Nine individuals who were actively involved in the development and operation of the Water JPI were interviewed by the Evaluation Panel based on a qualitive framework, with an emphasis on the 5+1 dimensions of evaluation. As a first step, interviewees answered a questionnaire (ANNEX III) with common questions in advance of the interview meeting. Through the questionnaire, the Panel aimed to gather more in-depth information on a range of topics, and to understand the background of the main observations from the desk-research.

The questions were structured into nine sections covering the following topics:

1. Alignment.
2. Global Leadership.
3. Knowledge Production.
4. Governance.
5. Success factors and Achievements.
6. Bottlenecks.
7. Relationship with the EC.
8. Influence on Policy Making.
9. Future of Water JPI.

A more open discussion took place during the interviews. The Panel members sought clarifications to some answers to the questionnaire and more specific or additional information related to the role and the background of each interviewee. Therefore, the interviews provide a qualitative view on the way Water JPI is operating, the challenges it faced and the impact it produced. The interviewees (ANNEX IV) fell into four general categories based on their main field of involvement in the Water JPI (some may have

served with more than one capacity): Governance, Management, Advisory Boards and European Commission. The descriptive analysis below highlights the main concerns and comments that have been expressed in the interviews.

3.3.1 Alignment

All the interviewees agree that aligning national and European RDI policies and funding under JPIs in general and Water JPI is a very complex process, which makes it very difficult to assess its impact. Every alignment effort must deal with the different institutional and financial frameworks that apply to regions and countries, and this often imposes significant constraints. Another important dimension that emerged from the discussions with interviewees is the fact that the concept of alignment is understood differently by the various actors involved.

A key factor is that not all countries have a specific water research strategy or programme which on the one hand, reduces the impact margins of alignment for some countries (e.g. Finland, Italy). On the other hand, it is observed that some countries are adopting the SRIA and other members states are adapting national priorities towards the SRIA (e.g. France, Cyprus). One interviewee commented the following:

> *"The national regulations and priorities of partners are different and due to lack of dedicated national programme/strategies on water-related research and lack of political support, it is difficult to align the national agendas with the SRIA of Water JPI. The adoption of SRIA needs a high-level political support."*

Nevertheless, alignment is considered as the cornerstone for the development of any transnational initiative and the formulation of a common strategy and joint activities. In general, interviewees welcomed the Water JPI's alignment efforts. The main positive aspects in relation to alignment according to the views of the majority relate to:

- jointly designing and developing the SRIA which formed the basis for all Water JPI activities, and maintaining commitment on SRIA,
- sustaining important funding for water RDI as Water JPI membership accounts for almost 90% of all EU MS public annual expenditure on water RDI (six Joint Calls for proposals with a total budget of 81M€ with a multidisciplinary approach),
- using the Water JPI SRIA as a basis for discussion with the EC,
- developing new cooperation tools and interesting outputs (Knowledge Hubs, TAP, etc.),
- reducing of fragmentation on RDI activities in Europe by creating synergies and cooperation with other European (FACCE JPI, JPI Oceans, JPI AMR, Bodiversa Water Europe, EurAqua etc) and international initiatives,
- initiating dialogue between and within the national institutions to create synergies and common consensus on the RDI objectives in for the water sector, and
- coordinating use of RDI infrastructures.

3.3.2 Global Leadership

It is generally accepted that water challenges are global in nature and of high priority for the public and do not concern a single geographical area. Therefore, the Water JPI GB's decision to invest both in effort and budget, from its early stages, to advance international cooperation is considered rational and of significant added value.

Discussions on international co-operation were initiated by the Water JPI with a broader set of countries, including China, India, and the United States of America. The Water JPI decided to seek cooperation with seven countries: Brazil, Canada, Egypt, Taiwan, Tunisia, South Africa, and Vietnam. Water JPI has been very effective in promoting RDI cooperation with Brazil, Canada, and South Africa, while cooperation with Egypt, Taiwan, Tunisia, and Vietnam has been relatively satisfactory. South Africa was the only country to declare its interest and actively pursue cooperation.

Efforts and discussions with some other countries have not yet led to the desired outcomes. India sought a bilateral agreement with the EU (this was not possible due to the JPI framework) and the collaboration with China proved difficult due to the absence of a suitable funding agency. Lastly the EU-US disputes over intellectual property rights management did not allow a final agreement.

Many of the interviewees consider the Water JPI's effort to develop international cooperation to be one of its most important successes. They particularly focus on the fact that JPIs have had better “success” in attracting international partners than the normal H2020 calls. Several activities have been launched in order to influence the global water sector. On the other hand, while acknowledging both the importance of the results achieved and the difficulties that existed, some interviewees believe that more could be done. In particular, they report that cooperation agreement with important countries such as China and the USA, is moving at a slow pace and presents difficulties.

One of the issues raised in the discussions was the correctness of the Water JPI's ambition of playing a global leading role in the field of water research and innovation. Rather than *"leading a global effort"*, an alternative, more viable goal for the Water JPI could be *“strengthening global cooperation”* to address water challenges.

A key bottleneck was the fact that partners beyond Europe had difficulties to understand the complex EU RDI funding landscape. Furthermore, non-EU countries are confronted by the existence of diverse European platforms in the water area and the launch of new initiatives supported by the EC (e.g. PRIMA), with similar goals and partners. This renders the selection of appropriate cooperation partner(s) challenging. In addition, many see the lack of human and financial resources as a constraint hampering enhanced efforts to strengthen and sustain international cooperation.

The main suggestions for improvement in the future, concern the:

- increased investments in joint ventures with international water players,
- establishment of alliances and organisation of joint activities with other initiatives, and

- enhanced Water JPI visibility through participation in international conferences and UN meetings, securing speaking slots in big flagship events, systematic use of social media, etc.

3.3.3 Knowledge Production

Up to now, Water JPI has launched six Joint Calls for proposals with a budget of more than 80M€. 70 projects have been funded which is considered a rather small number, taking into consideration the numbers of projects supported at national and European level over the same period. Nevertheless, the Water JPI projects are considered as complementary to the other funding programmes such as H2020, in terms of size and multi-disciplinarity. Most of the interviewees said that the joint actions and the funded projects have a significant and positive impact on the production of (high-level) new knowledge. One interviewee commented the following:

> *"…there was an enhancement of knowledge and a focus on the issues of most concern, and I felt that the scientific community… was keen to share knowledge and expertise and even resources."*

Nevertheless, everyone admits that they are not in a position to assess the impact of Water JPI projects on the basis of a scientifically accepted method and data. This is due to a number of factors which are lacking: there is no set impact analysis criteria and tools, and a strategic approach to communicate the research results to policy makers has yet to be defined. One interviewee commented about how this could have been improved:

> *"Definitely the Water JPI had a positive impact on EU-wide water RDI. Maybe a stronger pressure on funded project partnerships in order to conclude their projects with results shaped to enhance the contribution of science to policy, would have been useful."*

According to the EC, Water JPI enhanced the knowledge to several issues, such as emerging water contaminants and risks posed to human health, wastewater treatment and water reuse, and challenges related to water use in agriculture, implementation of water related Sustainable Development Goals, and sustainable management of water resources. Most interviewees emphasised the important contribution of thematic activities, including Knowledge Hubs and TAPs to the enhancement of knowledge production and knowledge sharing on specific topics. Therefore, the setting up of additional Knowledge Hubs has been proposed to share work and address potential gaps in technical knowledge sharing (e.g. related to sanitation). One of the interviewees emphasised about the importance of Knowledge Hubs:

> *"By establishing Knowledge Hubs, the Water JPI succeed in synthetizing results from individual projects and strengthening the science/policy interface."*

Some argued that the value of the knowledge produced would be greater if the Joint Calls for Proposals and consequently the funding was more focused on specific scientific areas. The large dispersion of topics included in the Joint Calls, as a result of the efforts

to “satisfy” the priorities of many funding agencies, is one of the main weaknesses as far as the knowledge production is concerned. One interviewee said the following:

> *“The high diversity of the SRIA and JPI community has resulted in fragmented funding programmes, which is one of the weaknesses of the JPI and its SRIA.”*

In addition, the SRIA and the Joint Calls for Proposals focus primarily on basic research with limited emphasis on innovation production. As a result, the outputs of the funded projects have scientific value, but may be far from the interest of policy makers.

3.3.4 Governance

Although, it is widely accepted that the governance of multilateral partnerships is more demanding than other types of bilateral partnerships, almost all interviewees agree that the Water JPI Governance is well structured and overall functions successfully in terms of administrative and relational efficiency.

The increased number of participating countries in the Water JPI activities (14 in 2012 and 23 in 2020) has been very positive. The flexibility in the governance system has allowed several adjustments aimed at improving productivity and adapting to wider changes in the Water JPI environment. The main changes concerned the creation or dissolution of TFs and working groups. One interviewee described the effectiveness of Water JPI’s governance:

> *“Water JPI has a very effective governance with very good management structure and clear terms of reference. The establishment of a permanent secretariat and temporary task forces for discussing a specific and identified purpose show good administrative efficiency.”*

The Secretariat was very efficient in most of the responsibilities assigned to it and in setting procedures for joint actions, conducting monitoring and evaluation exercises, drafting of Implementation Plans, etc. The main initiatives worked without administrative problems and the optimization of funds was achieved in most cases. The main reservation expressed is related to the fact that only a very small number of JPI members participated actively in the management of the Water JPI. This may have led to reduced undertaking of roles and responsibility, particularly when the involvement of stakeholders was important in order to have a better impact on policy development. Real engagement of JPI members, not only in funding, but also in managing the activities is required. One interviewee commented:

> *“…strong centralisation in management was perhaps an obstacle to motivate the active participation of all partners and the assumption of roles in the organizational structure so as to restrict the entities with decision-making roles.”*

The work produced by the two Advisory Boards (AB), the Scientific and Technological Board (STB) and the Stakeholders Advisory Group (SAG), is considered by all to be very important and supportive of the efforts to promote Joint Programming. The ABs give advice on request to the Water JPI Governing Board and Management Board on specific issues. Their main role is to ensure that the activities are relevant to water research needs, relevant to the needs of water sector stakeholders (enterprises, policymakers, researchers, society) and of high scientific quality. Their positions also feed into SRIAs. Nevertheless, concerns were raised, mainly by those who participated in the Boards, about the number of members (usually 10 to 12 advisors in each group), the level of active participation and the synthesis of the SAG.

The Water JPI has been developing interconnections with other initiatives and entities involved in the AB. The collaboration with other JPIs and ERA-NETs was implemented mainly via the Joint Calls and joint actions in common priorities but could be improved in terms of aligning practices. Moreover, the inclusion of other collaborating bodies is considered important, especially in terms of those that are very close to the implementation of the research results.

The intergovernmental nature of JPIs creates significant strengths as well as weaknesses. Some consider that the need for many decisions to be taken by the Governing Board, which meets every six months, is a constraining factor that leads to delays both in the implementation of important actions and more generally in achieving the vision of the Water JPI.

3.3.5 Relationship with the EC

The interaction between the representatives of the Water JPI and the EC has been very good. Almost all interviewees were particularly positive about working with EC officials and considered EC support necessary for the success of the JPIs. The Water JPI supports the development of EU policies on water and plays an important role in creating synergies with relevant networks and pooling funds for research and innovation. It also helps the EU to bring countries beyond EU to engage in water-related research.

Nevertheless, some argue that EU support was not to the extent expected and should have been stronger both in terms of funding and guidance and other aspects of JPIs' development. One interviewee commented the following:

> *"The role of the EC could have been more effective in facilitating the establishment of better dialogue between entities within EU to reduce the disparity of the internal procedures for collaboration".*

There are also reports of a change in the EC's approach, especially following a change in its leadership, which raise doubt on how the EC "sees" JPIs and their role over time. The following comment was given by one of the interviewees:

> *"How the EC viewed JPIs was somewhat unclear to me. It appeared, initially, that the EC was happy to transfer responsibility for all*

international water research to Water JPI… They proposed (2014) the development of a Framework Partnership Agreement that would run to 2020… to establish a stable and structured partnership between the EC and the Water JPI who would commit to establish, maintain, and implement the strategic research roadmap on water out to 2020. This never happened and I'm not sure why it did not…".

3.3.6 Influence on Policy Making

One parameter that is always considered in any evaluation of a policy, programme or initiative is the impact on the factors that influence policy making. This assessment is an extremely difficult exercise, not only for the evaluation panel, but also for those involved in the day-to-day running of the initiative. Some interviewees expressed the view that it is still too early to assess the impact on policy making, as the first relevant efforts started in 2019 with the implementation of the first two Knowledge Hubs and the first Water JPI TAP action. Of course, the completion of the relevant actions was significantly affected by the current pandemic.

Many of the interviewees expressed the view that the Water JPI has made significant progress in producing results and translating them into policy advice and recommendations. The Water JPI offered to stakeholders a wide range of solutions in several policy domains (new contaminants, water scarcity, water ecosystem services, etc). Position papers and policy briefs were produced particularly by the Knowledge Hubs and TAP action, to communicate results more easily to the users and citizens about water challenges treated by the Water JPI. One interviewee said the following:

"The policy briefs and briefing documents that have been produced by the two activities in particular i.e., the Knowledge Hub and the AQUATAP-ES networks were excellent outputs."

Nevertheless, weaknesses are identified in JPI's capacity to influence policymaking at national level. The influence on policy making is important but lacking evidence of efficiency or success. Many attribute the problem to the lack of a comprehensive strategy for communicating recommendations in the right way to the right people. The need for improvement of impact demonstration was raised by one interviewee:

"This an area that needs greater improvement in particular demonstrating impact from research outputs, knowledge transfer and influencing policy makers."

The interface with respect to the EC was considered quite productive at several levels. The Water JPI has supported EU water policies and has been successful in maintaining a close interaction with the EC. The use, by the EC, of the Water JPI SRIA, as the background document for the foresight study to identify topics for the H2020 Societal Challenge 5 Work Programme is mentioned as an example. Policy briefs prepared in the context of the Knowledge Hubs are explicitly produced to develop

recommendations for the implementation of relevant EU policies. In addition, the Water JPI also supported other thematic policies, such as the European Strategy on Bioeconomy and the European Common Agricultural Policy.

> *"The contribution of Water JPI to relevant EU policies is very strong. For instance, Water JPI activities support the implementation of EU water policy, such as the Water Framework Directive (WFD) the Urban Wastewater Directive, the Bathing Water Directive, the Nitrates Directive, the Drinking Water Directive and the Floods Directive."*

Several practical measures to improve the situation were proposed:

- policy makers need to be more involved and proactively engaged on the Advisory Boards,
- the Water JPI needs to communicate throughout the research cycles from the beginning, middle and to the end with key EU policy makers in key positions with relevant DGs, such as DG R&I and DG ENV,
- stakeholders should be involved from the beginning to influence outputs towards the direction of their needs,
- it should be mandatory for projects to provide outputs, such as policy briefs, to translate the research outcomes into actionable policy recommendations,
- stronger attention needs to be given to selecting the target audience for the Water JPI communications and outreach
- interaction with regional networks of water managers, water utilities or irrigation associations is important, and
- demonstration sites and living labs can be a good way to disseminate the projects results
- communication experts should be involved in promoting Water JPI impact.

3.3.7 Success Factors

Based on the responses of the interviewees the most important achievements of the Water JPI can be summarised as follows:

Community of researchers	*"…the creation of an EU research community together with other EU countries to address water issues."* *"Creation of a community of practice/community of researchers around water."*
Alignment	*"A very good start for alignment of the European water research."*
Fragmentation	*"The reduction of the fragmentation of the research on water in Europe and beyond… mobilising funding and in-kind contribution to research for solving the water challenges along a common row."* *"The greatest impact is bringing together national funders and researchers together over the 10-year timeframe."*
SRIA	*"Developing and regularly updating a Strategic Research and Innovation Agenda that presents and prioritises R&I needs (present and future)". "Alignment of EU MS research programmes and shaping the way in which research is funded".*
Critical Mass	*"The extension of the Water JPI membership to build a greater critical mass."*
EU Policy	*"Positive influence on the perception of DG ENV and DG R&I views of water programmes."*
Internationalisation	*"The effort to develop and consolidate international cooperation in water R&I"* *"From South Africa and the Water Research Commission, the Water JPI has been our success story for internationalisation of R&D projects which we are planning to copy for Africa calls."*

Knowledge Generation	*"In addition, there has been a positive impact of research programs in knowledge generation…".*
Future	*"Major contribution to the establishment of Water4All".*
Common Investment	*"The launch of six Joint Calls for Proposals (2013-2020) with about €83.1 million from the MS for only €14.3 million of EC contribution…".*
Knowledge Hubs and TAP actions	*"…knowledge hubs to facilitate further joint learning between researchers from the EU and the other WJPI partner countries."*

Success Factors

- The commitment of some key partners for progressing towards alignment and impacts.
- The establishment of an efficient Water JPI Governance.
- The initiation and the strengthening of an important dialogue between and within the national institutions to create synergies and common consensus.
- The creation of a variety of "implementation tools" to allow most funders (including from countries beyond EU) to join in different activities.

3.3.8 Bottlenecks

The main obstacles in fulfilling the Water JPI objectives according to the interviewees are:

Countries' Commitment: Lack of strong commitment from some countries in terms of funding, long term investment, implementation of key actions, national consultation, coordination and restructuring of national systems, etc. Obvious need for stronger high level political support.

Level of Representation: Participation in Governing Board meetings, of representatives (organisations or persons) who do not have the authority to commit their country in decision-making, often leads to limited engagement real and delays in implementation.

National Barriers: Differences and limitations in national rules often resulted in inability to participate in joint activities, the application of innovative tools and alignment of new funding practices, such as the creation of a common pot in Calls, the transnational budget transfer, etc. In addition, the high heterogeneity of national RDI systems has sometimes posed insurmountable obstacles to achieving maximum alignment.

Human and Financial Resources: The limited availability of national human and financial resources had a negative impact on the development of additional actions and the

participation of some funding agencies in Joint Calls, in taking responsibility for coordinating or even participating in some actions, sharing the workload of the secretariat, etc. In several cases there is limited participation of non-EU countries due to cost and time constraints to travel to Europe. As a result, the benefits to the research and innovation community in some countries have been diminished, while the capacity of the Water JPI to achieve its core objectives is put into question /generally questioned.

Dependence on EU funding: As a result of the limited availability of national resources, it has become necessary to rely on and secure EU funding. In practice, this becomes one of the most important preconditions for the smooth running of the Water JPI and part of the complexity of managing a JPI.

Administrative Overload: The need to secure the flow of funding through the EU, leads to the continuous involvement of the Secretariat and the most active partners in the preparation both of new proposals and implementation of ongoing EU contracts, including preparation of deliverables/progress reports. This process is highly bureaucratic and limits opportunities for engaging in new, more innovative, and productive activities.

Strategy Focus: On the one hand, the SRIA is thematically very broad with an emphasis on research and scientific impact. On the other hand, there is a lack of focus on concrete and tangible results, on innovation development and on industry and stakeholders' involvement.

3.3.9 Future

In the context of the Strategic Plan of Horizon Europe and the rationalisation of the partnerships landscape, a new European co-funded partnership named Water4All has been established, aiming at enabling water security for all in the long term. Water4All will focus on boosting systemic transformations and changes across the entire RDI pipeline and fostering the matchmaking between problem owners and solution providers by investing in science – policy – market interface. The creation of the Water4All is supported by both the EC and the Member States through the Horizon Europe Programme. The EC states that the experience and good practices of the Water JPI will be used in the implementation of the Water4All.

The continuation of the Water JPI, until the completion of its existing obligations arising from projects already funded by the EU, is taken for granted. However, the future of the Water JPI is less clear. There are different scenarios which could be explored. Some suggest integrating the Water JPI into the Water4All, while others suggesting parallel coexistence as the best option, each with a clear mandate. One interviewee commented:

> *"Partnerships need rationalisation and there is no space to several institutions and mechanism on its side. Water JPI should be integrated to a new partnership as far as they have a common scope and move this way to the future."*

Nevertheless, everyone agrees that, if the Water JPI remains on stage, it should have a clear role, avoiding duplication or overlapping with other EU/UN initiatives. Some propose that the Water JPI should change its core business and move from launching joint calls for proposals to a more supporting role in the design, implementation and monitoring of European water-related policies that reflect Member States' priorities. In such a case, Water4All would become the implementation arm, while JPI would play a more executive role.

Many believe that the future of water research in Europe for the coming years is linked to the Water4All and the comprehensive range of research issues it addresses. In this context, they suggest that the Water JPI should acquire some form of cooperative relationship with the Water4All. In fact, most of the interviewees expressed doubts as to whether Water JPI could survive without being integrated in Water4All, as EC funding would be transferred to the Water4All. Member States could not or would not want to fund two initiatives in the same field.

One option discussed during the interviews is linked to the Water4All exit strategy. The idea expressed both by the GB Chair and the EC, provides that the two initiatives will be collaborating for the coming years creating synergies when possible (e.g. common Advisory Boards). Following the completion of the Horizon Europe Programme and the end of Water4All, the Water JPI will return to the forefront and undertake joint planning in Europe for water RDI activities.

Water JPI has started to assess a more sustainable financial model for running the coordination and core actions of the JPI, whilst not endangering its membership and inclusiveness approach. Almost everyone agreed that the continuation of the Water JPI in the future, no matter what shape or form it takes, is mainly in the hands of the Member States and it requires strong commitment. None of the interviewees envisaged a scenario for splitting funding into the two initiatives, which would mean that neither would receive sufficient funding to fulfil its mission.

4.The 5+1 Dimensions

The Chapter is a synthesis of comments, conclusions, and recommendations of the Evaluation Panel in relation to the five Dimensions (see section 2.2.2). In addition, to comply with its mandate, the Panel added an additional Dimension (+1) which concerns the Future Perspective for the Water JPI, in view of the Horizon Europe Programme, and in particular the development of the European Partnership Water4All.

Key Issues (KIs) for each Dimension are defined by the Panel. The definition of KIs, for the current Assessment, follows, to a large extend, the framework of the indicators included in the confidential IC4WATER D6.1 Guidelines document, although in some cases they have been adapted, to be more in line with the Panel's conclusions for the case of the Water JPI. Justification for this adaptation will be given in the relevant section of this Chapter.

Over the years, the Water JPI has intensified its activities, with a good level of integration of partners and distribution of tasks. This is a strength of the Water JPI, which nonetheless adds complexity to the impact assessment task. According to the Guidelines, the following 11 activities are considered for evaluation purposes.

Each Dimension is linked to a number of activities. The Panel thoroughly examined all activities where relevant data and information were available. Most of the activities were not unilaterally related to a single Dimension but were linked with several of them. The Table 2 presents the "5+1 Dimensions", the indicators included in the Guidelines, the Key Issues defined by the Evaluation Panel and the Activities under consideration.

A1: Joint Transnational Calls
A2: Development of SRIA
A3: Knowledge Hubs
A4: Mapping exercises
A5: Scientific and thematic conferences, workshops, webinars, etc.
A6: JPI Workshops (vision, good practices, strategy, etc.)
A7: International cooperation missions, roadshows, participation in fora
A8: Interaction with EC
A9: Outreach, dissemination, communication, platforms
A10: Management and Governance structure via bodies: GB, MB, ABs, TFs.
A11. Development of reference documents and management procedures such as Vision, SRIA, Implementation Plan, ToR, Exploitation Policy, Privacy Policy, and Responsible Research and Innovation Policy

Table 2. Dimensions, Indicators, Key Issues and Relevant Activities.

Dimension	Guidelines' Indicators	Panel's Key Issues	Relevant Activities
1. Alignment of national and European and international R&I programmes and resources	1. Adaptation of national priorities towards JPI SRIA 2. Committed SRIAs 3. Shared or coordinated use of R&I infrastructures	KI 1.1 Adaption of National Research Agendas, Priorities, Activities and Funding Towards the Water JPI's SRIA and Actions. KI.1.2 Committed SRIA KI.1.3 Shared or Coordinated Use of R&I Infrastructures	A1, A2, A3, A4
2. International Cooperation	1. Engagement with countries beyond Europe 2. Influence on global agenda	KI.2.1 Extending WJPI Membership to non-EU countries KI.2.2 Building Cooperation with Relevant European and Global Initiatives KI.2.3 Global Coordination / Leadership Role	A1, A2, A3, A4, A5, A7, A8,
3. Enhanced knowledge production /sound knowledge base in JPI area	1. Productivity and quality of R&I community 2. Size, structure and diversity of community 3. Integration with user sectors 4. R&I management policies	KI.3.1 Science-Based Knowledge Productivity KI.3.2 Relevance of Water JPI Funded Projects with EU priorities	A1, A2, A3, A5, A6, A9, A10, A11
4. Governance	1. Administrative efficiency 2. Representative efficiency 3. Relational efficiency	KI.4.1 Design and Implementation of Key Guiding Documents KI.4.2 Governance Structure, Coordination and Decision-Making KI.4.3 Level of Geographical Representativeness, Commitment and Resources KI.4.4 Stakeholder Engagement, Representativeness, Inclusiveness, and Partnerships	A1, A2, A3, A4, A6, A8, A9, A10, A11
5. Contribution to the Area of Societal Challenges	1. Influence on factors contributing to tackling the area of societal challenge 2. Impact on policy relevant to the area of the societal challenges	KI.5.1 Influence on Factors and Policy Making	A1, A2, A3, A8, A9, A10, A11.
6. Future Perspective	--	KI.6.1 Members States' Commitment KI.6.2 EC Financial Support KI.6.3 Sustainability	

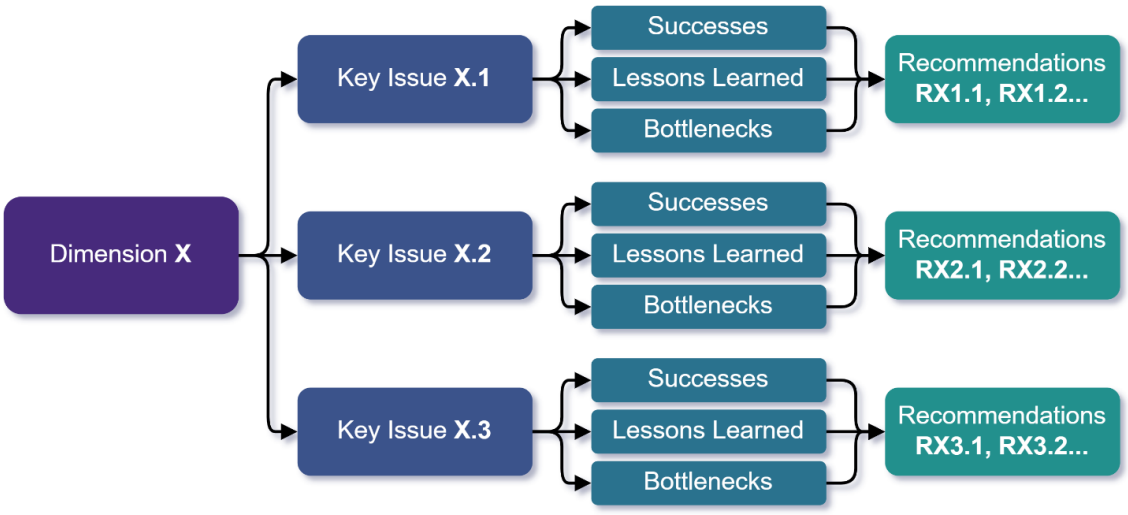

Figure 23. Flow of Dimensions - Key Issues - Conclusions - Recommendations.

In the following sections, a brief description of the "5+1 Dimensions" is given on the basis of the detailed data and information included in Chapters 2-4, while for each Key Issue the successes, the bottlenecks, the lessons learned, and the recommendations of the Panel are presented in detail (Figure 23).

4.1 Dimension 1 – Alignment

Alignment is the strategic approach undertaken by Member States to modify their national research programmes, priorities or activities as a consequence of the adoption of joint research priorities in the context of Joint Programming, with a view to improve the efficiency of investment in research at the level of Member States and the European Research Area (ERA)[2]. The mission statement of Water JPI says the following about alignment:

> *"Better results and optimisation of public funds are obtained through the alignment of water research agendas and programmes at European and international level."*

Adopting the definition of the High-Level Group for Joint Programming (GPC), alignment has been identified as a prerequisite of successful joint programming activities. Based on the GPC's definition and the alignment modalities pointed out by ERA-LEARN 2020, which include actions and approaches that go beyond the establishment of Joint Calls for transnational RDI projects, the Water JPI has formulated in its Vision 2020 two objectives related to alignment: *harmonising national water R&I agendas* (SRIA) *and activities* (Joint Calls, mobility schemes and infrastructure actions) in participating countries.

[2] *A common definition of alignment based on the GPC's definition.*

To achieve these objectives, Water JPI aimed to mobilise existing R&I programmes, to harmonise their research agendas and infrastructures, to define common research needs and to develop synergistic joint activities in order to (i) increase their efficiency and (ii) avoid duplication. This approach would permit the JPI to address grand challenges with unprecedented effectiveness.

Under its second Implementation Plan 2017-2019, *"Progressing Alignment"* is mentioned as one of the eight horizontal activities[3] of Water JPI. Alignment is considered as a cross-cutting issue essential for the success of other activities and can be implemented via actions, aiming to foster greater coordination and complementarities among national research priorities, programmes and activities around jointly identified strategic priorities. The Plan adopts the ERA-LEARN typology along the research cycle to define possible alignment activities.

Examples of Possible Alignment Activities

National / regional programmes: common vision; joint calls; SRIA

National / regional / EC programmes: discussion with the EC on the SC 5 Horizon 2020 Work Programme

Funding: synchronisation of national calls – TAP instrument

Procedures: good practices workshops on implementation, evaluation, reporting, post evaluation, on impact assessment, on joining JPI

Training: Joint European Innovation Partnership on Water/JPI webinars

Mobility and Infrastructures: development of the interactive platform to facilitate access to mobility schemes and research infrastructures)

Three Alignment Workshops were organised in the period 2014-2017. The first workshop (Brussels, 2014), aimed at identifying priority activities for alignment, based on experience in national and international programmes. The second workshop (Paris, 2015) identified ten key recommendations for short, medium and long-term actions. These recommendations included among others the communication and dissemination of SRIA at EU and national level to different audiences, the improvement of contacts with water economic sector (e.g. Water Europe, and SME's), and support to the countries without a national SRIA to define priorities for water research.

The third Workshop (Stockholm, 2017) provided the occasion for a discussion on activities that can be used by member countries to modify their national research programmes, priorities or activities to improve the efficiency of investments in research. The workshop focused on planning how to progress alignment using the Thematic Annual Programming instrument and exploring how Mirror Groups can help to progress alignment nationally. In addition, a Task Force on Alignment was established, made up

[3] *Horizontal activities (e.g. update of the SRIA, mapping of RDI funding, engaging stakeholders, international cooperation, outreach and dissemination, etc.) are not specific to a particular theme of the SRIA.*

of volunteering delegates, to prepare a Roadmap on alignment activities. Task Forces on Alignment and Horizon Europe were then merged at the end of 2021.

4.1.1 Adaptation of National Research Agendas, Priorities, Activities and Funding Towards the Water JPI SRIA and Actions (KI1.1)

The remit of JPIs relates to tackling major, common, European societal challenges in a coordinated way, through aligning national research programmes in an effective manner, making better use of Europe's limited public R&I funding and extending links to various international initiatives. The Vision and SRIA can be considered as key strategic documents of any JPI. The Water JPI SRIA is a reference document that is steering/orientating the EU strategy on water. For Water JPI to deliver its objective to harmonise national water R&I agendas and activities, its SRIA needs to reflect national priorities and is supposed to have influence at the national level on priorities, activities and funding.

The process followed by member countries to develop research programmes and define their policy agenda varies widely. This is reflected in the diversity of responses to the survey circulated among the GB Members on the influence of Water JPI on national research programmes and policy agendas. Eight out of sixteen GB members thought that Water JPI SRIA has influenced the focus of national research programmes or policy agendas from a moderate to a very large extent, whereas the influence was more positive on research programmes (43%) than the policy agenda (36%).

Successes

There is an agreement of all Member Countries on the two Water JPI Vision documents outlining the objectives to be achieved by 2020 and by 2030. This represents a significant buy-in to the philosophy of the Water JPI and acceptance that European funding agencies and researchers can achieve more and make better use of public funds through research cooperation and R&I programming coordination.

The Vision preparation triggered an extensive process of collection and analysis of information, as well as stakeholder consultations, in order to select, refine and prioritise R&I needs and develop and update the JPI SRIA. These documents enabled the Water JPI to engage and communicate its vision with national stakeholders. The Vision 2020 has also supported attracting new partners and observers, which has helped to further strengthen the JPI. The expansion of the Water JPI partnership (see section 3.4), representing collectively 88% of European public R&I investment in water resources, demonstrates buy-in from Member States to the philosophy of the Water JPI resulting in increased critical mass, alignment and coordination of efforts.

One of the key instruments to implement the Water JPI SRIA is the launch of Joint Calls for Proposals, in order to stimulate and facilitate multi-national, collaborative R&I projects and increase synergies on crosscutting issues. The launch of seven Joint Calls, up to date, (see section 3.5.1) with the financial support of the majority of funders is an

example of alignment in action, fostering collaboration on institutional funding to work on synergies among researchers.

The mobilization of national funds was fostered, with a large number of countries from Europe and abroad participating in Calls. Half of the participating countries can be considered as strongly engaged since they were involved in four or more calls, which demonstrates that the national priorities are aligned with the Water JPI SRIA. In some countries, the Water JPI SRIA has led to the launch of specific national research programme on water. It is also used as a reference document to define national strategy and priorities.

Bottlenecks

National barriers hampering the participation and financing of joint activities account largely for the JPI's inadequate performance in this area was one, if not the main, inadequacy of the initiative. For instance, establishing a common pot was not deemed possible and partners had difficulties to fund other activities beyond joint calls due to national or organisation level restrictions.

It is hard to accurately assess the level of alignment and adaptation of the national policy agendas towards Water JPI SRIA because some member states lack a defined, comprehensive strategy for water, and instead have divided water-related agendas under several strategies. In some countries, the research agendas are formulated following national public consultation, and therefore, the influence of SRIA cannot be measured. Often, the funding agencies are not involved in drafting policy agendas and can only issue recommendations. Policy agendas are usually shaped by the local challenges and priorities, so it would be too ambitious to expect SRIA to have a strong influence.

The absence of Ministries dedicated to water or specific national strategic water-related agenda, complicates the adoption of the SRIA priorities at national level, as well as the commitment of resources for joint actions and calls. The countries' contributions were also uneven, in terms of commitment of human and financial resources to joint actions. Furthermore, the low success rate in securing funding, in the Water JPI Joint calls was a potential demotivating factor for certain countries, causing difficulties in advocating participation in Water JPI. A permanent disappointment might result in the withdrawal from Water JPI activities.

Lessons Learnt

The process of developing the SRIA and corresponding Implementation Plans needs to be inclusive to ensure maximum buy-in at the national level before the development of any specific actions. The adoption of a long-term sustainable vision and the SRIA depend on high-level political support. This will facilitate significant in-kind as well as financial commitments from the member countries.

There is a strong impetus to increase Water JPI's visibility by better communicating the initiative's outcomes and impacts to in turn improve national commitment to actions. In-country coordination amongst all relevant national R&I players is key to achieve a common national position on transnational alignment of research strategies, programmes and activities and as such, strengthen awareness and commitment of national actors towards alignment and joint programming. Effective alignment takes time and needs to be supported by adequate financial and institutional means. Adequate financing needs to be earmarked for joint programming and transnational R&I joint actions within national research budgets.

Recommendations

R1.1.1: Member countries are encouraged to progress alignment with the SRIA when planning their national / regional calls, when setting and participating in Mirror Groups and when mobilising other research programmes.

R1.1.2: In countries where there is no national water strategy in place, one option could be to examine the possibility to adopt SRIA as the basis for setting national priorities.

R1.1.3: Water JPI should track/monitor/explore the Member States' adaptation of national research activities towards the SRIA. This will enable Water JPI to define a strategy for maximising the involvement of Member States in joint activities.

R1.1.4: To develop and support interaction among partner countries, the intranet could be improved by including a specific section on alignment. This would then ensure availability of public friendly versions of official documents (e.g. SRIA) in local languages to be distributed and communicated to target audience and the wider public, list of contacts of representatives from different countries to share knowledge and ideas, networking tools/platforms for representatives from different countries, history of participation and commitments of different countries.

R1.1.5: The dissemination of results could be considered as a key factor to improve Water JPI's visibility on a high political level, which in turn could result in improved national commitment.

4.1.2 Committed SRIA (KI1.2)

The Water JPI Members have worked on the development of a SRIA which is the backbone of the initiative, being the reference document for the implementation of joint activities. It establishes R&I priority actions in the water sector to address the challenges as far as freshwater, groundwater and transitional and coastal waters are concerned. Thus, the SRIA is highlighting the range and direction of all Water JPI activities, which are intended to be realised through the Implementation Plan and various EU and national funding mechanisms.

All GB members considered that SRIA 2025 (3.0) reflects the water-related priorities of their country at least to moderate extent, with 59% finding large and 18% very large extent of reflection (see section 4.1.2). Despite the general positive assessment, it is stated that there is a difference in the degree of alignment for both the core themes and the expected research outputs of the SRIA 2.0. The themes related to the competitiveness in the water industry and the water-wise biobased economy are garnering the least support.

Two Knowledge Hubs on "Contaminants of Emerging Concern" (2018) and on "UN Sustainable Development Goals - Water4SDGs" (2019) were established (see section 3.5.2) with the participation of several key stakeholders in order to handle the research questions at hand with an intersectoral and interdisciplinary perspective.

Outputs of the Hubs, include policy briefs, press releases and infographics and engagement in dissemination activities for achieving knowledge transfer goals, thus making an important contribution to the development and alignment of Water JPI SRIA at national levels. The Knowledge Hub - Water4SDGs produced also a position paper on Alignment of Water Related RDI Strategies in light of COVID-19 Challenges to Support the Implementation of UN SDG 6: Clean Water and Sanitation.

Successes

The four SRIA's published to date have resulted from a comprehensive, interactive process, including the consultation, collaboration, and consensus of a very broad base of Water JPI partners and stakeholders. The initiation and the strengthening of an important dialogue between and within the national institutions to create synergies and common consensus on the R&I objectives is for the water sector a considerable success. The process has resulted in better identification of relevant research themes and has strengthened the water research. The dissemination of short, translated versions of the SRIA have contributed to increase the capacity of the member countries to better communicate to the different stakeholders the challenges that the Water JPI has been tackling over the years.

The SRIA has been implemented through the Water JPI Joint Calls, the Knowledge Hub on Contaminants of Emerging Concern, Knowledge Hub on UN SDGs, the launching of two TAP actions and as a basis to make recommendations to EU Funding Programmes including targeted actions like ERA-NETs Cofund and CSAs in Horizon 2020. The survey among GB Members shows that the current SRIA 2025 (3.0) seems well-aligned with national water-related priorities. The two ABs have also been found to be effective high-level mechanisms to capture the inputs of different stakeholders.

Bottlenecks

Two of the SRIA themes seem not to be fully addressed in the Joint Transnational Calls so far. This could be interpreted as the SRIA not being sufficiently focussed and aligned with the priorities of the Member States, but instead too broad, or that insufficient human and financial resources of the Member States have been dedicated to these themes.

Due to limited information on the extent to which funded research projects addressed the given call topics of Water JPI's joint calls aligned with the SRIA themes and since impact assessment of the funded projects has not yet been conducted for most calls, it is unclear if and how the funded projects have contributed to the Water JPI SRIA themes. From the available sources, it is also unclear if the outputs of the Knowledge Hubs, has been taken into account in the update of the latest SRIA.

Lessons Learnt

Strategic and policy cooperation at transnational level can be operationalised via the formulation of a Common Vision for future European research. This can be based on joint mapping and foresight exercises to identify already existing and planned national and European research initiatives, in order to pinpoint possible research gaps that need to be addressed with the aim to effectively tackle societal challenges.

Following a collaborative and interactive approach to design the SRIA helps strengthen ownership, trust-building and networking between member-countries. It facilitates the subsequent development of transnational R&I joint actions and allows to benefit from insights from external/independent scientists and stakeholders too. Hence, the process in itself facilitates alignment.

Furthermore, there is a need of focussed SRIA, as highlighted in some of the interviews in order to attract a higher number of partner countries in the joint activities.

Recommendations

R1.2.1: The Water JPI should explore the possibilities to monitor the SRIA (sub) themes taken up in the implementation plan, joint activities and their outcomes (e.g., project results, knowledge hubs) and how these can be disseminated to the different stakeholders on national, European and international level.

R1.2.2: Attention to neglected topics in the implementation plan of joint activities can help to initiate a discussion on the relevance of these topics in future activities but also in the updating of the future SRIA.

4.1.3 Shared or Coordinated Use of R&I Infrastructures (KI1.3)

Since water resources and environmental processes are affected by global, regional and local drivers and experience a variety of challenges, national and/or European Research Infrastructures (RI) play an important role in addressing the complexity of necessary knowledge exchange, transfer, innovation and multi-disciplinary approaches. Improving alignment requires multiple factors:

> *"Alignment can be achieved via capacity and community building amongst researchers, and by providing them with the necessary infrastructural and technical resources to conduct transnational*

research. This requires sharing research knowledge, data and infrastructure across borders through specific joint actions including (i) network of researchers on a specific research issue (thematic and/or methodological), (ii) sharing/joint use of research infrastructure, and (iii) transnational technical 'virtual' infrastructure (data sharing/open access platforms)."[4]

According to the SRIA 2025, the RI landscape is rather fragmented. Most Member Countries operate existing RI which are not yet linked to other countries' RI, due to a lack of relevant national and European roadmaps. Therefore, Water JPI is aiming at reducing this fragmentation by facilitating connections among existing and upcoming facilities.

A comprehensive EU water R&I mapping report was developed (2014) including the creation of a Projects' Database. The Database aimed to (i) better understand the European water-related R&I activities and take stock of national and regional research strategies, policies, and programmes, and (ii) provide an inventory of existing research projects, which would enable further linkages among research institutes and increase awareness of past or ongoing research activities. An update of the mapping exercise and the database was foreseen in the Implementation Plan 2017-2019, ensuring interoperability with other initiatives' databases. It is unclear from the available sources whether the mapping exercise and project database have been expanded and if the project database is used by researchers and/or other stakeholders.

A Task Force on Research Infrastructures was established in 2018 and a "Definition Document" has been developed to strengthen the need of such a TF. The TF leader participated in the 3rd Open ENVRI Community Meeting[5] and had the opportunity to gain an insight into the state-of-the-art on the need for water-related RI and established linkages with potentially relevant RIs. The TF on Research Infrastructures is still active and its implementation plan for the year 2022 was approved by the GB in late 2021.

In the period 2018-2019, Water JPI held two workshops on mobility and infrastructures. These workshops provided the occasion for participants to discuss a number of issues related to RI actions and platforms (prototypes), RI schemes promoting linkages and synergies with European and national RI programmes and platforms (i.e. MERIL). Furthermore, they exchanged views on two proposed platforms, considering in particular RI platform operators needs or evolution of transverse activities of the TF on RI.

The Mobility and Research Infrastructure Platform of Water JPI was launched in 2020, with the aim to support the mobility of researchers and experts and create a RI network

[4] *Workshop on the Practical Implementation of Alignment II: Learning from Good Practice — ERA-LEARN*

[5] *Organised by the ENVRIPLUS H2020-project which brings 26 RIs from four environmental domains (Atmospheric domain, Marine domain, Biosphere and Solid Earth domain) to work together, capitalise the progress made in various disciplines and strengthen interoperability amongst RIs. The project holds biannually a 'ENVRI week' to increase integration and cooperation, targeting different groups of stakeholders.*

and synergies within the entire water community. At a European level, the European Strategic Forum on Research Infrastructures (ESFRI) contributes to the development of pan-European RI and boosts Europe's research and innovation potential. The Water JPI has identified the following RIs as being relevant: International Centre for Advanced Studies on River-Sea Systems (Danubius-RI), European Long-Term Ecosystem and Socio-Ecological Research Infrastructure (eLTER), Analysis and Experimentation on Ecosystems (AnaEE), Integrated Carbon Observation System (ICOS) and e-Infrastructure for Biodiversity and Ecosystem Research (LifeWatch ERIC).

Successes

The participation of 108 organisations in the second mapping exercise must be highlighted as a major success and the effort of the participants in providing the most accurate information must be acknowledged.

Bottlenecks

Currently, there is little data/information on shared or coordinated use of water R&I infrastructures or other resources. While there is a platform developed (Mobility and Research Infrastructure Platform) the Water JPI benefits and outcomes have not been leveraged via such platforms. The R&I infrastructure has not been as fully demonstrated and disseminated for use. In the different interviews, remarks were made that good examples of other resources have again emerged from the activities and networks rather than funded research project outputs. Such examples are the Water JPI researchers' network AQUATAP-ES and the Knowledge Hub on Contaminants of Emerging Concern. The connection of the Mobility and Research Infrastructure Platform with the other Water JPI tools (e.g. Open Access - Open Data interface, Water projects database) and the Knowledge Hubs is also unclear.

Lessons Learnt

The mapping of national and regional R&I institutions, their programmes, projects, and funding schemes constitutes a key activity in progressing the concept of alignment. The information held in the project database constitutes a useful resource for the scientific community about ongoing water-related research.

The update and expansion of an open-access, searchable database, containing detailed information on funded research and infrastructures, is expected to encourage networking, collaboration, and resource sharing. Rapid outdating of mapping results implies that regular updating is needed considering the new developments in terms of research and societal challenges. Better access to RI services also requires fostering capacity development in the equipment and services that are provided to research projects and programmes.

Recommendations

R1.3.1: Connect the mobility and Research Platform with the other Water JPI tools and knowledge hubs to present a global and comprehensive view of the relevant data and to maximise the use of the output.

R1.3.2: Develop new mechanisms to (i) increase the number of participating organisations and countries involved in the mapping exercise, and (ii) expand the projects' database.

R1.3.3: Explore further collaboration with ESFRI and especially the requirements to create synergies with the ESFRI RIs already identified.

4.2 Dimension 2 – Internationalisation

According to the GPC, JPIs have been successful in developing a strong internationalisation agenda, using a combination of membership or partnership approaches. International cooperation has become a strategic goal of JPIs and an integral part of the JPIs long-term strategies. Indeed, international cooperation has evolved as an enabler in the fulfilment of the core JPI goals to increase the science base and build critical mass, helping to enhance the global impact of national R&I investments, providing gateways for scientific excellence and global knowledge flows as well as enhanced visibility and political leverage in key global fora.

From the EU's perspective, meeting or responding to the grand Societal Challenges, the SDGs and the Missions, depends on a strategic coordinated approach to international cooperation and the JPIs provide the enabling framework for building international partnerships and attracting investment and the world's best talent. The Water JPI's grand challenge of *"achieving sustainable water systems for a sustainable economy in Europe and abroad"* emphasises the international dimension of its remit and the rationale for its activities. From a forward-looking perspective, global water crises have been identified as a key risk[6] with potentially disruptive effects on the economy and society.

The Guidelines define two indicators in relation to the "Dimension 2 - International Cooperation", namely *"Engagement with countries beyond Europe"* and *"Influence on global agenda"* (Table 2). However, the Evaluation Panel believes that the Water JPI's

[6] *http://reports.weforum.org/global-risks-2015/part-1-global-risks-2015/introduction/*

performance on internationalisation needs to be assessed from the extent to which appropriate action has been taken on the following three fronts:

- ✓ Extending Water JPI membership to non-EU countries
- ✓ Building cooperation with relevant European and global initiatives
- ✓ Playing a Global coordination/leadership role (Water JPI and EU)

4.2.1 Extending Water JPI Membership to non-EU countries (KI2.1)

The extension of membership to non-EU countries constitutes an important goal for the Water JPI which has proven challenging due to a combination of contextual factors which are themselves subject to dynamic change. Progress has been hampered by these factors which vary among the targeted countries, as well as Water JPI own constraints, including limited resources which also affect other dimensions of its work.

This goal is particularly important for the Water JPI's mission, since it provides the means for extending the geographical scope, relevance, and profile of its work, creating important bridges to influential players at international and global level. These serve as building blocks for the Water JPI for playing an enhanced role in coordinating and potentially steering the global agenda on water R&I policy and the relevant UN SDGs. The evidence indicates that international cooperation has been assigned a high level of priority by the Governing Board from the start. The GB members individually took responsibility to approach one of the 7 selected countries (China, USA, India, Brazil, South Africa, Canada, Vietnam).

Successes

To date, the Water JPI's approach to extend membership to non-EU countries was met with steady but rather limited success. The main success stories are South Africa (voting member) and Tunisia (associated partner) which have gradually increased their participation in the Water JPI activities, including the joint calls. A key success factor is that the cooperation is grounded in mutual reciprocity and shared interests both in terms of the R&I topics of common concern and the types of activities to address them. A key building block is a strong bottom-up drive on both sides to make the scientific cooperation work.

Bottlenecks

Potential bottlenecks requiring attention relate in the case of Canada to the fact that successful cooperation has led to Canada being approached by other JPIs. This has introduced constraints in terms of the number of such European initiatives Canada can engage in and the latter is giving more careful consideration of their relevance to the national strategic R&I agenda. In the case of South Africa, a key concern is in ensuring that the cooperation is based on mutual benefit and the deepening of cooperation in the future depends on the extent to which Water JPI activities can reflect the needs of non-EU countries (e.g. the African continent) and can be organised outside Europe.

The cooperation efforts with USA, China and India have been less effective and the main bottlenecks identified here relate to the lack of agreement on intellectual property rights

management (USA), the switch from bilateral relations to the Water JPI's multilateral forum for decision-making (India) and the lack of accessibility and commitment of relevant funding agencies (China).

Lessons Learnt

These bottlenecks indicate the need for a higher level of political intervention needed on the part of the EU and MS to create a more enabling environment for making international cooperation work. In this context, the Water JPI would benefit from a clearer orientation and support from the European Commission services on the appropriate internationalisation approach to be adopted, considering recent policy developments on open strategic autonomy.

Recommendations

R2.1.1: The Water JPI experience to date on international cooperation highlights the need for an enhanced governance facility to set and monitor goals, to keep the internationalisation efforts on track and to take timely remedial action with bottlenecks. An international Task Force was in place up to 2016 and this needs to be revamped with updated ToRs. The Task Force would serve as the operational arm of the GB to ensure that decisions taken on international cooperation are implemented, monitored and reported on.

R2.1.2: The EU needs to provide JPIs and similar partnerships with more systematic guidance and support for tackling higher level issues of a political nature or linked to science diplomacy. The EU needs to work more closely with JPIs in the co-design of effective forward-looking internationalisation strategies in order to ensure a better understanding of the requirements for making the cooperation work.

4.2.2 Building Cooperation with Relevant European and Global Initiatives (K2.2)

To complement its efforts in extending membership to non-EU countries, the Water JPI has focussed its efforts on building closer links and collaborative activities with other European initiatives, including relevant JPIs, Article 185 initiatives, ERA-NETs, and other partnerships. This type of collaboration is important at several levels as identified by the IC4Water project, namely reducing fragmentation and duplication of efforts and resources at European level, mutual learning, and exchange of good practices, building synergies in areas of common interest, and launching complementary actions and joint calls, increased visibility and profile, developing more holistic approaches. In turn, these contribute towards building sufficient critical mass to advance science diplomacy and wield influence in global and international fora.

Thus, a key rationale for this cooperation with European and global initiatives is that it provides a framework for achieving the necessary global scale to tackle global challenges effectively. From a European perspective, this cooperation offers an opportunity to advance European values and interests and to showcase European solutions to global challenges. From a global perspective, this cooperation provides

international scale and a diversity of local conditions which enhances opportunities for experimentation, piloting and learning from good practice globally. This impact assessment focuses on the extent to which the full extent of these benefits and opportunities has been or can be realistically achieved by Water JPI.

Successes

Key successes of Water JPI's cooperation with other European initiatives include the launch of joint transnational calls, for example the Aquatic Pollutants with three JPIs in Water, Oceans and Antimicrobial Resistance, and the development of joint activities, including knowledge transfer platforms (Knowledge Hubs and TAP actions), networking, strategy development (IC4Water to foster international cooperation) and to a lesser extent co-creation of new solutions.

Bottlenecks

Key bottlenecks relate to the lack of an enabling environment for implementing joint international activities and partnerships (lacking political commitment, respect, trust, resources), and the complexity of the European research and innovation landscape and funding instruments since not all initiatives can participate in joint calls. The lack of clearly defined success/impact (SMART) indicators and targets agreed at the launch, remains a challenge for assessing impact. The engagement of the target audience, in particular the EU and policy makers, is not sufficient to meet the scale and complexity of global challenges.

Lessons Learnt

The IC4Water's series of workshops to codesign an international cooperation strategy for Water JPI has provided important insights into common barriers and pitfalls to cooperation between peer European and international initiatives. It has also identified success factors: what worked, why and how these successes can be further enhanced, including the development of joint activities such as knowledge hubs and the need for more focus on co-creation of new solutions.

Recommendations

R2.2.1: In order to achieve the Water JPI's internationalisation goals, the targeted audiences, including the EU and policy makers, need to be more effectively engaged in the co-design and implementation of joint transnational activities between peer initiatives.

R2.2.2: The European Commission with the support of policy makers needs to play a more enabling role in the co-design of appropriate SMART performance indicators and targets for international cooperation and joint transnational activities between European and international peer initiatives.

4.2.3 Global Coordination and Leadership Role (KI2.3)

At the core of the Water JPI's mission is the role and influence it wields in steering the global water R&I agenda. This is highly dependent on several factors, primarily the extent to which the Water JPI is effectively connected to relevant high level global and international frameworks and is in a position to maintain a valued global presence as well as a unified position among its members and partners in these frameworks.

This calls for a strategic coordinated approach on internationalisation which would help to determine which global frameworks are to be targeted and how, set commonly agreed goals and well specified priorities, and facilitate the adoption of a common position, who does what, and the allies and partnerships which need to be developed.

Effective communication of project results to relevant stakeholders and global frameworks is an important building block for global agenda-setting together with sound mechanisms for valorisation by the public and private sectors. In this context, the results generated by the joint call projects, especially innovative high-quality content of direct policy relevance to the global agenda, can serve as a key lever for enhancing Europe's global coordination /leadership role. The need for a strategic approach on internationalisation was recognised with the setting up of a dedicated Task Force, however this ceased to be fully functioning since 2016.

The IC4Water project has developed a set of key recommended actions, starting with the valorisation of results from joint projects, alignment activities and networking instruments. The project aims also to launch an international cooperation strategy by June 2022, incorporating new connecting structures.

Successes

As part of its remit to develop an international cooperation strategy, the IC4Water project has been implementing a range of highly relevant activities, including undertaking a comprehensive mapping of key players and potential partners.

It has organised a series of workshops to explore areas of mutual concern and interest, addressing funders, research performers, and the private sector as well as regional players (Mediterranean and Africa area). The IC4Water project has identified a typology of bottlenecks affecting international cooperation based on insights from all these players, as well as other European and global initiatives. This indicates that common challenges relate to resource constraints, timing, and governance.

Bottlenecks

Water JPI funded projects do generate impacts at international fora, however the scale of these impacts remains limited due to the lack of a targeted approach and having the appropriate connecting mechanisms in place.

Lessons Learnt

The extent to which a strategic approach on internationalisation can be operationalised, in turn depends on the Water JPI's level of preparedness to engage in global

frameworks, and the extent to which the projects funded through the joint calls and results generated, connect to policy makers, and help to advance the global R&I agenda.

Beyond logistical barriers, the IC4Water workshop discussions point to an urgent need to build strength and profile by providing a framework for these European and global players to work together on an ongoing basis, by engaging a wide range of stakeholders and developing a more systematic approach for tackling global agenda issues of common concern. There is also a need to develop effective mechanisms for keeping the strategic dialogue initiated by the IC4Water going. The Knowledge Hubs could provide a partial solution to this need for an enabling framework and stakeholder engagement on specific themes.

Recommendations

R2.3.1: The European Commission needs to play a more proactive role in a systematic way in valorising the results of European initiatives, in particular JPIs, as part of its drive to steer the global agenda on water R&I.

R2.3.2: The European Commission could explore ways of bringing together key research results from different initiatives together, allowing a cross-fertilisation and integration of key findings, including breakthrough solutions, and valorising them by connecting the lead researchers to relevant global fora in a more strategic and coordinated approach.

R2.3.3: The International Task Force could be re-designed and tailored to implement a strategic coordinated approach on internationalisation.

4.3 Dimension 3 – Enhanced Knowledge Production

A major goal of the Water JPI is to produce science-based knowledge leading to the support of European policies comprising the identification of problems, their quantification, and the development of feasible technical and managerial solutions as well as policy coherence towards sustainability transformations.

The Water JPI mobilises existing national and regional R&I programmes and aims to align their research agendas. It defines common research needs and develops joint research projects that aim to increase efficiency by avoiding duplication across Europe and provide positive impacts on environmental water science and policy, and research agendas.

The Guidelines specify that project effectiveness of enhanced knowledge production and impact is assessed by productivity and quality measures, the diversity and functionality of the R&I community, integration with user sectors, and evidence of effective research and innovation policies. The Evaluation Panel decided to examine the knowledge productivity based on the following two Key Issues, which are relevant to the scientific production and its link to the science policy and the EU priorities in particular:

1. Science-Based Knowledge Productivity
2. Relevance of Water JPI Funded Projects with EU Priorities

The Panel considers that issues related to the two indicators of Guidelines *"Integration with user sectors"* and *"R&I management policies"* are covered to a very high degree by Dimension 4- Governance.

4.3.1 Science-Based Knowledge Productivity (KI3.1)

Proposals have been funded across several calls on the themes of Emerging Water Contaminants - anthropogenic pollutants and pathogens, wastewater treatment and reuse and safe use of reused water (environmental, human), water use efficiency and sustainability in agricultural, water resource management focused on SDGs, improving water resources management, risks to human health of emerging pollutants and pathogens (especially AMR), and conservation and restoration of aquatic ecosystems.

Evidence supporting significant impact on EU and partner research agendas and policy is limited (from Water JPI documents; interviews as part of the assessment), partly attributed to the time since project funding, and partially the difficulty of defining mechanisms to provide scientific input to the Science – Policy Interface. Scientific research conducted in the Water JPI matures over years and there is an expected delay in impacting on research agendas and environmental policy. The Water JPI produced Policy Briefs and held discussions with key policy makers to contribute to more informed policies and research agendas in the water sector, although evidence of impact is limited. Only the 2013 Pilot Call has been assessed so far and an evaluation/lessons learnt of one of the two Knowledge Hubs on *"Contaminants of emerging concern"* has already been carried out.

In response to the view on the limited evidence of impact of Water JPI-research projects, the Evaluation Panel has identified a select group of Water JPI-sponsored research activities that are linked with science policy. These activities include:

1. The identification, assessment and evaluation of a new class of emerging substances (Persistent and Mobile Organic Chemicals – PMOCs) was investigated by searching REACH chemical data bases of registered chemicals since 2006 in cooperation with ECHA. PMOCs are now being considered as a separate classification of chemicals (such as Persistent, bioaccumulative and toxic substances, PBTs) to be included in regulating industrial chemicals.

   On the PMOCs, the PBT Expert Group (ECHA) is actively discussing the development of the criteria for new CLP hazard classes for persistent, mobile, and toxic substance / very persistent and very mobile substances (PMT/vPvM). The research has established criteria for registered chemicals to be characterised as PMOCs and the researchers have developed innovative, state-of-the-art analytical methodology to study occurrence and behaviour.

2. Research produced and published by Water JPI funded projects on the occurrence, characterization, behaviour, and risk of anti-microbial resistant organisms (AMR) in wastewater effluents and receiving surface waters and GWs using new methodologies (genomics) and technology in microbiology has been developed with much notice. DG ENV has taken a strong interest in this area highlighted by the Water JPI. In addition, the Water JPI developed a Joint Call for Proposals in 2020 focusing on this topic.

   Following the publication of AMR research from the 2013 Pilot Call, the EC's JRC published a state-of-the-art article on the contribution of water chemicals to AMR (JRC, 2018). Subsequently, two antibiotics (amoxicillin and ciprofloxacin) were added to the WFD's surface water Watch List (WL). The inclusion of the antibiotics is consistent with the European One Health Action Plan against Antimicrobial Resistance (AMR), which supports the use of the WL to 'improve knowledge of the occurrence and spread of antimicrobials in the environment'.

   The JRC Report on AMR states "*Antibiotics have been frequently detected in different aquatic environments within urban water cycles (in waste, surface and drinking water). Even though the detected levels of such antibiotics are low (in the range of ng/L to µg/L), they could promote antimicrobial resistance through gene transfer between bacteria.*" The Water JPI is arguably an EU leader in the research needed to address these health and policy needs.

3. Wastewater treatment and reuse is a strategic area of interest to the EC/EU for the promotion of wastewater reuse to sustain water resources in EU river basins (2019 EU Regulation), and to protect water resources from overexploitation and scarcity under climate change scenarios. The largest risk to the acceptance and uptake of wastewater reuse for agricultural irrigation (and aquifer recharge)

depends on societal acceptance that reuse is safe from a human and environmental health perspective.

Numerous Water JPI projects provide sound science on the occurrence, removal, behaviour, and treatment technologies applied to emerging substances and pathogens to support the efficient and safe use of treated wastewater. The EU Regulation (2020) aims to promote the safe use of treated wastewater for specific purposes establishing minimum quality requirements of safe use. The last years have seen the funding of eight projects directly dealing with wastewater reuse, and over ten projects with waste treatment technology aiming to achieve safe effluents.

4. Water resources management and water governance is the key to attaining progress on the UN SDG 6 as well as achieving sustainable water resources at EU river basins for all uses. The Water JPI has funded more than 25 projects to improve river basin management and efficient use of water resources, many of which will provide knowledge and methodologies to achieving SDG-6 sub-objectives even if not formally mentioned as a project focus.

Successes

The above presented cases demonstrate clear impact on science policy. The project coordinators and scientists were the primary drivers of pushing the scientific impact into the policy/research agenda sphere. One of the most important achievements of the Water JPI, highlighted by many, is the creation of a research community of EU partner scientists to address common water research agendas.

A major success was the research conducted in manageable-size projects (numbers of partners, funding, duration) found to be very desirable to project investigators compared to large EC projects that are difficult to administer. To date, the completed projects have been productive in numbers and quality of scientific publications, educating PhD and postdoctoral students, and strengthening gender balance among research teams.

Bottlenecks

One of the bottlenecks is the limited assessment of Calls for Proposals and their outputs. The impact of research projects as part of Calls is not yet known because of a lack of impact analysis criteria/tools, and project final reports. Many projects do not also provide published papers or input to the communication of project results to policy makers, even though this aspect is mandatory in all projects funded. Although policy briefs were prepared by the Water JPI on evolving project results, there is little evidence that most of the projects have yet influenced environmental or public policy (exceptions above noted).

National funding rules sometimes hindered the Water JPI's activities. Differences in national funding rules had a negative effect on the Water JPI leading to complex administration. The existence of country-specific rules also prevented the establishment of a common pot of funding for joint activities and also prevented active funders from

joining in certain activities (e.g., TAPs), also limiting the participation of their national scientific and technological communities.

Lessons Learnt

The Water JPI, focused through the SRIA, has been able to create a community of research scientists across the EU and partner countries to tackle common water issues and problems. The combined funding of partner countries to address an agreed environmental issue with country funds has been a positive feature of the Water JPI.

Scientific papers are the technical documents supporting the legal framework of studies. Published scientific papers in peer-reviewed journals are arguably the biggest output of the funded projects, but the extent to which findings are effectively translated into policy impact remains unclear.

Recommendations

R3.1.1: It should be an obligation of researchers funded by Water JPI joint calls to include peer-reviewed papers in the final report of the projects. These papers should be the basis of the projects ex-post evaluation.

R3.1.2: The scientific papers should be the basis for material which is then used in science-policy communication. The establishment of an effective mechanism to promote and monitor valorisation of projects results is crucial to achieving this goal.

4.3.2 Relevance of Water JPI Funded Projects with EU priorities (KI3.2)

The current evaluation of the 'enhanced knowledge' generated in Water JPI research makes first an assessment of the activity sector of funded research projects in policy priority areas of the EU and society in the water sector. A list of the EU priority issues, strategies, regulations and directives addressed by Water JPI funded projects include: WFD, its implementation, responses to 'Fitness report', agriculture links to water quality; WFD and GWD and their quantity and quality goals, UN SDG 6 goal, Pharmaceuticals Strategy, Wastewater reuse for irrigation and aquifer recharge, climate change and its impacts in the water sector, the EU PFASs Strategy, Plastics Strategy, Antibiotic resistance in waters, Drought, Floods and Extreme events Strategy, water resources management and sustainability.

Table 3 presents the main priority areas addressed and the aggregated number of Water JPI funded projects addressing these key EU water priorities as their major focus. Many projects addressed more than one priority area and SDGs could be part of the Water Resource Management projects but are not mentioned as a specific focus. The Water JPI has funded only few if any projects in some key strategic areas of priority to the EU (PFASs; plastics, climate change, hydromorphology, eutrophication, etc.). The

classification of EU surface waters as 'good' is primarily limited by eutrophication of surface waters, and hydromorphological modifications (Fitness Report, 2020).

Water JPI projects and calls do not address this key output of the first 20 years of the WFD, and, in general, do not address these EU priority areas in the water sector. The topics selected for Joint Calls were developed through an extensive dialogue with stakeholders, most of whom were the participating MS. The appropriate Units of DG ENV responsible for developing and implementing actions on EU water priorities are generally not aware of the Water JPI.

DG RTD frequently made good use of the content in the SRIA's to construct their Calls for Proposals under Horizon 2020 which shows that Water JPI's SRIA development process was useful for the EC. However, the scopes of Calls for Proposals, thus informed by MS stakeholders, appear overly broad, and perhaps did not identify key EU priority areas for attention, as indicated above.

EU Strategic Areas	No of WJPI projects
WRM + Sustainability	29
Agriculture	21
WW - Treatment Technologies	20
AMR	18
Emerging Chemicals	18
Emerging Chemicals	12
WW - Reuse	8
Pharmaceuticals	5
Water Scarcity - Droughts	4
Floods - Extreme Events	4
WFD Eutrophication Hydromorphology	3
WFD GW - Quality and Quantity	2
WFD SW	1
PMOCs	1
PFOS/PFOA	0
Climate Change	0
Plastics	0
SDGs/SDG-6 Water	0

Table 3. Number of Water JPI projects focusing on EU Priorities in the Water Sector.

Bottlenecks

Many experts interviewed in the preparation of this evaluation assert that the scope of the individual research Calls was too broad, perhaps as a result of consulting primarily MS stakeholders, and not EU policy makers (e.g., DG ENV).

A disconnection between objectives and available resources was evident. The five research questions addressed over the 2011-2020 period are very ambitious, so having five research questions to answer with relatively limited resources has prevented the Water JPI from addressing all of them to an adequate extent.

Final reports of project results are seldom submitted after the completion of a project.

Lessons learnt

Over time, SRIA became too broad-based and lacked focus, covering all aspects related to water and water management,

despite limited resources to address all these issues.

As a result, the Calls for Proposals are also too broad and not sufficiently focused towards EU priority areas to provide a coherent thrust in research policies and agendas in the water sector. Exceptions include the funding of AMR research, Water Resources Management, and Wastewater Reuse.

Recommendations

R3.2.1: To positively influence policy makers and those who set research agendas, the Water JPI must decide on an appropriate mechanism to guide the Science – Policy interaction. This is most challenging and strong consideration should be given on how to increase efficiently and effectively impact the Science – Policy interface, especially with the Water JPI inside Water4All.

R3.2.2: The Water JPI should seek the involvement of more stakeholders in the priority setting process and in particular the EC Directorates-General in addition to DG RTD.

4.4 Dimension 4 – Governance

Following the analysis of the Water JPI framework and objectives in previous Chapters, the current Chapter delves into the governance structure in order to determine to what extent the governance facilitated the achievement, or lack thereof, of the pre-determined objectives. The analysis also examines to what extent the governance of the Water JPI generated commitment from participating entities, and how effectively different stakeholders were engaged with and included.

The Guidelines define three indicators in relation to Governance and ten relevant activities (Table 2). The indicators refer to three parameters of efficiency, the administrative, the representative and the relational efficiency. The Evaluation Panel, considering all available data and procedures, identified the following four Key Issues for this Dimension:

1. Design and Implementation of Key Guiding Documents
2. Governance Structure, Coordination and Decision-Making
3. Level of Geographical Representativeness, Commitment and Resources
4. Stakeholder Engagement, Representativeness, Inclusiveness, and Partnerships

4.4.1 Design and Implementation of Key Guiding Documents (KI4.1)

The 10-year Water JPI Vision, which served as the basis for SRIAs (revised every five years), and Implementation Plans (updated every three years) guided the Water JPI's joint actions such as Calls, Knowledge Hubs and the alignment of national research programmes.

Stemming from the Vision 2020 document, the Water JPI defined a SRIA, a document that *"lays out specific actions in the short, medium and long term, tackling a specific challenge"*. Building on an intermediate SRIA (SRIA 0.5) in 2013, SRIA 1.0 was

published in 2014, as the result of a collaborative, participatory and forward-looking process identifying and prioritising R&I directions. It defines needs and related objectives as well as corresponding timeframes for each of the five research questions identified in Vision 2020 (see section 3.1 and 3.2). The Water JPI's SRIA 2.0 was published in 2016 and the SRIA 3.0 in 2020, the latter informed by the new Vision 2030. Several consultative workshops and online Public Consultations encouraged the participatory approach in the preparation of the SRIA and the Vision documents.

Following the publication of the SRIA 1.0, the three-year Implementation Plan 2014-2016 aimed to maximise societal impact by outlining activities owned and performed by the Water JPI. Other activities were proposed to be owned or performed by the EC, complementing the delivery of the SRIA. Water JPI activities notably include calls for proposals and progressing in programme alignment, SRIA development and outreach. The Implementation Plan 2017-2019 is much more sophisticated, with a wide range of horizontal and vertical activities (see section 3.2). The Water JPI Calls for Proposals (see section 3.5.1) for funding were framed to varying extents within priority research themes established in the Vision and further defined within the SRIAs, as well as the SRIAs of partners in the calls (e.g. FACCE-JPI, JPI Oceans, etc.).

Successes

The Water JPI has had an effective, efficient and inclusive process for the guiding framework and activities. Key documents (Vision, SRIA and implementation plan) were all published on time and within the agreed timeframe. The frequency of revision of the Vision and SRIA documents is generally considered to be successful. The Water JPI was also successful in taking a forward-looking, consultative and participatory approach, as exemplified for instance by the workshops organised to updated SRIAs and Implementation Plans.

Implementation activities such as Joint Calls and Knowledge Hubs were also judged as being effective according to those involved in the JPI. The protocols established for Joint Calls for Proposals, review of submitted proposals and administration of funded projects is deemed appropriate and proportional with a 'light' administrative burden to the research investigators.

Bottlenecks

One of the bottlenecks for Water JPI has been a lack of assessment and monitoring of objectives and activities. The establishment of a vision, SRIAs and implementation plan is often highlighted as an achievement in and of itself by those involved in the JPI as well as in publications (see section 3.5). However, there is a lack of a global impact assessment of the Water JPI's work, and an absence of monitoring of the objectives set out in Vision 2020 or in the SRIAs, which, according to the Terms of Reference (ToR), is the responsibility of the MB.

Another bottleneck is that the Key Achievements Report does not track progress towards the objectives set out in Vision 2020. As suggested by its title, it focuses only on ten

achievements of the Water JPI, lacking a critical view and omitting a gap analysis that could have served as a basis for suggestions to move forward on the achievement of objectives set out in Vision 2020. There is no clear method for tracking, assessment and adjustment of objectives. Most of the goals set out in Vision 2020 were not measurable, or it was not specified how they would be measured. Half of the objectives include quantitative targets, which, in theory, would allow tracking progress towards their attainment.

Furthermore, there is a lack of clarity regarding the assessment periods for these objectives: the Vision 2020 uses the evasive term “periodically”. The guiding documents do not explain how the achievement of objectives will be monitored, assessed, and serve as inputs for decision-making on potential adjustments to be made.

Lessons learnt

Having a clear and coherent framework in terms of vision and objectives does not guarantee the proper monitoring and evaluation of those objectives and activities carried out to achieve them. While it is important to have ambitious objectives, they should remain achievable considering human and financial capacity constraints and be measurable to enable monitoring and potential adjustments to ensure that objectives are met.

Recommendations

R4.1.1: Formalise and institutionalise impact assessments to ensure accountability for them being carried out, for instance by including them in the ToR.

R4.1.2: Set aside resources for the Secretariat to carry out the assessment of progress towards the achievement of objectives set out in Vision 2020.

R4.1.3: Ensure that objectives are measurable and achievable within the given timeframe, considering human and financial capacity constraints.

R4.1.4: Consider following a results-based rather than research-driven approach to improve the SRIA and Implementation Plan process and ensure a better response to real-word needs in terms of water research.

4.4.2 Governance Structure, Coordination and Decision-Making (KI4.2)

The governance structure supporting the Vision 2020, SRIAs and Implementation Plans is defined by the ToR. The structure (Figure 3) consists of five main bodies: the GB, MB, ABs represented by the Scientific and Technological Board (STB) and the Stakeholders Advisory Group (SAG), and ad-hocTFs). The Chair of the Water JPI presides the GB, while MB is overseen by the Vice-Chair.

The GB is the decision-making body and is ultimately responsible for the Water JPI, dealing with policy and strategic issues. It is advised by the MB, ABs and TFs in these decisions. The MB composed of up to seven members acting on the basis of in-kind contribution, is the Water JPI's executive body. Initially chaired by Spain, followed by France (2014-2020) and currently by Italy.

The ABs advise the GB and MB on specific issues as requested. Their size and membership are decided by the GB. While the STB is composed of academic and industrial water experts from public or private research and development institutions, the SAG is composed of institutions representing the private sector, civil society, local policymakers, etc. The TFs are ad-hoc working groups responding to specific technical, scientific or administrative demands of the GB and/or the MB, composed of volunteers from Water JPI member countries, allowed through "ad-hoc" working groups to respond to.

The ToR do not describe specific, formal co-ordination mechanisms between the governance bodies beyond periodical meetings. Coordination depends to a large extent on the JPI Coordinator. Internal communication was carried out by the Secretariat, supported by tools such as an intranet, although email communication was largely favoured.

Successes

One of the main successes for Water JPI governance was its clear assignment of roles and responsibilities, and modalities for partner country participation. The ToR (2020) clearly defined roles and responsibilities for each of the five main governance bodies, as well as modalities for partner country participation in the governance of the Water JPI. While remaining stable overall in terms of structure and key characteristics, the governance set out by the ToR was relatively flexible and was modified to adapt to bottlenecks identified over the evaluation period (2011-2020). The interviews and narratives largely highlighted that the Water JPI's governance structure worked smoothly and that its clarity helped to avoid conflicts. 88% of the GB members who responded to the GB survey agreed to a large or very large extent that an efficient decision-making process has been established.

The governance of Water JPI has also had a good level of coordination and communication. Although formal co-ordination mechanisms beyond meetings were not defined, a large degree of flexibility seems to have been left to the Coordination/Secretariat (C/S) team and coordination seems to have worked well overall. Narratives and interviews highlighted good communication and coordination between different bodies to the most part. In practice, the degree of coordination also depends on the level of commitment and involvement of partner countries (see issue three). Internal communication also seems to have run smoothly, as 94% of GB members reported being informed to a large or very large extent about on-going Water JPI actions.

This was in large part facilitated by the C/S team, whose important role and good work on coordination and internal communication was largely acknowledged by those involved

in the Water JPI. Tools such as an Intranet containing documents, meeting minutes, presentations, and so on, supported internal communication. In practice, the main communication channel was email. As highlighted by one interviewee, however, the effectiveness of email communication may have declined due to an excessive reception of emails for some recipients being a contact for some or all the ERA-NET Cofund and CSA projects. On some occasions, the length of documents and the amount of information contained in the emails sent may have been an issue.

The governance was also successful in its integrity and transparency. The ToR included important clauses ensuring a certain level transparency and integrity, as well as clauses to avoid conflicts of interest for each of the governance bodies, the “one country = one vote” principle and the possibility to vote with a secret ballot on sensitive matters.

Bottlenecks

A bottleneck for the governance has been a certain level of inertia in high-level decision-making. Although the GB members mostly considered the decision-making process efficient, a certain level of inertia from the GB, the highest level of governance, was highlighted by certain interviewees. In particular, the fact that all important decisions need to go through the GB, which only met twice a year on average (although the ToR only mandate one meeting per year), sometimes slowed down procedures such as the validation of position papers and other documents.

Despite valued contributions, a sometimes-limited effectiveness of ABs has been a bottleneck. It is important to note that many interviewees praised the ABs for their timely and relevant advice and submission of proposals to the GB and MB and highlighted that they acted as enablers of the science-policy interface by making the connection between the Water JPI and their own institutions and constituencies. As such, the ABs have a key role to play in disseminating Water JPI research outputs to a broader, relevant audience.

However, certain issues with respect to ABs were highlighted. First, the challenge of ensuring a high level of involvement from all 12 members and a lack of commitment from a few members of the SAG was brought up by one of the interviewees. Another interviewee also highlighted that participation in ABs was at a too low level, and the relatively frequent changes in membership led to lost time in “educating” newcomers. Another issue was a certain overlap in the roles of the STB and SAG, as the SAG is also composed of many scientific stakeholders.

Lessons Learnt

A clear assignment of roles and responsibilities and clear modalities for country participation, combined with a certain level of flexibility to address governance bottlenecks, seems to have favoured effective governance of the Water JPI. The built-in clauses to avoid conflicts of interest and favour integrity in the ToR are a good practice, and likely contributed to the positive view of the overall governance that seems to be common to all those involved in the Water JPI.

A flexible approach to coordination among governance bodies (i.e. no formal coordination mechanisms beyond meetings in the ToR) can work well, given sufficient levels of commitment from members and effective communication from the Secretariat. Nevertheless, having formal/institutionalised coordination mechanisms, particularly between the GB and MB, could further ensure accountability and commitment from members.

A well-functioning Secretariat is essential for good communication and coordination across the Water JPI. However, the frequency and length of internal emails sent should be limited, and the Intranet or other communication channels with smaller groups favoured to the extent possible.

The GB meetings organised twice a year should not act as a barrier to faster decision-making when needed on relatively less strategic items. The ABs have an important role to play in the science-policy interface, including in disseminating outputs from Water JPI research to broader constituencies. Their strategic role should be further recognised and strengthened.

Recommendations

R4.2.1: Keep a clear but flexible approach to governance to ensure that the structure is both stable and able to adapt to changing circumstances.

R4.2.2: Establish formal coordination mechanisms to ensure a broader involvement of national institutions beyond the representative in Water JPI governance, such as an annual meeting to highlight the achievements of the Water JPI and how countries/institutions can further be involved.

R4.1.3: Reduce the inertia in decision-making at GB level, either by delegating decision-making on certain items to subordinate bodies (i.e. the MB), or by increasing the frequency of GB meetings (e.g. every 3-4 months). One suggestion from the GB survey was to mobilise more countries in the MB and TFs to facilitate the implementation of GB decisions by sharing the workload. Including more Water JPI voting members in the different Water JPI Task Forces might this also foster exchanges among voting members before the GB meetings.

R4.1.4: Strengthen the strategic role of ABs by:

- Ensuring that AB representatives are high-level officials within their institutions to send a signal of commitment and favour engagement across the Board.
- Limiting turnover in members to the extent possible, for instance by bringing AB member terms forward from three to five years.
- Reducing the number of members within the board to favour higher individual commitment and avoid “free riding”.
- Consider gathering both the STB and SAG into a single Advisory Group to avoid an overlap of roles and streamline the science-policy interface.

4.4.3 Level of Geographical Representativeness, Commitment and Resources (KI4.3)

Having a wide range of European and extra-European countries represented within the Water JPI is essential to the achievement of its vision. Two of the six objectives of the Water JPI's Vision 2020 relate to involving a high number of European and global countries. Objective two aims to attain a critical mass of research programmes, involving at least two-thirds of public National R&I investment in Europe. Objective one targets global impact as a means of solving societal issues related to water.

Membership followed an increasing trend from 2011 to 2018, and a slight downward trend from 2018 onwards. As of September 2018, the Water JPI had 22 voting member countries from Europe and beyond, including, three observer countries (Belgium, Greece and Hungary) and five additional partner countries involved in joint actions (Brazil, Canada, Egypt, Taiwan and Tunisia). In November 2020, the membership model was revised to include the status of Associated Partners. By June 2021, the membership of the Water JPI counted on 20 voting member countries, five Associated Partners, (including Tunisia as a newcomer), three observer countries (including Slovenia as a newcomer) and nine additional partner countries involved in joint actions (Bulgaria, Brazil, Canada, Egypt, Lithuania, Morocco, Slovakia, Switzerland, and Taiwan.

All member countries of the Water JPI are represented in the GB by national delegates, of which at least one must be affiliated to a programme owner institution (e.g. Ministry, research agency, etc.). Other country representatives can attend meetings in an advisory role. The European Commission, Associated Partners and Observer countries act as non-voting members.

Another key issue to guarantee the Water JPI's consistency and stability as well as commitment from member countries is funding. According to the ToR of the Water JPI, each member must contribute to the operational costs on an annual basis by paying a fixed voluntary fee approved by the GB. Members can also offer additional cash or in-kind contributions in order to meet the necessary requirements for a financially sustainable Secretariat team. The budget is prepared by the Secretariat and presented to the GB for approval every two years.

The funding of the Water JPI is based on three principles: "i) membership should not be endangered by the introduction of fees; ii) each country to have a single vote regardless of the Member contribution paid and iii) JPI Member contributions should be shared between all members." For the period 2019-2020, the Water JPI transitioned towards a funding model that was expected to be more sustainable, allowing more affordable and extended membership. This funding model sought to maximise the use of EC funding and ask member countries to cover the remaining needs for core C/S operations, with a hierarchy in the in-kind contributions before defining fees.

Successes

Water JPI has had a good representation of countries at EU level and also some external partners. According to the GB survey, all GB members agreed that Water JPI partners represented the main European actors in P2P funding on water-related challenges to at least a moderate extent, and 65% to large or very large extent. As highlighted in one narrative, the relative stability in the representatives of the partners involved in the different activities helped to create links and to ensure good communication, with changes in positions sometimes creating a little friction in the transition.

GB and MB members also had the opportunity to engage further with the Water JPI, if they wished to do so, via Task Forces. Furthermore, the increasing number of participants in the Joint Transnational Calls over the years was enabled by the strong and sustained commitment of many GB members, and several member countries established national mirror groups to better align national RDI agendas and communicate on Water JPI activities. However, the decrease in full membership from 2018 points to declining commitment from member countries.

Water JPI has a certain level of stability, consistency and coherence ensured by having a dedicated Coordinator overseeing a centralised Secretariat. Within the Water JPI Secretariat, the role of Coordinator is a full-time position provided by the institution hosting the Secretariat. Having a dedicated Secretariat and Coordinator enables long-term stability and a growing level of operational efficiency.

The payment of annual fees to contribute to Secretariat costs are a strong signal of member country commitment to the Water JPI. The Water JPI is one of the few JPIs where member countries pay an annual fee to financially support core activities, notably the Secretariat. Within other JPIs, the operational costs are covered only by CSAs with projects by the Commission due to the difficulty of agreeing on an annual fee among member countries. Furthermore, as highlighted by one senior GB representative of the Water JPI, one of the strengths of the Water JPI was its low dependence on supporting projects, helping it to achieve financial sustainability. Although financially sustainable, resources were relatively limited, as highlighted by almost all interviewees. However, as a beneficial result of this budgetary pressure, certain procedures were simplified, meetings were streamlined, and their frequency reduced. Furthermore, the three underlying principles of the funding of the Water JPI represent a good practice in ensuring inclusiveness, integrity and fairness.

Bottlenecks

Low representation of extra-EU partner countries in Water JPI activities is a clear bottleneck of Water JPI. Some interviewees highlighted that the physical meetings of the boards, as well as other activities such as the Knowledge Hubs, acted as a barrier to the participation of non-EU partner countries due to the financial and time constraints of travelling to Europe. Increasing the use of hybrid events and allowing non-EU partners to host events and activities would send a strong signal to these countries, demonstrating

partnership rather than leadership, and increase participation of extra-EU countries in Water JPI activities.

Another bottleneck is the insufficient level of representation from some member country institutions within the GB, that may have contributed to reduced commitment. Most of the outputs (narratives and interviews) from those involved in the Water JPI highlighted the need for a higher level of political support as well as an unbalanced commitment of members in terms of human, financial and in-kind resources (e.g. organising and providing facilities for in-person meetings). It must be noted that the level of representation is not the only factor at play here - the level of commitment of member and partner countries is to some extent outside of the Water JPI's control as it depends on individual countries' allocation of human and financial resources to the Water JPI. This is a common challenge to multilateral initiatives, which face higher transaction costs than bilateral and national ones.

Another reason behind declining commitment may have been the centralisation of the Secretariat. Having a centralised Secretariat seems to be more efficient operationally but having a decentralised Secretariat across more than one country could be a means of increasing commitment among member countries. The bureaucracy linked to EC funding took also much of the Secretariat's time. Given that the Water JPI submitted almost one proposal annually to the EC, many years over half of the Secretariat's time was dedicated to EC bureaucracy.

Lessons learnt

Having a high level of representation from member countries is essential to ensure commitment and involvement. A high level of representation ensures a certain level of stability by reducing turnover from changes in position within the member country institution and sends a strong signal to other GB members regarding the strategic importance of the Water JPI.

While representation among EU countries is good, more efforts towards extending partnerships beyond the EU could have been made. The shift towards more virtual and hybrid meetings, facilitated by the COVID-19 pandemic, has both positive (more inclusion of extra-EU countries) and negative effects (reduction of in-kind contribution from some countries and, as a result, declining commitment). Europe-centric activities (e.g. Knowledge Hubs) hinder extra-EU country participation.

There are pros and cons to having a centralised Secretariat, but overall, the centralised model seems to work well, allowing a high level of stability and efficiency. The rotating chairmanship and vice-chairmanship offsets the negative effects of this centralisation in terms of member and partner country commitment to some extent.

The funding model of the Water JPI can be considered as a good practice among JPIs, as it ensures a certain level of commitment and follows sound principles that ensure a high level of integrity and inclusiveness. However, different funding rules among EU member countries hinder the creation of a common pot for the Water JPI and prevent

some members from taking part in certain activities. Furthermore, the level of overall funding from member countries and the EC is considered insufficient to achieve the ambitious objectives set out by Vision 2020 and the broad-scoped SRIAs.

Recommendations

R4.3.1: Ensure that the level of funding is adjusted to reflect the reduced level of in-kind contributions (largely hosting meetings) due to increasingly virtual and hybrid meetings. With EC support, work towards harmonising national funding rules for JPIs and research in general, to allow the creation of a common funding pot and ensure the long-term financial sustainability of joint research programming.

R4.3.2: Increase financing to fund a team within the Secretariat dedicated to dissemination and global outreach. This would include translating research outputs into policy advice and disseminating them in high-level international fora, events and conferences, avoiding excessive dependence on personal/bilateral relations.

R4.3.3: Ensure a high level of representation in the Water JPI governance: Within the JPI, mandate a certain level of seniority in the ToR for GB participation, to build commitment and strengthen the profile of the Water JPI. A specific task force could also be set up to look into this question in more detail and explore avenues towards ensuring a high level of representation and commitment, including an in-depth analysis of whether the Secretariat would benefit from being decentralised or not.

R4.3.4: Member countries should ensure continued national dialogue around the level of involvement in the Water JPI and other initiatives, considering the availability of resources and research priorities. In practice, one way forward could be to mandate the payment of an annual fee/in-kind contribution from all. However, making this mandatory could significantly reduce the number of member and partner countries and would require revising the principle that membership should not be endangered by the introduction of fees.

R4.3.5: Favour virtual and hybrid GB meetings and allow non-EU members to host activities to favour inclusiveness.

4.4.4 Stakeholder Engagement, Representativeness, Inclusiveness, and Partnerships (KI4.4)

Engaging with stakeholders beyond the R&I community is essential to inform decisions and key strategic documents within the Water JPI, but also to disseminate the outputs of Water JPI research and ensure their real-world application. It is also key to the achievement of the Water JPI Vision 2020's first objective, to "involve water end-users for effective research, R&I uptake", to solve societal issues via interaction with end-users. Additionally, although not directly relevant to the achievement of an objective of the Vision 2020, collaboration and partnerships with other JPIs was broadly viewed as an effective means of increasing impact and avoiding overlaps in research by those involved in the Water JPI.

Given the Water JPI's multidisciplinary approach, covering the ecological, economic, societal and technological dimensions of water, GB representatives responsible for the Water JPI at the highest level should come from a diversity of institutions reflecting this approach. Currently, most of the twenty voting members of the GB represent institutions, agencies or ministries involved in education, research, innovation, science and technology. Four environment-related institutions are represented, as well as one on water and infrastructure and another on energy.

As highlighted in KI4.1, the process for developing key framing documents was very forward-looking, participatory and inclusive. For instance, stakeholders and the general public were consulted on the contents of the SRIA 1.0 via a public consultation and consultative workshop, which 54 stakeholders attended. SRIA 2.0 benefitted from two public consultations and two stakeholder workshops, which included members of the Water JPI's ABs, experts in water R&I and other stakeholders representing water utilities, scientific committees and water policy associations. Via its links with the Water supply and sanitation Technology Platform (WssTP) and European Innovation Partnerships (EIPs) on Water, the Water JPI aims to build synergies with, and support water-related enterprises.

Successes

Elaboration process for SRIAs has been participatory and inclusive. The consultations and workshops for stakeholder involvement feeding into the JPI's strategic documents is one of the strengths of the Water JPI. The inclusion of a larger number and diversity of stakeholders for SRIA 2.0 is a notable good practice.

Institutionalised stakeholder engagement with the ABs, in particular the SAG has been also successful. Having one governance body dedicated to stakeholder engagement is an effective means of ensuring that stakeholders with a diversity of backgrounds (compared to other Water JPI governance bodies) are engaged within the Water JPI. This feature of the Water JPI's governance is a good practice.

Many interviewees echoed that ABs were effective in ensuring dialogue with stakeholders and acting as a communication link between the Water JPI and broader constituencies and communities. Notably, they allowed for improved relations with the private sector. Beyond the ABs, the MB also included ERA-NET and CSA project coordinators. According to one of the interviewees, this allowed a wider range of opinions to be reflected in the preparation of topics for GB meetings as well as better coordination. However, certain issues should be addressed to strengthen the role of the ABs.

Water JPI has had some good connections with other JPIs. The Water JPI collaborated with FACCE-JPI (ERA-NET Cofund WaterWorks2015 in 2016) and Biodiversa (ERA-NET Cofund BiodivRestore in 2020) with a joint call with each. Many outputs from people involved in the Water JPI agreed that these collaborations were successful and highlighted the engagement of the Water JPI with others, aiming to exploit synergies while engaging in joint actions in overlapping priorities or common stakeholders. According to one of the interviewees, however, cooperation did not go beyond Joint Calls

and activities. For instance, there was no cooperation in terms of aligning practices with R&I funding (e.g. call rules, project evaluation system). Furthermore, repeated exchanges with other research programmes (e.g. PRIMA) encountered slow and limited success.

Bottlenecks

A lack of representation of some scientific expertise in the governance structure has been a bottleneck for Water JPI. There is a notable under-representation in the ABs of environmental/ecological institutions, and an absence of socio-economic institutions. Furthermore, some interviewees highlighted an under-representation of experts with socio-economic backgrounds or competences in the ABs.

Due to the fact that SAG is a board of institutions and their delegates are appointed by the institutions themselves, there is a lack of transparency on SAG delegates. Although SAG delegates represent the institution, he absence of publication of the names of members of the SAG makes the evaluation of the level of representation and the analysis of other inclusiveness dimensions such as gender challenging to carry out. This is even more the case for analysing the evolution over the evaluation period, as information on past representatives is not available either. However, it should be noted that the names of MB and STB members are publicly available and that a gender balance is observed in both[7].

Limited engagement with certain stakeholders such as industry, end users and regulators. According to many interviewees more work needs to be done to interact with organisations and platforms of regulators, professionals, end users and industry. Many interviewees echoed the lack of engagement with the private sector, despite efforts made to do so, notably through the AB members.

Lessons learnt

Prescribing a multi-disciplinary approach is not enough to ensure multi-disciplinarily in decision-making representation. Including a wide range of stakeholders in the elaboration of key documents is a good practice, but as highlighted above, financial constraints also need to be accounted for to avoid having an SRIA that is too broad in scope.

[7] *5 of the 9 MB members and 7 of the 11 STB members are female. Additionally, the Chair and Coordinator of the Water JPI are women.*

Recommendations

R4.4.1: Ensure continued but more inclusive stakeholder engagement in the definition of key strategic documents, notably by organising hybrid or virtual workshops allowing the participation of more geographically diverse partners.

R4.4.2: Increase transparency to foster trust from internal and external stakeholders by making the names and positions of the members of all governance boards since the inception of the Water JPI publicly available. Also consider the publication information on internal workings, e.g. meeting minutes and lists of participants.

R4.4.3: Implement new mechanisms to engage with "under-engaged" stakeholders. This could also be favoured by increased participation in international fora and events (e.g. IWA events to engage with the private sector).

R4.4.4: Set up a Task Force to explore avenues towards more diverse representation of institutions on the GB to transcend the research silo.

4.5 Dimension 5 – Contribution to the Societal Challenges of Water Area

The overall mission of Water JPI is to contribute to societal challenges, as stated on its website: *"Joint Programming Initiatives are inter-governmental collaborations meant to tackle major societal challenges unable to be addressed by individual countries and in doing so contribute to the development of the European Research Area".*

How has Water JPI succeeded in this? To give an answer to this question, the entire framework of activities (Figures 7 and 8, Table 1), presented analytically in previous Chapters, has been under scrutiny in the analysis. The Guidelines for the evaluation define two indicators in relation to the "Dimension 5 – Contribution to the Societal Challenges of Water Area", namely *"Influence on factors contributing to tackling the area of societal challenges" and "Impact on policy relevant to the area of the societal challenge"* and seven relevant activities (Table 2). To have a more holistic approach, the Evaluation Panel decided to merge the two indicators to a single Key Issue "Influence on Factors and Policy Making" for Dimension 5.

4.5.1 Influence on Factors and Policy Making

When the first version of the Common Vision 2020 was published (2013), the key policy in Europe was the new WFD and the knowledge needs that arose from it. The societal challenges linked with water were already identified and formulated as follows:

- "Water in the changing world, a common vision for achieving sustainable water systems"
- "Tackling water challenges for a changing world"
- "Achieving sustainable water systems for sustainable economy in Europe and beyond".

This requires a joint multi-disciplinary approach, since outstanding economic, ecological, technological and societal challenges are to be addressed.

Times changed, however, and in 2020 the Water JPI launched a new vision, the Vision 2030 named *"Together for a water-secure world Water JPI Vision"*. In between the two visions, the policy landscape had diversified and changed in many ways. Both in EU as well as globally, broader policy frameworks which go far beyond water, such as the Green Deal and the Agenda 2030 with 17 SDGs, are drawing attention. In Europe, the WFD has gone through a fitness check, together with directives on floods and groundwater. These have had their reflections on the Vision 2030, which aims to tackle water challenges through its shared mission of Jointly enabling "smart" water solutions for a changing world. Both objectives and research themes are well placed.

SRIAs have formed the larger focus areas around which the various Calls have then been formed. The processes of developing the SRIAs have been consultative and participatory and in this way, they have also functioned as means for contributing to the societal challenges as participants have included members from all member states as well as the EU (see section 5.4). Also links through Abs have been established in relation to the key areas of knowledge and forthcoming outputs from the Water JPI.

In all Joint Calls of the Water JPI, the requirement to contribute to the societal challenges has been made clear and explicit. The need for using several disciplines was emphasised in all. The 2013 Pilot Call used multidiciplinarity as the means while all the later calls encouraged towards transdisciplinarity, i.e. research which brings not only scholars from various disciplines, but also other societal actors to work together. It was also explicitly stated that the communication with the society to enhance implementation should always be addressed. As these were clearly stated as requirements of the proposals, the projects in general were planned to contribute to societal challenges.

It is difficult to assess the concrete societal outputs of the projects, as the information that is currently available on the implementation of the projects is still limited, partly due to the fact that many of the projects are still on-going. On the negative side one could point out, that having so limited amount of information available can hinder the communication of the Water JPI to the society for implementation.

One of the main objectives mentioned in the Communication & Dissemination Strategy of Water JPI is to communicate the best available science and information on Water Challenges to key stakeholders and the general public. The various stakeholder groups are identified, the research agents being the first. The EU is not mentioned explicitly, but naturally belongs to the policy makers and the EU is being mentioned in various parts of the document.

As follow up of this strategy, much of the plan was implemented. Most of it provides information about the Water JPI activities and the various societal challenges linked with water and the role of science in tackling them., The linkage between the projects funded by Water JPI and these communications should, however, have been stronger to the extent of reaching effectively the set target of contributing social challenges.

Water JPI follows the Open data & access policy which is highly relevant from the perspective of its contribution to societal challenges. Most decision makers and the wider public do not have access to publications nor the data itself, even though this is often favourable. For example, on local and regional level analyses the open data could be useful. It is also imporant in low income countries which do not have access to expensive scientific journals or data. From a sustainability perspective, it is crucial that open access to research is available everywhere globally. However, this is not fully applied in practise yet: The website of Water JPI offers basic information on various projects but does not lead very far regarding outputs and data. Still, general presentations of the projects and the details of contact points are available which helps in finding more information.

The capacity to foster mobility of researchers has been discussed in the 2019 workshop on mobility and infrastructure platform for Water JPI. This is a very positive opening in many ways. It brings to the table issues such as gender, ethnicity, social inclusion as well as environmental concerns, and opens discussions on how to manage existing and arising challenges linked with them. These discussions could also offer opportunities to share ideas of societal contributions to societal challenges, as these all tangent issues such as equity, gender equality, work, opportunities, as well as ecological concerns arising from mobility. Even though it could be seen as self-evident, targeting the practices towards the users and effective contribution to these challenges is highly important to be mentioned explicitly and also provide a monitoring mechanism to see what the impact has been.

The contribution to societal challenges requires several paths to take. The direct collaboration with actors, stakeholder involvement and engagement have a crucial role here to play. Water JPI has placed much of the responsibility of this to the project level. On the Water JPI management level, the Advisory Board has been seen as the window to stakeholders, in particular with the industry. Presently, the role of business in sustainability transformation is growing fast and a dialogue throughout the years has built trust and facilitated a continuous flow of knowledge.

Engagement has been taking place also internally, within but also between projects in internal workshops of which the Water JPI has been rich with, and more so between internal and external actors, in Water JPI's workshops and Knowledge Hubs where also external experts have been invited to participate.

Collaboration with some JPIs has been active, especially the joint calls which have tackled thematically the societal challenge. Engaging with a broader spectrum of JPIs to draw together research understanding and evidence on societal challenge was not that strong, and this could be strengthened. However, in Europe, there are several other science-policy oriented research networks which could have been useful institutions to engage with, including EurAqua.

The international cooperation has been enhanced to develop collaboration with other regions. This has been important for sharing SRIAs and one can see this as an important indirect way to increase contribution to societal challenges. However, the direct

impacting on societal actors internationally was less active and organised. The outputs from Water JPI research link directly with the societal challenges globally and there is a high demand for scientific understanding and evidence due to lack of research in many part of the world as well as on global level. This kind of kowledge is needed when developing national, regional and international conventions. Thematic policy briefs and posters could have been appealing in these conditions.

The SRIAs have been developed jointly with MS actors as well as stakeholders where challenges and key areas of knowledge needs have been extensively identified. When the latest SRIA was developed, a foresight analysis was made for thefuture, the SRIA 3.0 and there was a full chapter dealing with future needs . The vision of the Water JPI with the contribution to societal challenge was well embedded in these excersises.

Successes

Water JPI has a strong emphasis on contribution to societal challenges in its vision, and much has already been done. SRIA areas approach various water issues from sustainability perspective by analysing the link between human activities and the environment and scrutinizing them to five most urgent areas. This can be seen integrated to calls and projects in a logical way both on the impacting issues (e.g. sustainable urban waters) as well as the enabling issues (e.g. trans disciplinarity and societal communication). The shared internal practices run by the Secretariat include several useful means including knowledge hubs.

Bottlenecks

Much of the research which could have had strong contribution to societal challenges. However, the research has not been synthesised into a form understandable and relevant to the wider audience and especially to the decision makers, and further communicated to the end users. It is difficult to find even information about the activities and outputs of each project, as the Water JPI website informs of the original plan of the project but does not lead the reader to the website of the project itself where more dynamic understanding of the project could be gained. Neither have the efforts and their effectiveness on Water JPI's contribution to societal challenge been systematically assessed internally, which could have been a useful internal learning method as well as useful material for the development of policies and practices of Water JPI.

Lessons Learnt

Overall, emphasis on contribution to societal challenges has been clearly defined. There are some innovative approaches, such as knowledge hubs and especially the one on sustainable development, as well as including business actors in the ABs. Generally, the SRIAs have useful contents that have contributed to projects tackling societal challenges with their research questions.

However, no clear strategy relating to an assessment system has been developed for Water JPI to monitor the degree to which the goal to contribute to societal challenges

has been implemented. Also, the material that was analysed by the Panel, indicated many opportunities to bring forward to policy making the outputs from Water JPI projects as well as the network as a whole, had been lost. This was a result of the following: the international focus was placed on building relationship with selected countries instead of communicating openly and effectively to all countries and being visible at international policy and science-policy meetings.

Recommendations

R5.1.1: Draft a strategy and action plan with clear milestones and specific objectives on achieving best contribution to societal challenges with most effective and engaging way. As part of the strategy, a monitoring scheme and evaluation steps are needed in order to ensure that the strategy is understood and implemented as envisaged.

R5.1.2: To strengthen the Secretariat team with experts on social science and science communication for professional science-policy-society interface. This extended Secretariat team could work together with project teams in order to deliver coherent communication material such as posters, policy briefs, from the outputs of various projects, which are structured around the local needs of various decision makers and potentially also investment and business. The Secretariat, via the communication team could actively promote the network at various international and Europe-wide science-policy events (e.g. UN HLPF, UN Water, UN CBD, UN Paris process etc.).

4.6 Dimension 6 – Future Perspectives

The Water JPI has been successful in mobilising important national water research and innovation funding. It has encouraged and stimulated the broadening of the JPI to several international cooperation partner countries and focuses on the creation of new knowledge and knowledge transfer. Nevertheless, problems and bottlenecks such as the laborious alignment of the R&I directions across the MS, the uneven deployment of financial resources and a soft support function of the EC, have slowed down the pace of the overall Water JPI system towards the achievement of the planned goals. These considerations, which are analysed in depth and justified elsewhere in this Report, are, important elements that can give room for addressing the challenges, opportunities, and possible drivers for the future of the Water JPI.

The debate on the future of the Water JPI is mainly driven by the dual change that is emerging in the European Partnerships landscape. Thus, on the one hand, we have the completion of the H2020 Programme, which was the main co-funding mechanism for the ten JPIs including the Water JPI. On the other hand, we have the decisions taken at the European level, concerning the establishment of European Partnerships and the Water4All Partnership within the Horizon Europe Programme.

Water4All is one of the 49 European Partnerships agreed between the EC and the Members States at the Shadow Strategic Programme Committee in the framework of the strategic coordinating process for Horizon Europe Programme. The Water4All partnership aims to enable water security for all on the long term. This will be achieved through boosting systemic transformations and changes across the entire water-research innovation pipeline, fostering the matchmaking between problem "owners" and solution providers. It proposes a portfolio of multinational, multi-faceted and cross-sectoral approaches, encompassing policy, environmental, economic, technological and societal considerations. Enabling water security for all is a keystone for achieving the Green Deal and a Healthy Europe.

Water4All will be a Co-funded Partnership, with a (more or less centralised) blending of EU and national public and/or other R&I funding sources (ERA-NETs, EJP, FET Flagships model in H2020). Co-funded Partnerships involve EU countries, with research funders and other public authorities at the core of the consortium. They elaborate joint research agendas and implement them with joint calls and joint additional activities. According to the guidance for rationalising the partnership landscape[8] European Partnerships are expected to establish formal and regular collaboration with other relevant research and innovation initiatives. This must be reflected in their governance models and joint actions. Based on the above, the Evaluation Panel is of the opinion that there are three main scenarios for the future.

SCENARIO I: Water JPI continues its work as an initiative of its member countries, serving the Vision 2030 "Together for a Water-secure World" (see section 3.1.), and implementing the whole range of the activities foreseen by the SRIA and the relevant Implementation Plan. The funding of the activities will come from own resources of the member countries and through competitive programmes.

SCENARIO II: Water JPI retains its autonomy and governance structure but adapts its strategy to complement the Water4All framework of activities. In this scenario, the Water JPI functions more as a transnational scientific body and may also undertake sub-activities of the Water4All, such as providing scientific support, coordinating the operation of the ABs, etc. The need for funding will be significantly reduced as no Calls for proposals will be launched. It can come from a combination of national funding and transfer of Water4All resources, for the "supporting services" provided.

SCENARIO III: Water JPI is fully integrated into the Water4All. In practice, the Water JPI member countries take the decision to dissolve its governance structure and become full members of the Water4All. Through their

[8] *R&I partnerships in the FP should be implemented based on the principles of EU that is added value, transparency, openness, impact, leverage effect, long-term financial commitment of all the involved parties, flexibility, coherence, and complementarity with EU, national and regional initiatives. All partnership initiatives should have an exit strategy from FP funding (Council Conclusions of 1 December 2017).*

new role, the member countries participate in decision-making, contribute to the implementation of the planned activities and enjoy the benefits of the produced impact. Funding comes from the Horizon Europe Programme and national resources in line with the European Partnership funding framework.

Three Key Issues related to the future scenarios were identified as follows:

4.6.1 Member States' Commitment (KI6.1)

As it was evident from the current assessment of Water JPI, and previous evaluations in relation to joint programming process, strong commitment and active participation of member countries are crucial to the success of any such initiative. Therefore, it is obvious that these conditions must be presented in all three scenarios.

The most important differentiation between the scenarios, in terms of this parameter, lies in the need for double and parallel participation of the countries in two initiatives i.e. in Scenarios I and II, while this is not required for Scenario III.

4.6.2 European Commission Financial Support (KI6.2)

EU funding, for both the management costs and the co-financing of the Calls' budget, has been crucial to the success of all P2P initiatives in the past, including Water JPI.

Based on the above-mentioned scenarios it is obvious that the need to secure national funding is drastically reduced moving from Scenario I to Scenario III.

4.6.3 Sustainability (KI6.3)

Some views suggest that the Water JPI should remain in place, even with a limited role during the Horizon Europe Programme, so that it can become more active in the future with the ultimate aim of HE support to Water4All. In other words, to function as a possible alternative for the exit strategy of the Water4All.

This plan seems extremely difficult. On the one hand, it is doubtful whether the EU will be willing to terminate support and funding for the Water4All if the Partnership achieves its objectives. On the other hand, there is no evidence in place so far that can ensure the maintenance of the Water JPI until then. Moreover, there is no guarantee that the Water JPI will be able to maintain its capacity to be effective for a long period, without implementing its core work. The process for its creation and development so far was quite complicated and required a huge effort, consistency, and perseverance from many actors. Clearly, this is not a straightforward or easy process to be repeated successfully.

4.6.4 Lessons learnt

The idea for parallel lives of Water4All and Water JPI is not compatible with the philosophy of the European Partnerships and in particular the Council Conclusions requiring effective rationalization of the Partnerships' Landscape at the European level,

which in practice foresees the development and operation of only one European initiative in each area.

The Evaluation Panel, considering the significant challenges that all P2P initiatives, the Water JPI included, faced to ensure the commitment of member countries over the past decade, raises serious doubts as to whether it is possible to secure the commitment, of many countries, to two water-related initiatives that will run in parallel.

In addition, the capacity and desire of the national R&I systems, for double participation is questioned. Especially small countries, with low administrative capacity and limited resources, both in terms of human resources and budget, will have great difficulty responding to such a situation. In such a case, it is believed that their most likely choice will be to join the initiative that will offer the possibility of securing strong EU funding, which will mean at the same time a smaller contribution from their behalf.

Recommendations

R6.1: The GB of the Water JPI should take a clear decision about the future of the Initiative.

R6.2: Any decision should ensure the effective operation and sustainability of the initiative. The countries' strong commitment for active participation and securing the necessary, funding is key to securing success.

R6.3: In any chosen Scenario, it should be ensured that the gained experience, knowledge, good practices and lessons learned from the 10 years of the Water JPI life will be transferred to the new state of affairs.

R6.4: Where possible, take advantage of the structures and relationships developed by the Water JPI.

Table 4. The Evaluation Panel's recommendations and their relation to relevant stakeholders.

Code	Recommendations	Water JPI	MS	EC	Water 4All
Dimension 1 – Alignment					
R1.1.1	Alignment with the SRIA when planning their national calls.		x		
R1.1.2	SRIA as the basis for setting national priorities.		x		
R1.1.3	Monitor national research activities towards the SRIA.	x	x		x
R1.1.4	Intranet: specific section on alignment.	x			x
R1.1.5	Dissemination of results to high political level.	x	x	x	x
R1.2.1	Monitoring progress of the SRIA (sub) themes.	x			x
R1.2.2	Discussion on the relevance of neglected topics in future SRIA.	x		x	x
R1.3.1	Connect Platform with the other tools and knowledge hubs	x			x
R1.3.2	New mechanisms to expand the mapping exercise.	x			
R1.3.3	Explore further collaboration with ESFRI.	x	x	x	x
Dimension 2 – Internationalisation					
R2.1.1	Monitor internationalization efforts.	x	x	x	x
R2.1.1	Guidance for tackling issues of a political nature.			x	
R2.2.1	Co-design of transnational activities between peer initiatives.	x	x	x	x
R2.2.2	SMART performance indicators for international cooperation.	x		x	x
R2.3.1	Proactive role in valorising the results of European initiatives.	x		x	x
R2.3.2	Bringing key results from different initiatives together.			x	
R2.3.3	Re-designed of the International Task Force.	x			
Dimension 3 – Enhanced Knowledge Production					
R3.1.1	Include peer-reviewed papers in the projects' final reports.	x			x
R3.1.2	Mechanism to promote and monitor valorisation of results.	x	x		x
R3.2.1	Mechanism to guide Science – Policy interaction.	x			x
R3.2.2	Seeking involvement of more stakeholders.	x		x	
Dimension 4 – Governance					
R4.1.1	Formalise and institutionalise impact assessment.	x		x	x
R4.1.2	Assessment of progress towards the objectives' achievement.	x		x	x
R4.1.3	Measurable and achievable objectives.	x		x	x
R4.1.4	A results-based rather than research-driven approach.	x	x	x	x
R4.2.1	Clear and flexible approach to governance.	x			x
R4.2.2	Broader involvement of national institutions.		x		
R4.2.3	Reduce of the inertia in decision-making at GB level.	x			x
R4.2.4	Strengthen the strategic role of ABs.	x			x
R4.3.1	Adjust funding to reflect the in-kind contributions.	x		x	x
R4.3.2	Dedicated team for dissemination and global outreach.	x			x
R4.3.3	High level of representation in governance.		x		
R4.3.4	National dialogue about the level of involvement.		x		
R4.3.5	Favour virtual and hybrid meetings.	x			x
R4.4.1	Continued and inclusive stakeholder engagement.	x	x	x	x
R4.4.2	Transparency to foster trust.	x			x
R4.4.3	New mechanisms to engage with "under-engaged" stakeholders.	x			x
R4.4.4	Task Force for more diverse representation of institutions.	x			x
Dimension 5 – Contribution to the Societal Challenges of Water Area					
R5.1.1	Strategy on achieving best contribution to societal challenges.	x	x	x	x
R5.1.2	Experts on social science for science-policy-society interface.	x			x
Dimension 6 – Future Perspectives					
R6.1	Clear decision for the Water JPI future.	x	x		
R6.2	Strong commitment for effective operation and sustainability.	x	x	x	x
R6.3	Transfer of the gained experience and knowledge.	x			x
R6.4	Take advantage of the Water JPI relationships.	x			x

5. Conclusions and Final Recommendations

5.1 Key Issues' Evaluation

The Evaluation Panel decided to proceed with an assessment of the Water JPI performance in relation to the 5+1 Dimensions and the Key Issues (KIs), assigning scores to each one of them. This approach derived from the discussions of the Panel following the review of the provided material and the interviews and taking into account the analysis and conclusions of Chapter 6. It should be made clear that, with this evaluation approach, the Panel aimed to show the tendency that characterises each one of the Key Issues and not to assign a precise score on the performance. Thus, three groups of performance are formed (success, ordinary and room for improvement), that capture the overall picture in the Figure 24 below.

The Key Issues KI1.3, KI2.3, KI3.3 and KI5.1ab (in the red bar) are characterised by limited degree of progress. It is obvious that for these KIs, there is still room for improvement and significant challenges still to be pursued. Both Key Issues of Dimension 5 *"Contribution to the Area of Societal Challenges"* were rated low by the Panel. Despite the many actions that were developed and aimed at this direction, the lack of a relevant strategy to achieve best contribution to societal challenges with the most effective and engaging way, had a clear negative effect on the degree of impact in relation to KI5.1a *"Influence on factors contributing to tackling the area of societal challenge"* and KI5.1b *"Impact on policy relevant to the area of the societal challenges"* at European and international level.

Another bottleneck, which is directly linked to the abovementioned observation, is the inability of Water JPI to develop strong links and promote involvement of the industry and end-users in the process of exploiting research results (KI3.3 *"Integration with user sectors"*). Taking a leading role on the international R&I scene in the water area (KI2.3 *"Global Coordination / Leadership Role"*), was proved a very ambitious goal, despite the significant efforts to involve several important countries. The KI1.3 *"Shared or Coordinated Use of R&I Infrastructures"* can be considered as the weakest factor of the Water JPI.

The second group of Key Issues (in the orange bar) KI1.1 *"Adaption of National Research Agendas, Priorities, Activities and Funding Towards the Water JPI's SRIA and Actions",* KI2.2 *"Building Cooperation with Relevant European and Global Initiatives"* and KI4.3 *"Level of Geographical Representativeness, Commitment and Resources"* were implemented in an ordinary manner.

The Key Issues – in the green bar – include the Water JPI components that were successfully designed and implemented and had significantly met the relevant goals at a significant degree (KI1.2, KI2.1, KI3.1, KI3.2, KI4.1, KI4.2, and KI4.4). The most successful Key Issues are those associated with the Dimension 4 *"Governance".* Three of the four KIs of this Dimension are in the "Green Group". Two of them, namely KI4.1 *"Design and Implementation of Key Guiding Documents"* and *KI4.2 "Governance*

Structure, Coordination and Decision-Making", received the highest score by the Panel and are considered as the most successful. This is attributed to two success factors: (i) the excellent organization and operation of the Water JPI Secretariat Team, and (ii) the proper governance structure. The Key Issue 1.2 *"Committed SRIA"* is also directly related to these two success factors, as it expresses both the proper preparation of the planning and approval procedures by the Secretariat, and the efficiency and participation of the governing structure of all relevant bodies (e.g., GB and ABs).

Two more successful Key Issues with a high score are included in the Dimension 3 *"Enhanced Knowledge Production"*. The first KI3.1 *"Science-Based Knowledge Productivity"* is related to the widespread impression that the projects funded by the joint calls of the Water JPI led to qualitative research and significant scientific results, although no specific analysis has been carried out on this subject. The second KI3.2 *"Size, structure and diversity of community"* refers to the view expressed by many that one of the most positive impacts, for some the most important, of the Water JPI is the creation of a research community in the field of water.

Figure 24. Panel's Evaluation of the Water JPI Performance Against the Key Issues.

5.2 Overall Assessment

As already presented, this evaluation is based on the data, the key documents and opinions of the stakeholders regarding the highly ambitious goal of establishing the network and creating and maintaining the Water JPI activities. The panel agrees that the aggregate result did not quite reach the level of initial ambition, as not all aspects were developed to a high standard. However, the level of ambition had been set very high from the outset, both by the MS and the EC, and the difficulties and circumstances that existed when Water JPI started its operation cannot be ignored.

The idea of the Joint Programming requires, by default, the setting of ambitious goals in order to be attractive and able to inspire a high-level vision. However, it also requires strong commitment and support from both the MS and the EC, which as it turns out, in the case of the Water JPI, did not reach the level that was required by the objectives set. In addition to this overriding finding, the evaluation also showed the following main weaknesses of the Water JPI:

- the limited commitment of some countries and to some extent the EC, to ensure sustainability;
- the inability to link the research community deliverables with societal stakeholders' needs, and to influence the factors that determine water policy;
- the limited level of science - policy interface and the lack of strong political attention;
- the absence of agreed, measurable objectives and their link to available resources.

Most of these weaknesses are common with those identified at the H2020 Programme evaluation, in particular those related to the science - policy interface and the valorisation of research results. Thus, they have been emerged as priority goals for Horizon Europe, as part of the programme development process.

When evaluating the performance of Water JPI, the Panel also considered the key documents, announcements and the relevant evaluations, conclusions and recommendations that set the stage for the development of the Water JPI (see section 2.2). So, starting from (i) the goal of a *"new approach for making better use of Europe's R&D investments, through enhanced cooperation"* of the EC Communication in 2008, (ii) followed by the recommendation for the *"enhancement of trust between the participants, maintaining the principle of open participation for MS and the smart use of H2020 instruments"* proposed by 'Acheson' Report (2012), and the (iii) requirement of the GPC for applying the *"Framework Conditions"* (2012), (iv) the conclusion of the Dublin Conference for the need to put *"huge emphasis on the alignment of strategies and research programmes and their joint implementation"* in 2013, up to the request for designing the *"Long-Term Strategy - 2030"* by the Hernani Report (2016), the Water JPI has shown an exceptional ability to meet all the challenges posed by the broader supervisory and evaluation framework for Joint Programming.

The overall assessment of the Panel, classifies the following aspects of the Water JPI as having a positive impact:

- Building trust and encouraging of new forms of multi-lateral cooperation, among MS and EC. It is important to note that this cooperation was built at the state level, without a strong institutional or legal background.
- The creation of a European research community with the participation of research groups from non-EU countries to address water issues - 439 partners participated in joint proposals submitted in the six Calls for Proposals of the Water JPI.
- The active involvement of local, regional, national and European water-related stakeholders, such as ministries, funding R&I organisations, research performing organisations, industry and international partners.
- The establishment of a well-structured governance system and an efficient and effective Secretariat. As it turned out, the driving force for the most successful aspects of the Water JPI are related to the role, capacity and effectiveness of the Secretariat Team.
- The reduction of fragmentation on water research in Europe and beyond, and the alignment of strategy, policy priorities and programmes.
- The successful implementation of a broad spectrum of common actions, such as the mobilisation of co-investments (83 MEUR), the launching of six joint calls fostering scientific excellence (88 joint projects) and the organisation of two TAPs and two Knowledge Hubs facilitating joint learning. Special mention should be made to the high level of the Knowledge Hubs, which as recognised by all, contribute to significant impact on policy setting.
- The extending links to other initiatives, and the promotion of initiatives to consolidate international cooperation, is considered as an example of good practice by other similar initiatives.
- The influence on the EC's views on water priorities.

The above results explain the rather common opinion expressed by almost all, that the Water JPI performance:

> *"You can always see the glass half-full or half-empty… for Water JPI the glass is definitely half-full…"*

The assessment exercise showed that significant progress has been made in many aspects of Water JPI. Most importantly, the progress achieved for some of the key areas of activities seemed impossible at first, while others were developed from scratch. Therefore, the Panel's opinion is that the overall impact of the Water JPI is positive.

5.3 Main Recommendations

This section lists the key recommendations of the Evaluation Panel, which are linked to the future perspective. These four recommendations stem from the conclusions of the entire evaluation study. They are a synthesis of the recommendations presented in detail in Chapter 4 and concern all stakeholders in this evaluation process, in particular the Member States, the EC, the partners of the Water JPI and the Water4All. Some of them are linked to one of the five Dimensions, while others have a horizontal character and affect more than one, and sometimes, all Dimensions.

5.3.1 Strong and Long-term National and EC Commitment

The water challenges are generally accepted to be common at the European and global level, even if some elements may be specific to a particular geographic zone. Therefore, the strong and long-term commitment of the participating counties in Water JPI appeared obvious. However, the current assessment showed that there was a lack of sufficient national support, at least from some countries, in terms of volume and share of efforts, investment and other forms of commitment.

The strong commitment of the EC is also crucial. The argument that, Joint Programming is an initiative of the Member States and the EC's role is merely supportive, is not valid anymore. The European Partnerships are now a key component of the Horizon Europe Programme and the responsibility for full commitment lies with both the EC and the Member States.

One can easily assume that Water JPI, similarly to other JPIs, could have achieved its goals to a greater extent, if the required commitment from national stakeholders, the policy makers and the EC was at a higher level. While high-level policy makers may express formal commitment to implement an initiative, it is necessary to consolidate this commitment, to operationalise it at a practical level and, more importantly, to extend it to the upper levels, both on policy and management matters.

It is equally important to ensure that national and European high-level policy makers are actively involved in the discussion of the SRIA priorities, main objectives and measures. They should also play a central role in the communication strategy at the national and European level. There is a need to raise political awareness for the water challenges and secure the high-level political commitment towards addressing these challenges, through common European and international efforts. The commitment should relate both to the allocation of resources corresponding to the ambitious goals and to the undertaking of initiatives to ensure sustainability.

5.3.2 Valorisation Strategy

Translation of research results into new solutions is a critical factor. The analysis offers evidence that, the most significant weakness of the Water JPI has been the inability to ensure that the research community delivers what societal stakeholders really need. In addition, it became clear that even when there were valuable results, the appropriate channels to influence the factors that determine water policy were not in place.

Therefore, the introduction of a specific Valorisation Strategy to bridge the gap between science and policymaking and between research and practical exploitation of results, is the second key recommendation of the Panel.

The Strategy should include (i) an effective mechanism to promote and monitor valorisation of projects results, and (ii) a dedicated Communication Plan. The Plan should be developed by communication experts and focus on actions related to the translation of research outputs into policy advice and the dissemination and global outreach in high-level international fora, events and conferences.

The launching of the European Partnership Water4All should be seen as a first-class opportunity that is building on the strong foundations created by Water JPI and serving to complement and update the mission. A results-based, rather than research-driven, approach is now the prevailing priority on the European R&I scene, for a better response to real-world needs, and this is the main goal of the Water4All.

The MS and the EC should ensure that the significant experience and knowledge gained, and the structures, relationships and links developed through the Water JPI, will be transferred to the new state of affairs. These should be the cornerstone to build the new joint efforts. Despite the difficulties and weaknesses identified, it is believed that joint European and international action is the only way to meet the water challenges.

5.3.3 Monitoring Mechanism – a Reflexive Approach

Whilst defining objectives and designing subsequent measures are key parts of the development process, it cannot be taken for granted that they will automatically be successfully implemented and create the desired impact in the long-term. There are many examples of well-thought out and designed policies, which ultimately did not lead to the intended change.

However, even assuming that all Water JPI actions were designed towards the right direction, the Panel concluded that there was no established and structured evaluation process to provide credible and useful information that allows the lessons learned to flow into the decision-making process. Of course, one can assume that this was done at an ad-hoc basis, whenever a new version of the SRIA was under preparation. However, the assessment shows that this approach left gaps, that were difficult to be filled at a later stage.

That is why the third key recommendation of the Panel is related to the establishment of a Monitoring and Evaluation Mechanism in a “reflexive” manner, as a function that provides, to the Governing Board and the Management Team, continuous feedback for both the level of progress towards the achievement of objectives and the use of allocated funds. Monitoring and evaluation go hand in hand – neither is more important than the other. Monitoring ensures that the right thing is done, while evaluation ensures that the right outcomes are achieved.

The aim of such a mechanism is to determine the relevance and fulfilment of the objectives as well as the development of efficiency, effectiveness, impact and

sustainability. Its operation should be based on a systematic collection of data using well designed and agreed indicators.

5.3.4 Integration into Water4All

Despite the difficulties and weaknesses identified, it is believed that joint and coordinated European and international action is the only way to meet the water challenges.

The Panel is in favour of a clear decision that will be aligned with the new priorities under Horizon Europe Programme for (i) the rationalisation of the partnerships' landscape, and (ii) a better response to real-word needs with a results-based, rather than research-driven, approach.

The launching of the Water4All should be seen as a first-class opportunity. Water JPI was the main driver for the development of the European Partnership Water4All. It serves to complement and update the mission, not to cancel the Water JPI's contribution and success. It is the opinion of the Panel that the launching of the European Partnership Water4All, is an important, probably a unique, opportunity for all to work together with the aim to achieve the common vision that was set a decade ago under the joint programming process and in particular, the Water JPI.

The final, and overarching, recommendation of the Evaluation Panel is that the EC, the Member States, as members of the Water JPI, as well as all relevant national and European stakeholders - including the European water industry - should be invited to jointly consider their longer-term strategy to address the water challenges in Europe and beyond, in the framework of the European Partnership Water4All. The MS and the EC should ensure that the significant experience and knowledge gained, and the structures, relationships and links developed through the Water JPI, will be transferred to the new state of affairs. These should be the cornerstone to build the new joint efforts.

ANNEXES

ANNEX I – Panel Members

Panel Members	Country	Affiliation
Leonidas Antoniou (Chair)	Cyprus	Research and Innovation Policy Expert
Jennifer Cassingena Harper	Malta	Director of Policy, Malta Council for Science and Technology
Abida Durrani	The Netherlands	Senior Programme Manager, ZonMw
Steven Eisenreich	Belgium	Professor of Environmental Chemistry and Water Resources, Vrije Universiteit Brussel
Eeva Furman	Finland	Director for the Centre for Environmental Policy, Finnish Environment Institute
Juliette Lassman-Trappier	France	Policy Analyst, Water Governance and Circular Economy, at the Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), OECD
Andrea Rubini	Italy / Belgium	Director of Operations, Water Europe

ANNEX II – Narrative Authors

Dimension(s)	Action	Author
Governance	Water JPI coordination and secretariat	Véronique Briquet-Laugier / ANR
Governance	Water JPI governance / chair	Miguel A. Gilarranz / AEI
Alignment, Internationalisation	Public to private partnerships	Prisca Haemers / IenW
Alignment, Enhanced knowledge	Cooperation with other initiatives	Heather McKhann / INRAE, FACCE-JPI
Enhanced knowledge	Joint call 2018 / project coordinator	Célia Manaia / Universidade Católica Portuguesa
Enhanced knowledge	Joint call 2018 / project participant	Rosina Girones / University of Barcelona
Enhanced knowledge	Joint call 2018 / project coordinator	Miklas Scholz / Lund University
Enhanced knowledge, Governance	Joint call 2020 / call secretariat	Saskia Wohlgemuth, Stefanie Pietsch / Jülich
Enhanced knowledge, Contribution to challenge	Knowledge hub	Osman Tikansak / FORMAS

ANNEX III – Interviews' Questionnaire Template

Water JPI Impact Assessment – Questions to Interviewees

1. **What has been the impact of the Water JPI on the Alignment of national and European and/or international R&I programmes and resources?**
    - By increasing / maintaining long-term commitment on SRIAs at the national level?
    - By adaption of national priorities towards JPI SRIA?
    - By reducing water sector fragmentation on R&I activities in Europe?
    - By sharing or coordinating use of R&I infrastructures or other resources?
2. **How effective has the Water JPI been in promoting Global Leadership in "water"? In developing durable partnerships with countries beyond Europe? And influencing global agenda? If yes, what are the main successes and contributing factors?**

    Do you consider that the Water JPI has been and is playing a central role in providing and steering R&I in the water sector globally, in close cooperation with upcoming international conventions/policies and international research fora? If not, are there any actions which are required to facilitate this? Or any obstacles which need to be overcome? What are the Water JPI's strengths and weaknesses in this respect?
3. **What has been the impact of the Water JPI on how research is conducted and how the research results are implemented to address the societal challenges?**

    Do you consider that there was an enhancement of knowledge production/sound knowledge base (e.g. fostering productivity and quality of R&I community, increasing the critical mass - size, structure and diversity of R&I community, integration with user sectors, R&I management policies) in Water JPI area?
4. **How efficient was the Governance System of Water JPI in enhancing European level cooperation and activities?**

    What do you consider to be the level of administrative efficiency (e.g. procedures for joint actions, monitoring and evaluation, flexibility of Implementation Plans, commitment of funding partners for continuation, degree of participation in call steering and follow-up etc.) and relational efficiency (actions & activities in collaboration with other initiatives)?
5. **How important has the influence of the Water JPI been on policy making and what are the factors contributing to tackling the relevant societal challenge? (e.g. policy briefs, awareness, services for policy, regulators, managers, connecting / involving with and creating benefits for stakeholders and wider society etc.).**
6. **In your opinion, which success factor / achievement of Water JPI has created the most significant impact?**
7. **What bottlenecks have occurred and negatively influenced the implementation and fulfilment of Water JPI objectives?**

8. **How do you see the future of Water JPI, as an independent entity or in perspective to the new partnership Water4All? Which factors do you consider as the main challenges and risks for the future?**

   What is your vision for Water JPI in the next 10 years? (e.g.: remain an international initiative of bringing resources together to support R&I in water sector in common areas of interest; become a key reference point for R&I in water sector at the international level with established synergies with the other relevant initiatives in the area; become the key driver for the creation of water sector strategies at national level and of their coordination.)

ANNEX IV – Interviewees

Interviewee		Interview theme
Panagiotis Balabanis	As the EC DG RTD Head of Sector Water, Panos has been involved with the emergence of Water JPI since the beginning. During Horizon 2020, he was involved in the preparation and implementation of four ERA-NET Cofund Actions that supported Water JPI.	European Commission
Dominique Darmendrail	Dominique has served as the Water JPI Coordinator (2014-2020). She also coordinated the CSA IC4Water for the development of international cooperation and the preparation of the European Partnership Water4All.	Management
Padraic Larkin	Padraic joined the Water JPI as the GB Vice-Chair (2014-2018) during the period of transferring the coordination from Spain to France. Among others, he coordinated the process for the preparation of the five-year plan for the Water JPI.	Governance
Antonio Lo Porto	Antonio served as the Chair of Stakeholder Advisory Group (SAG) for the period 2015-2021. He was involved in the SAG as the representative and the Chair of EurAqua. He also co-leads the Task Force on research infrastructure.	Advisory Boards
Giuseppina Monacelli	Giuseppina is currently the GB Chair of the Water JPI. She had been following and participating in the activities of the Water JPI since its inception and undertook several roles and responsibilities.	Governance
Seppo Rekolainen	Seppo has had a long career as a researcher and research manager, and most recently was responsible of international water cooperation. He served for many years on the Scientific and Technological Board (2012-2019) of the Water JPI.	Advisory Boards
Germana Santos	Germana has been involved in the management of Water JPI joint since 2013, the EU RDI mapping and the identification of research areas for the development of the UN SDGs' Knowledge Hub.	Management
Mamohloding Tlhagale	Mamohloding is a member of the GB (since 2017) representing the Water Research Commission of South Africa. She is also involved in activities related to the successful involvement of SA researchers in Water JPI activities.	Governance
Lisa Sheils	Lisa has been active in the Water JPI since 2017, with contribution to the Joint Calls, the Water JPI and the Water4All SRIA. She is coordinating the risk and quality management and facilitated the AQUATAP-ES researcher's network.	Management

ANNEX V – Maturity maps and graphs

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Water JPI membership

The Water JPI was officially launched in 2011. Governing Board met for the first time on April 14, 2011, and the Water JPI Management Structure has been fully implemented since October 19, 2011. At launch Water JPI had thirteen Full Member countries and seven Observer countries. The Water JPI membership has grown since and in 2021, Tunisia joined as Associated Partner and Slovenia as Observer country. Currently with twenty Full Member countries, five Associated Partners and three Observers, the membership accounts for 88 per cent of all European public RDI annual expenditure on water issues. Figures 1-11 present Water JPI membership roles on different years. A bigger gif-version can be seen here and a bigger video-version here.

Three levels of membership are proposed to Partner Countries willing to participate in Water JPI activities, from to the lowest level of engagement to the most:

- **Observer**: for those having mutual interest in funding research and innovation in Water challenges and willing to know more about Water JPI activities with an engagement on a pilot joint action;
- **Associated Partner**: for those which began a successful cooperation with the Water JPI and are willing to engage more by committing to the Water JPI Vision and means of getting involved in more than one joint multilateral action; and finally
- **Full member**: for those which have strong commitment to the Water JPI Vision and Missions (Alignment, European Networking, International Cooperation, …), a history of successful cooperation with the Water JPI and want to get involved in more than one joint action and to contribute to the JPI strategy and functioning. Full member status gives access to voting at the GB with the corresponding duties of contributing to JPI functioning via fees and/or in-kind).

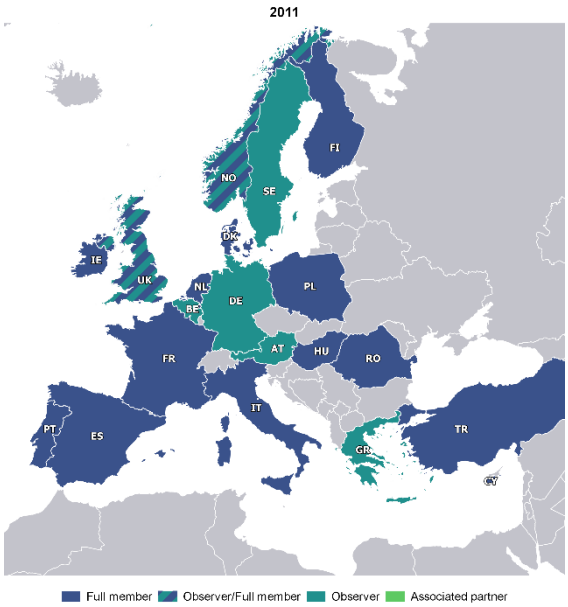

Figure 1. In 2011, the Water JPI was officially launched with 13 Full Member countries and 7 Observer countries. Norway and the United Kingdom became Full Members in April 2011 and May 2011, respectively.

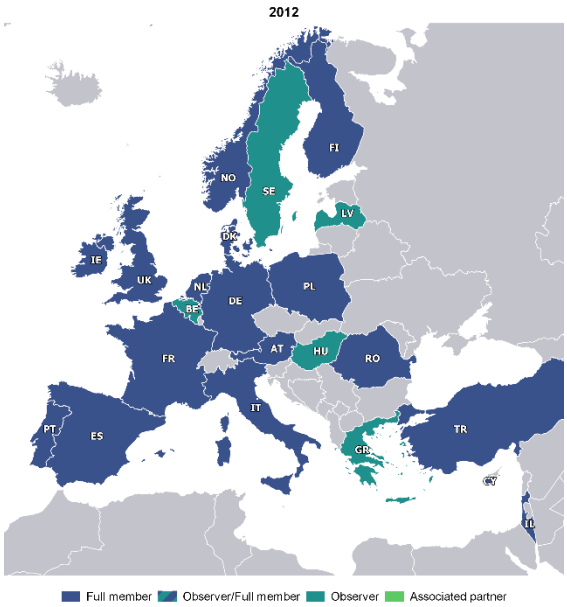

Figure 2. In 2012 Austria, Germany and Israel became Full Members. Hungary changed its role from Full Member to Observer, and Latvia joined as Observer.

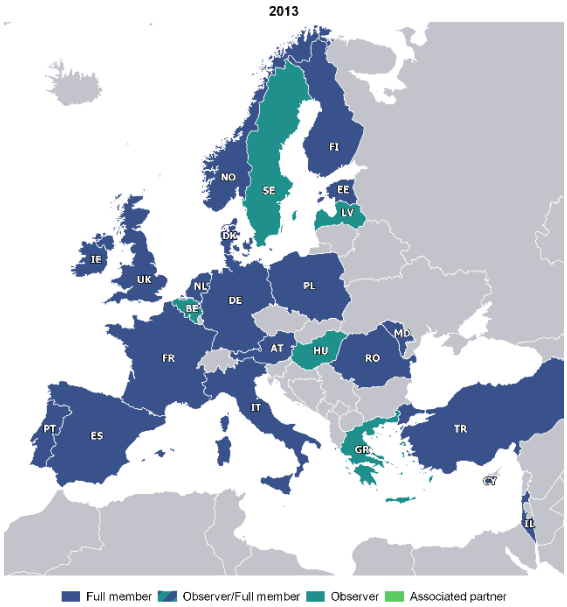

Figure 3. In 2013, Estonia and Moldova joined as Full Members.

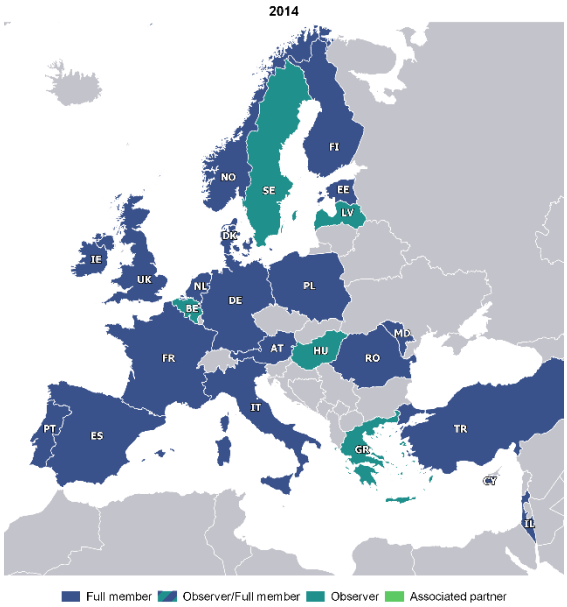

Figure 4. In 2014 there were no changes.

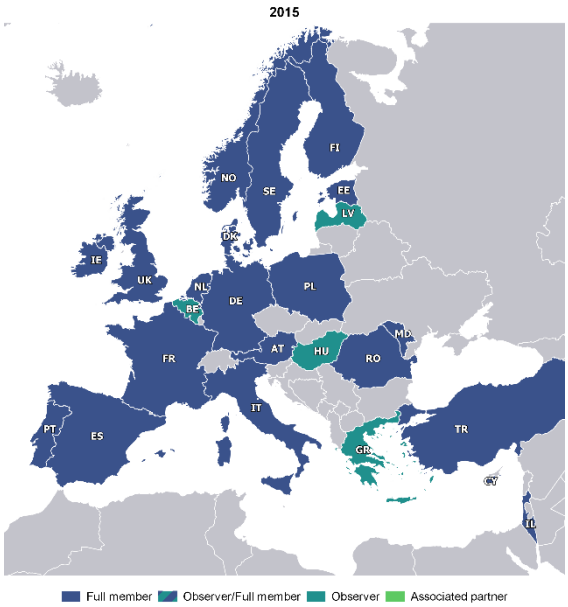

Figure 5. In 2015 Sweden changed its role from Observer to Full Member.

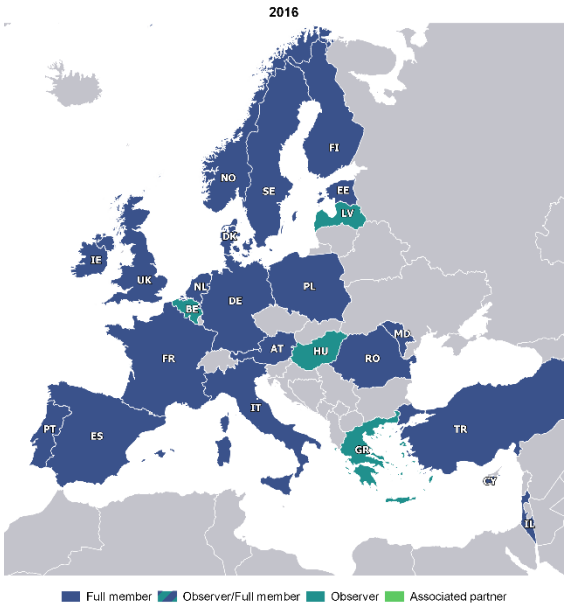

Figure 6. In 2016 there were no changes.

Figure 7. In 2017 South Africa joined Water JPI as Full Member. Latvia also changed its role from Observer to Full Member. South Africa is at a different scale.

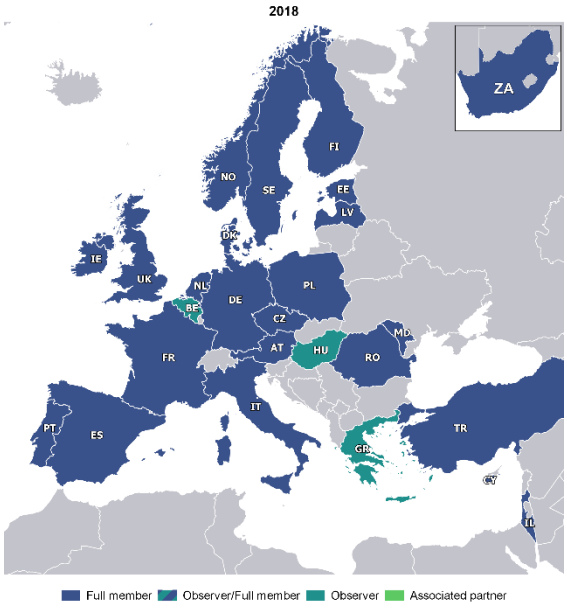

Figure 8. In 2018, the Czech Republic joined the Water JPI as Full Member. South Africa is at a different scale.

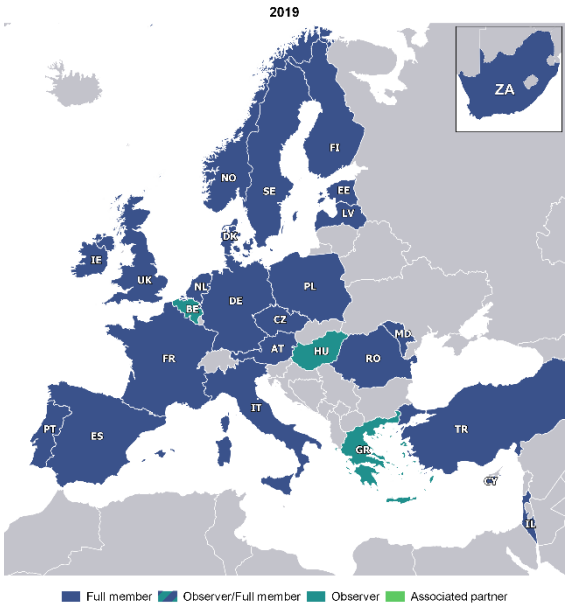

Figure 9. In 2019 there were no changes. South Africa is on a different scale.

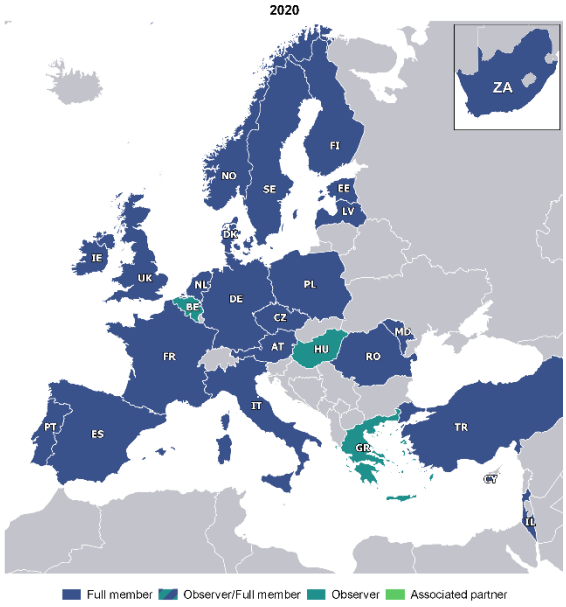

Figure 10. In 2020 there were no changes. South Africa is at a different scale.

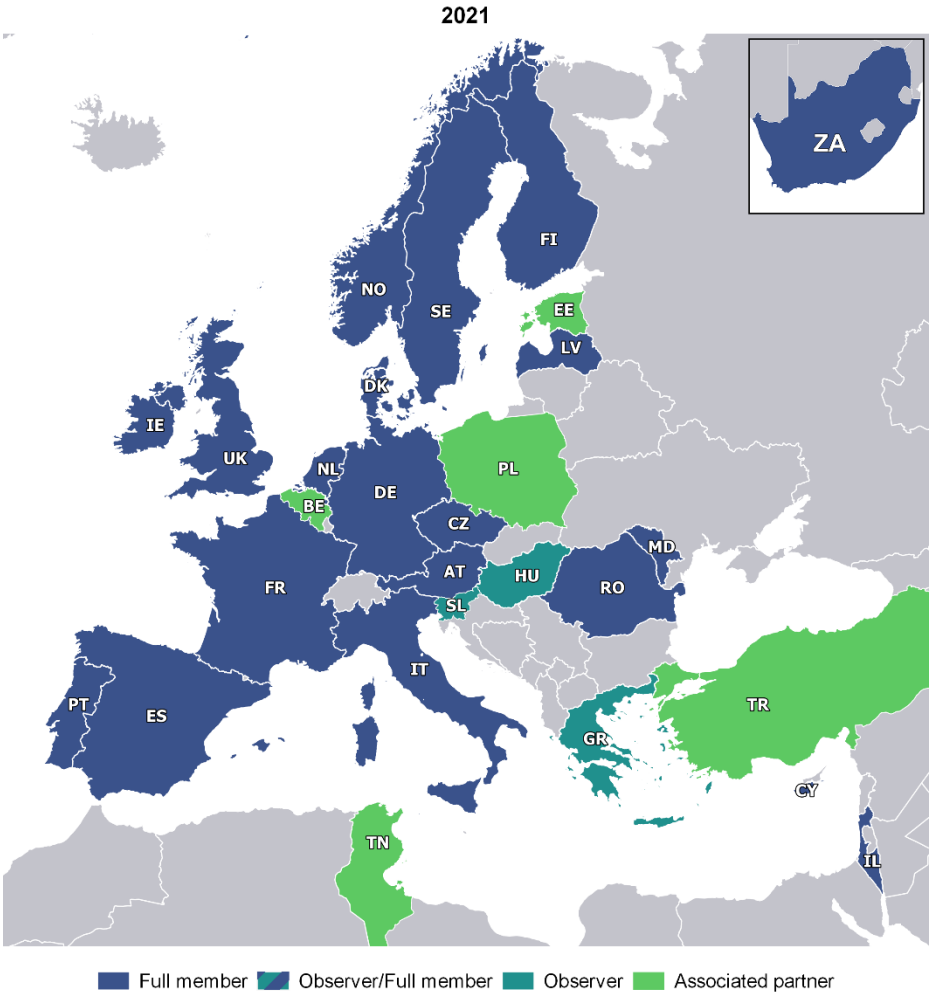

Figure 11. In 2021 Estonia, Poland and Turkey changed their roles from Full Members to Associated Partners. Belgium changed its role from Observer to Associated Partner and Slovenia and Tunisia joined as Associated Partners. South Africa is on a different scale.

Participation in calls

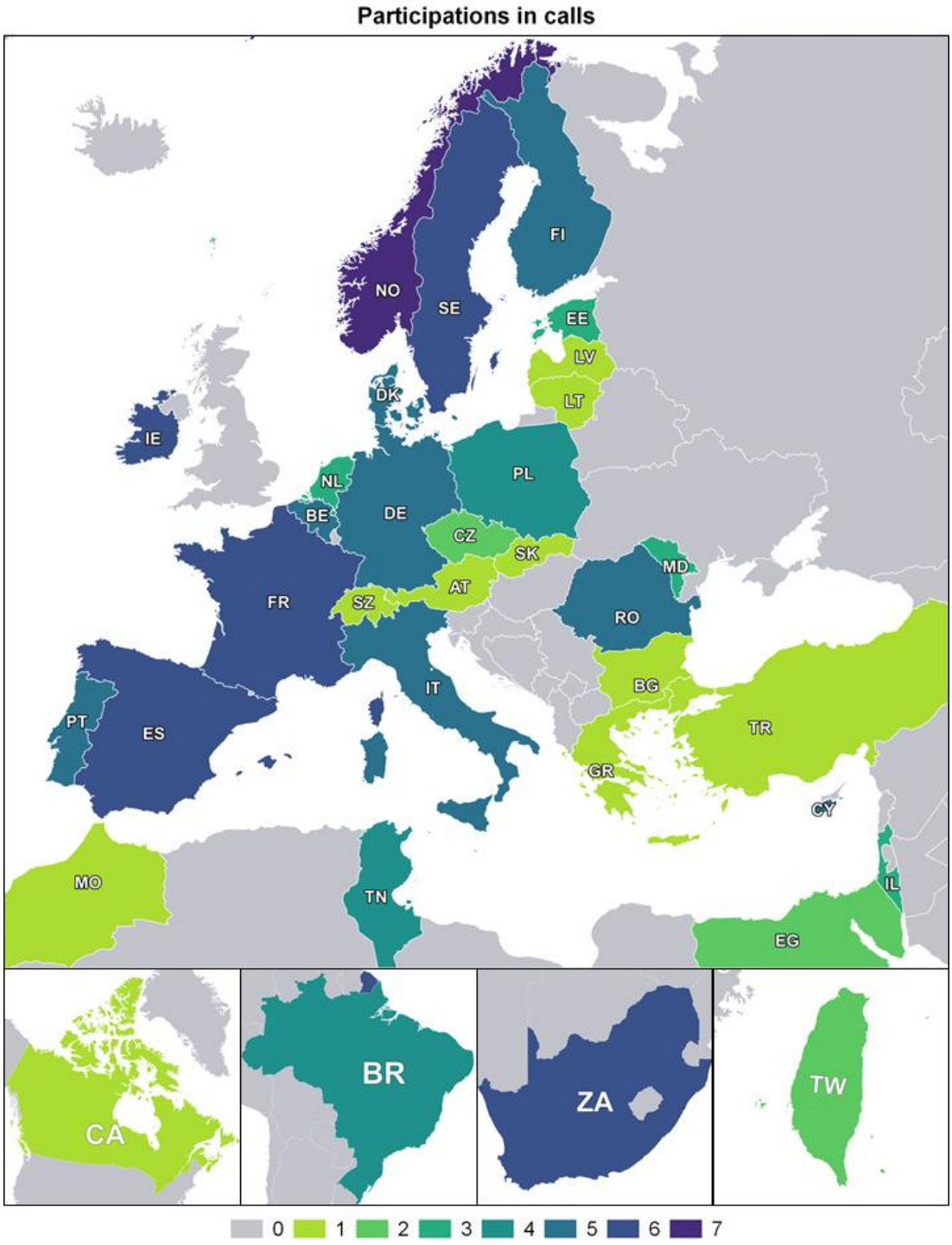

Figure 12. The number of participations in the Water JPI calls: CSA WatEUR 2013 Pilot Call, WaterWorks 2014 Joint Call, WaterWorks 2015 Joint Call, CSA IC4WATER 2017 Joint Call, WaterWorks 2017 Joint Call, AquaticPollutants 2020 Joint Call and BiodivRestore 2020 Joint Call. BiodivRestore final funding decisions are yet to be updated. Canada, Brazil, South Africa and Taiwan are at different scales.

The Water JPI provides funding via competitive Joint Calls for transnational collaborative water RDI projects. To date, five Joint Calls have been launched (2013, 2015, 2016, 2017, 2018) including three calls with support of the European Commission as part of

the Horizon 2020 ERA-NETs Cofund WaterWorks2014, WaterWorks2015 & WaterWorks2017 and two calls implemented within the Coordination and Support Actions WatEUr and IC4Water. The three Joint Programming Initiatives (JPIs) on Water, Oceans and Antimicrobial Resistance (AMR) also launched the AquaticPollutants call. Finally, BiodivERsA and Water JPI launched the BiodivRestore Call.

Call details:

- CSA WatEUR 2013 Pilot Call: Emerging Water Contaminants - anthropogenic pollutants and pathogens. 10 countries participated.
- Joint Call 2015 - WaterWorks 2014: Developing technological solutions for services for water distribution and measurement, wastewater treatment and reuse, desalination, floods and droughts. 15 countries participated.
- Joint Call 2016 - WaterWorks 2015 with the FACCE JPI: Improving water use efficiency and reducing soil and water pollution for a sustainable agriculture 22 countries participated.
- Joint Call 2017 - IC4WATER : Water resource management in support of the United Nations Sustainable Development Goals (UN SDGs). 14 countries participated.
- Joint Call 2018 - WaterWorks 2017: Closing the water cycle gap - improving sustainable water resources management as part of the ERA-NET Cofund WaterWorks2017. 19 countries participated.
- AquaticPollutants Joint Transnational Call 2020: Risks posed to human health and the environment by pollutants and pathogens present in the water resources as part of the ERA-NET Cofund AquaticPollutants. 27 countries participated.
- BiodivRestore Joint Transnational Call 2020: Conservation and restoration of degraded ecosystems and their biodiversity, including a focus on aquatic systems as part of the ERA-NET Cofund BiodicRestore.

Participations in EC projects

Projects funded for each call:

- CSA WatEUR 2013 Pilot Call: 7 projects funded.
- Joint Call 2015 – WaterWorks 2014: 16 projects funded.
- Joint Call 2016 – WaterWorks 2015: 21 projects funded.
- Joint CALL 2017 – IC4WATER: 8 projects funded.
- Joint Call 2018 – WaterWorks 2017: 18 projects funded.
- AquaticPollutants Joint Transnational Call 2020: 18 projects funded
- BiodivRestore Joint Transnational Call 2020: final funding decisions are yet to be updated.

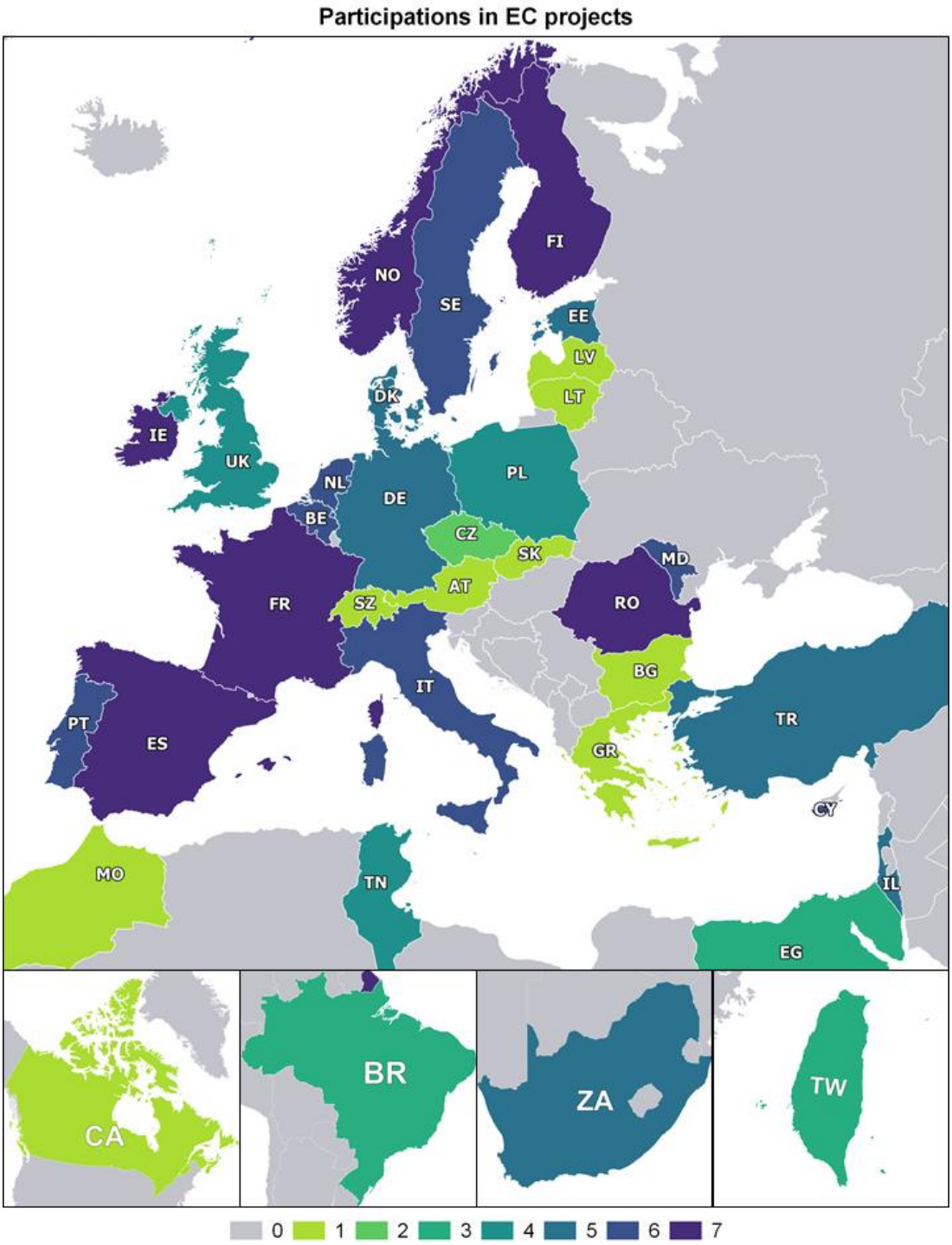

Figure 13. Participations on EC projects in different calls. Canada, Brazil, South Africa and Taiwan are at different scales.

Key leadership roles

- EC project coordinator:
    - The project coordinator is defined as a regular beneficiary to the project that holds extra administration and coordination roles. The coordinator serves as a liaison between the consortium members and the EC, and is responsible for the project reporting, the overall monitoring of the project, transferring the beneficiaries' financial shares and more.
- Joint call secretariat:
    - The Water JPI has a permanently staffed Secretariat hosted by a Water JPI member. Subordinated to the Management Board, the JPI Secretariat ensures technical support for the Governing Board, the Management Board, the Advisory Boards and Task Forces, taking care of the administrative implementation of JPI internal instruments.
- Work package leadership:
    - A work package is a major sub-division of the proposed project. Work Package Leaders are responsible for the management, coordination and implementation of the respective work package.
- Task leadership:
    - A task is part of a work package, describing one of the steps or smaller section of the work. Task Leaders are responsible for the management, coordination and implementation of the respective work package.

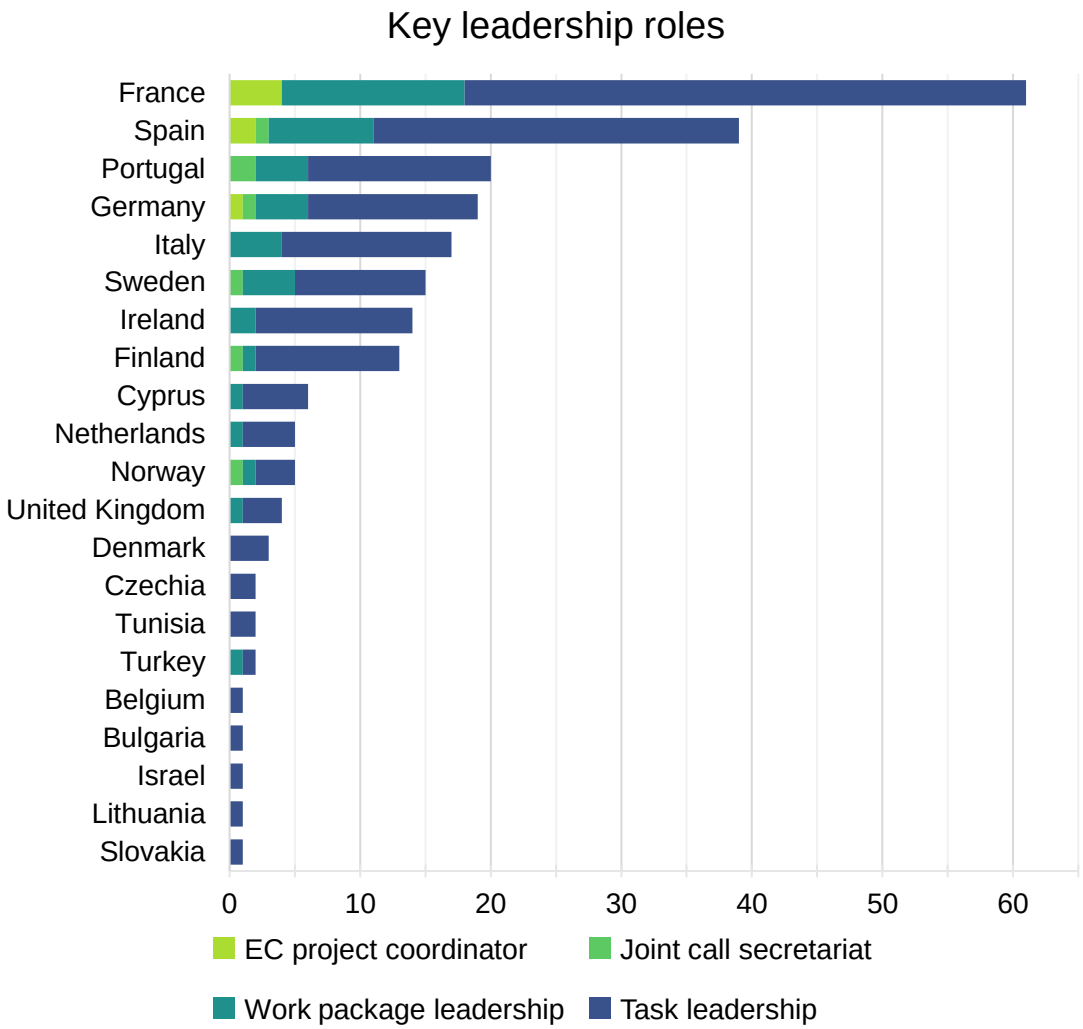

Figure 14. The bars describe the involvement of the Water JPI members in the EC supported projects: EC project coordinators, joint call secretariat, work package leaderships and task leaderships.

Task force roles

Task Forces are established on temporary bases for discussing a specific and identified purpose. They are composed by delegates of the Water JPI member countries who decide to voluntarily participate in specific activities proposed by the Water JPI Governing Board or the Management Board. Their mandate is therefore determined by the Governing Board and/or the Management Board.

- Task Force on Alignment
- Task Force on Interactions with Horizon 2020/Horizon EU
- Task Force on International Cooperation
- Task Force on Research Infrastructure

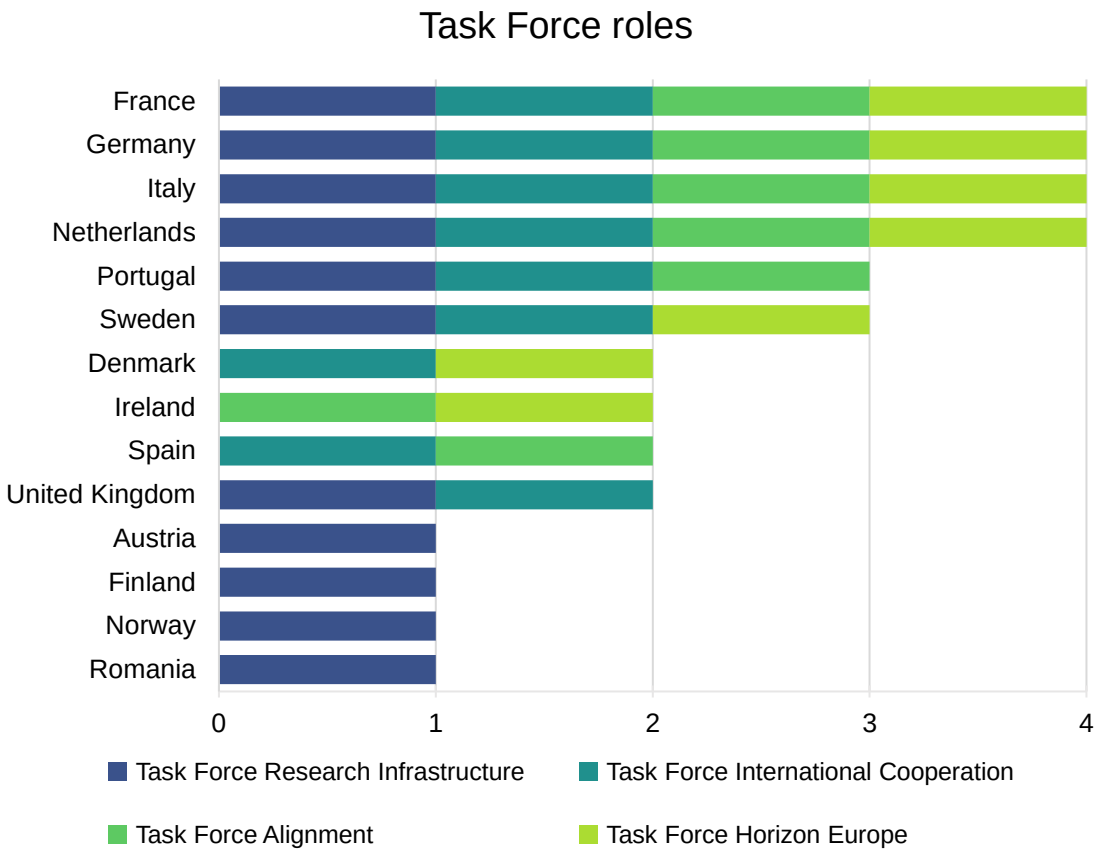

Figure 15. The bars describe the in-kind involvement of the Water JPI member countries in the different Task Forces: Research Infrastructure, International cooperation, Alignment and Horizon Europe.

Funding by partner organisation types (€)

Total costs of funded project participation by partner organisation types. Each bar describes a call, and they exclude BiodivRestore Joint Transnational Call 2020 as its final funding decisions are yet to be updated.

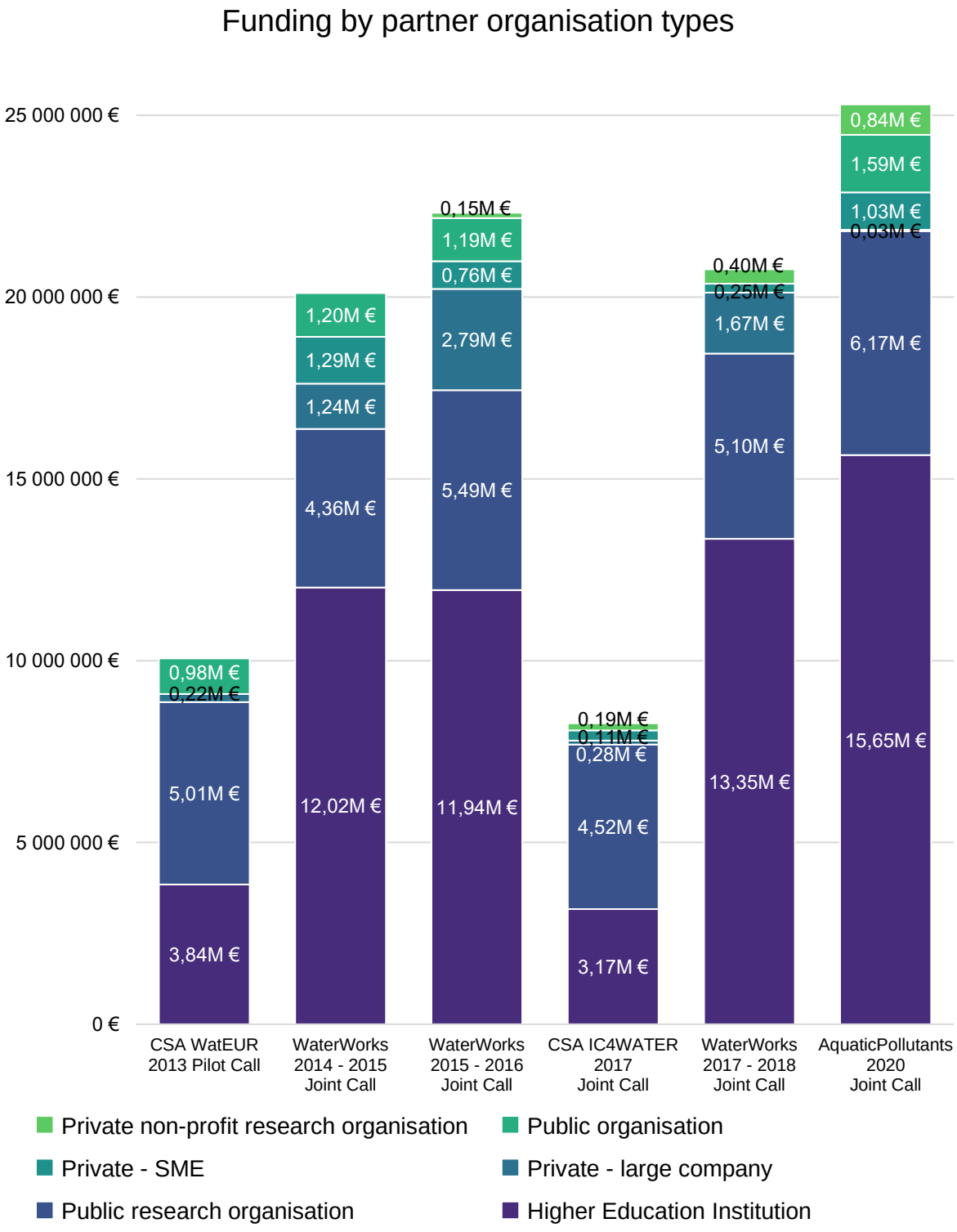

Figure 16. Total costs of project participation by partner organisation types: private non-profit research organisation, private – SME, private – large company, public organisation, public research organisation and higher education institution. All calls except BiodivRestore Joint Transnational Call 2020 are included as its final funding decisions are yet to be updated.

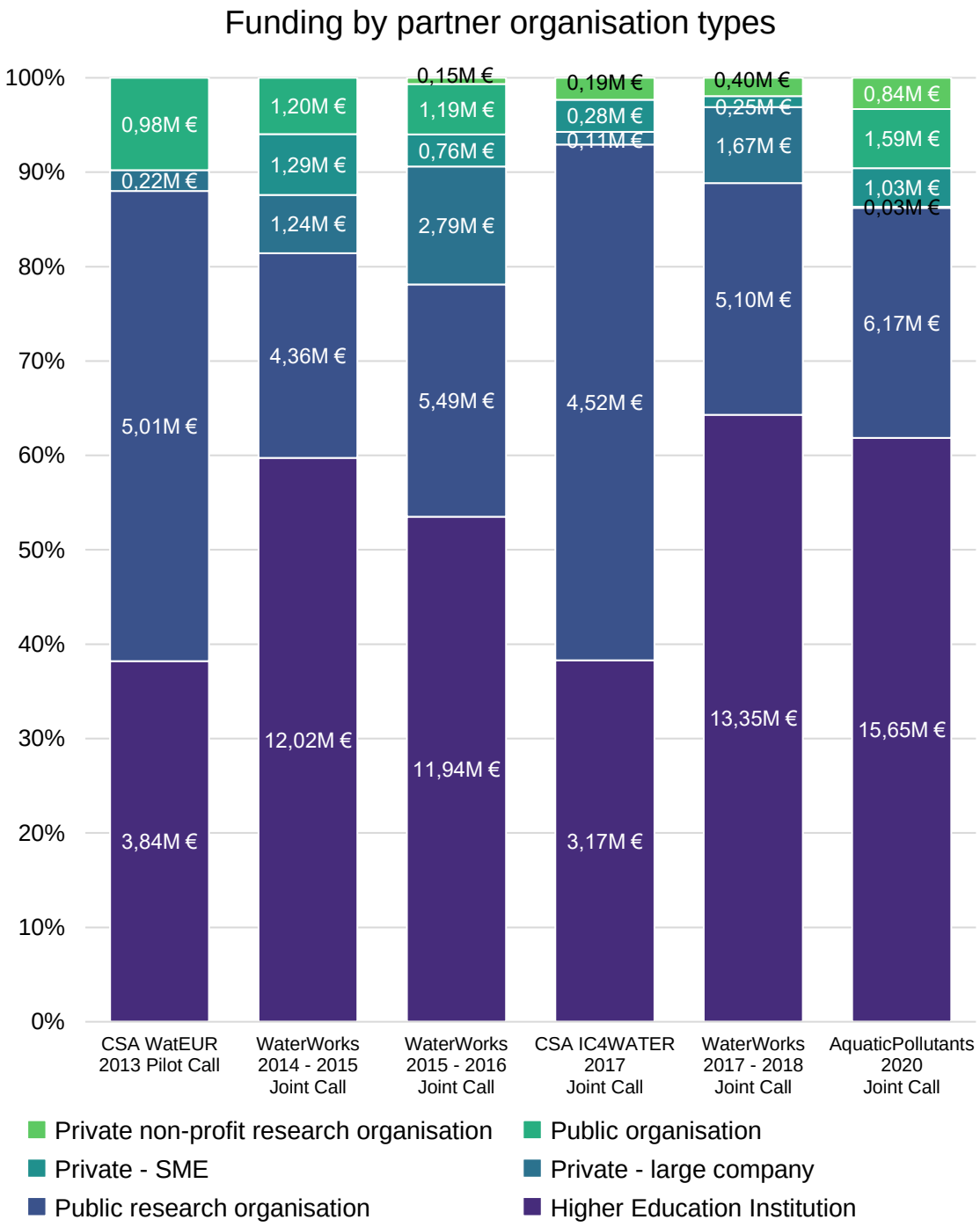

Figure 17. Total costs of project participation by partner organisation types: private non-profit research organisation, private – SME, private – large company, public organisation, public research organisation and higher education institution. All calls except BiodivRestore Joint Transnational Call 2020 are included as its final funding decisions are yet to be updated.

Partners by organisation types

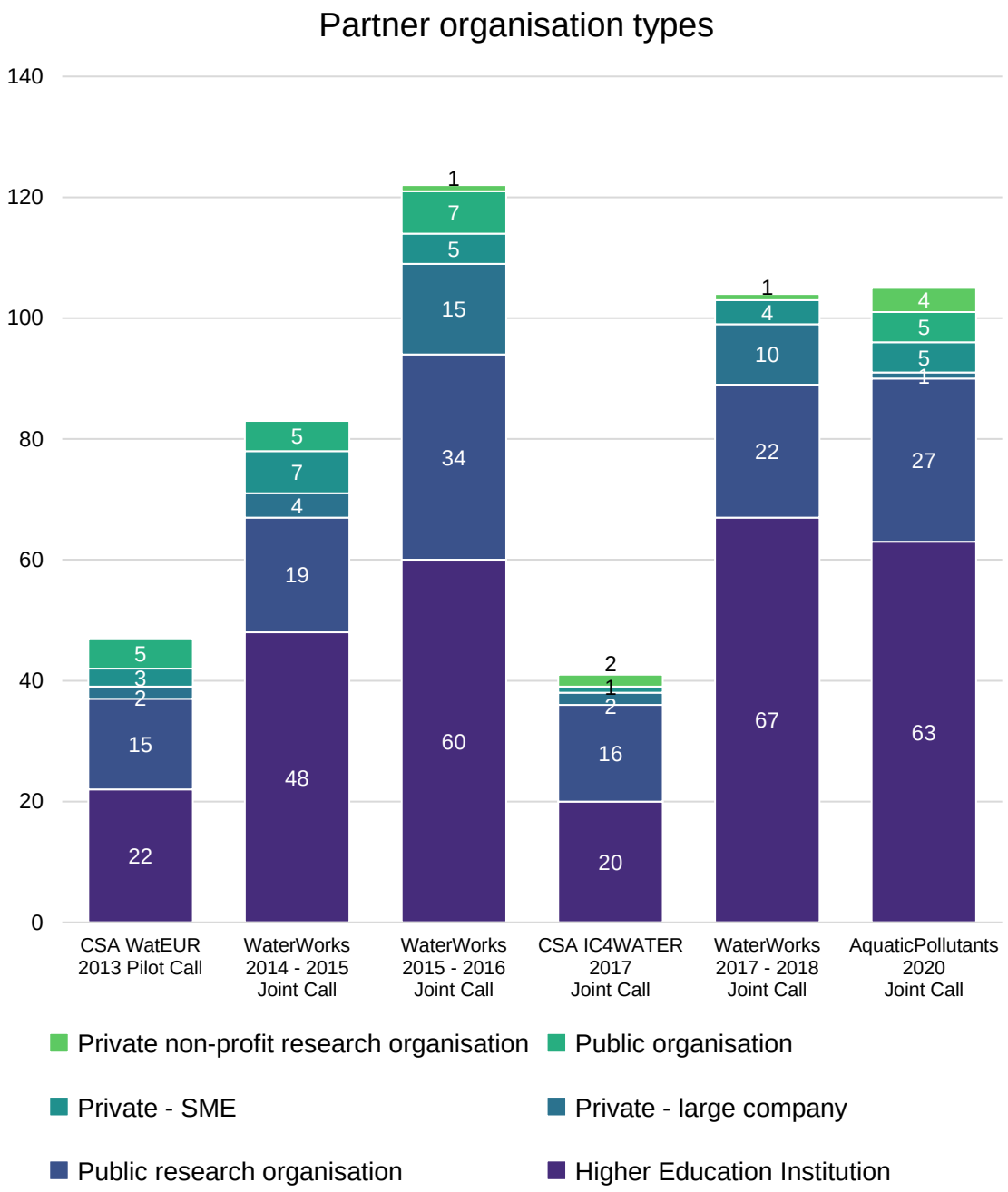

Figure 18. Number of different funded partner organisations classified by the organisation type. All calls except BiodivRestore Joint Transnational Call 2020 are included as its final funding decisions are yet to be updated.

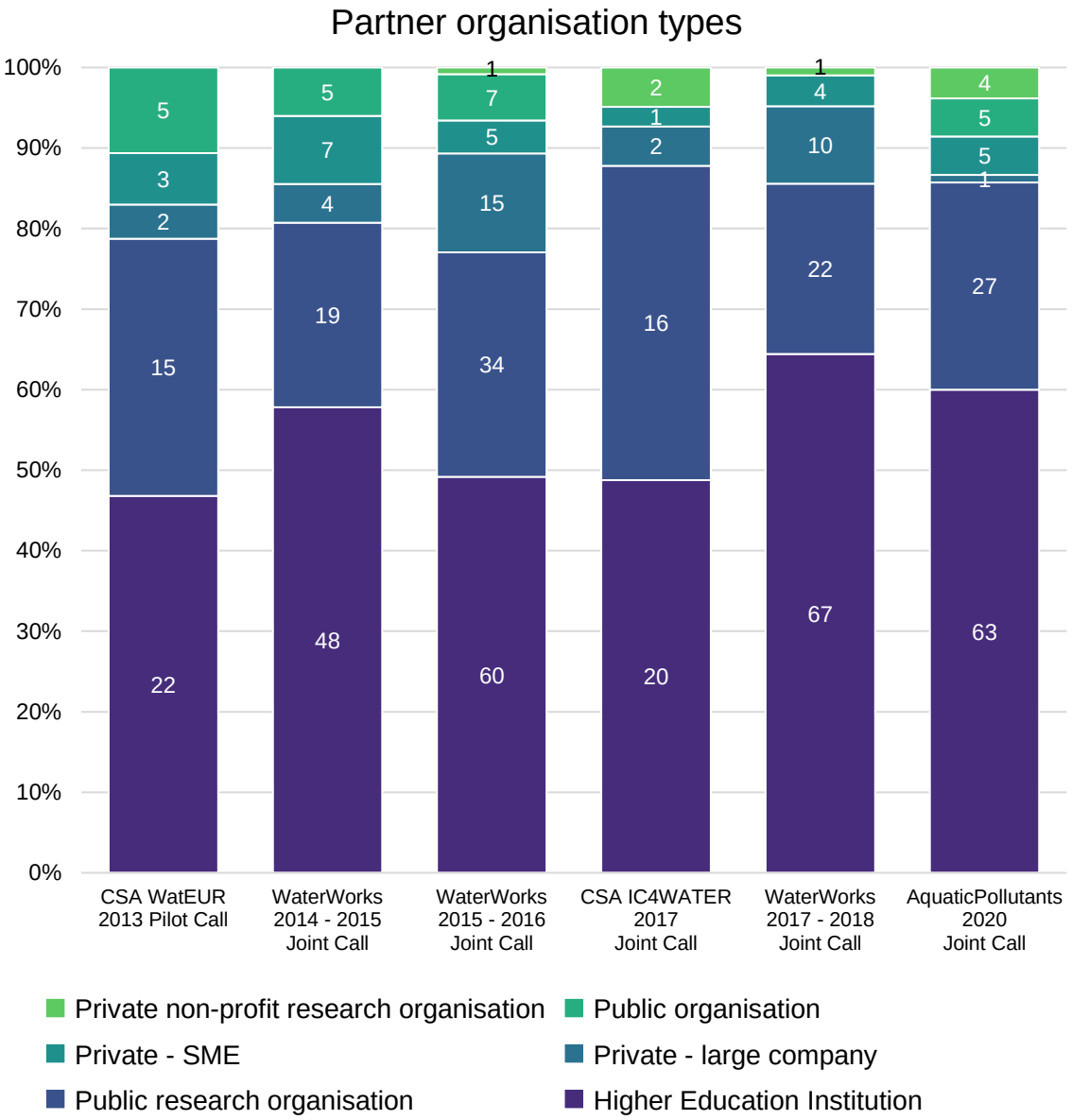

Figure 19. Number of different funded partner organisations classified by the organisation type. All calls except BiodivRestore Joint Transnational Call 2020 are included as its final funding decisions are yet to be updated.

Funded projects

Bar graphs present the number of funded and not funded proposals for each call. At the end of each bar the success rate is included. *All calls except* BiodivRestore Joint Transnational Call 2020 *are included as its* final funding decisions are yet to be updated.

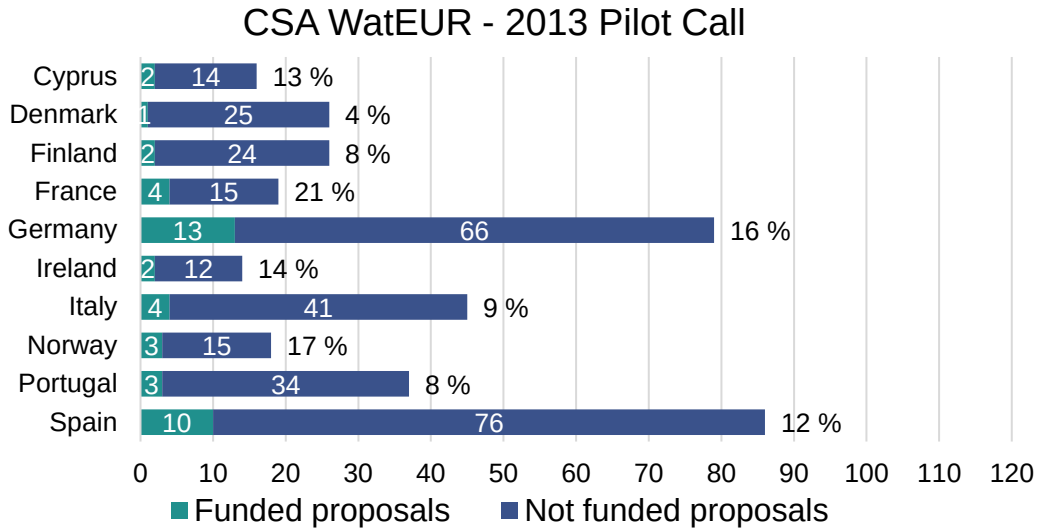

Figure 20. CSA WatEUR 2013 Pilot Call: funded proposals, not funded proposals and success rates.

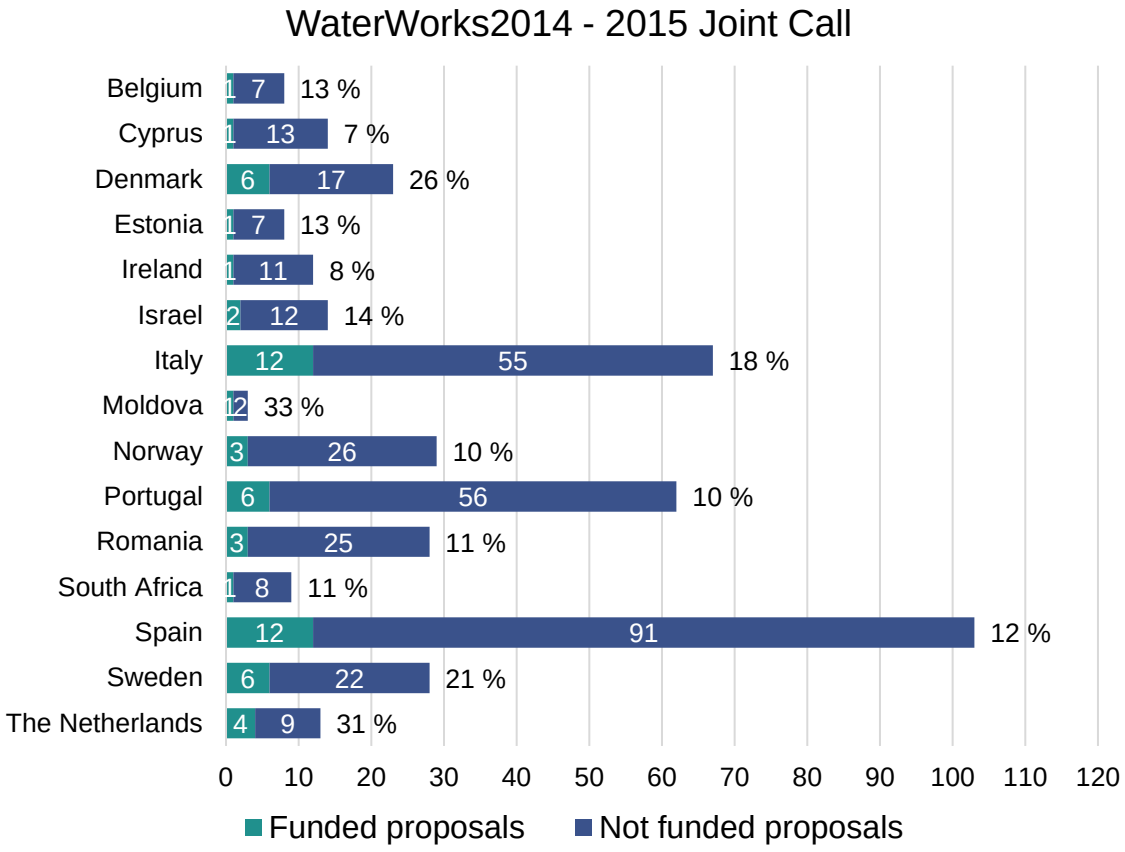

Figure 21. WaterWorks2014-2015 Joint Call: funded proposals, not funded proposals and success rates.

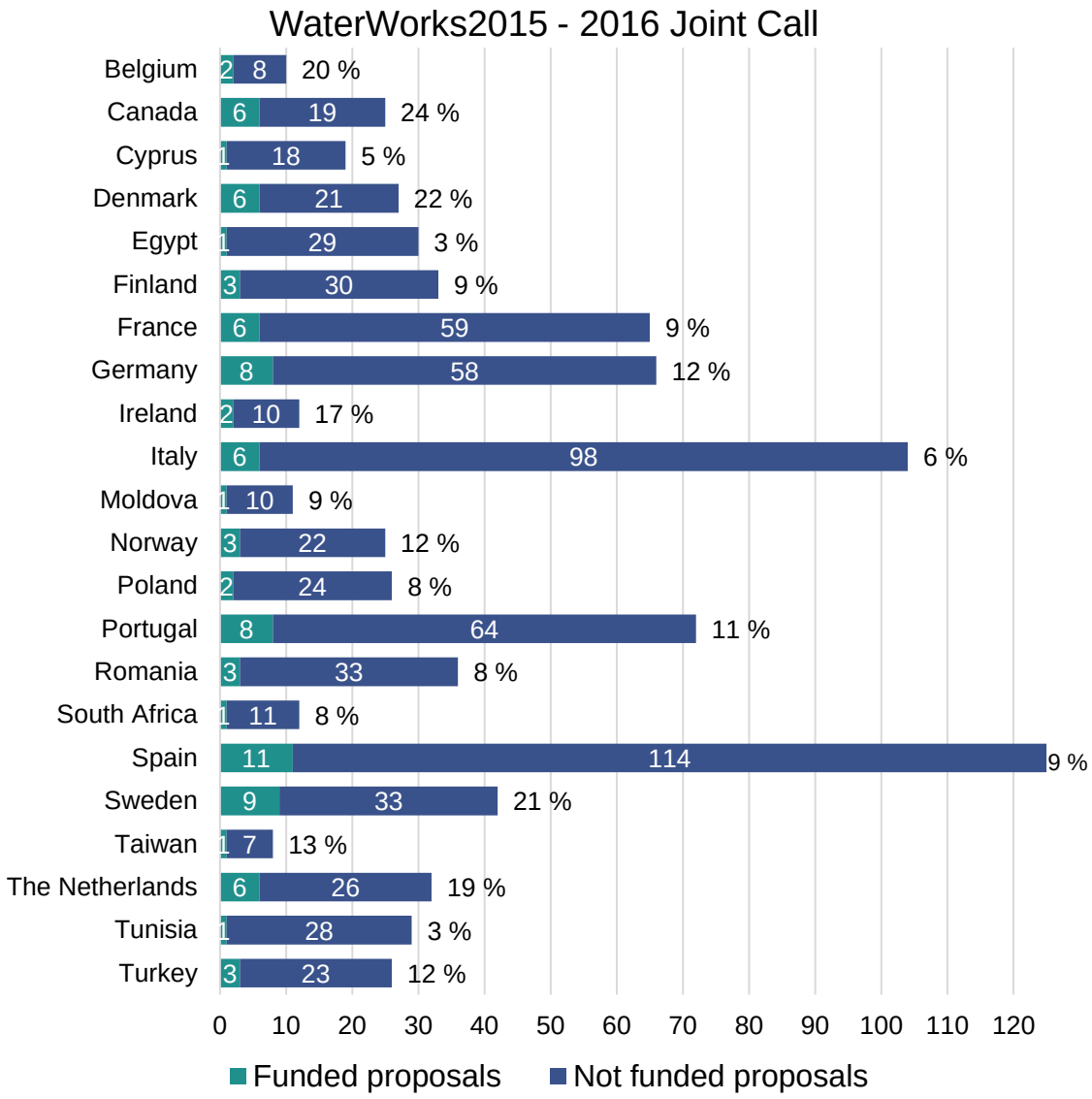

Figure 22. WaterWorks2015-2016 Joint Call: funded proposals, not funded proposals and success rates.

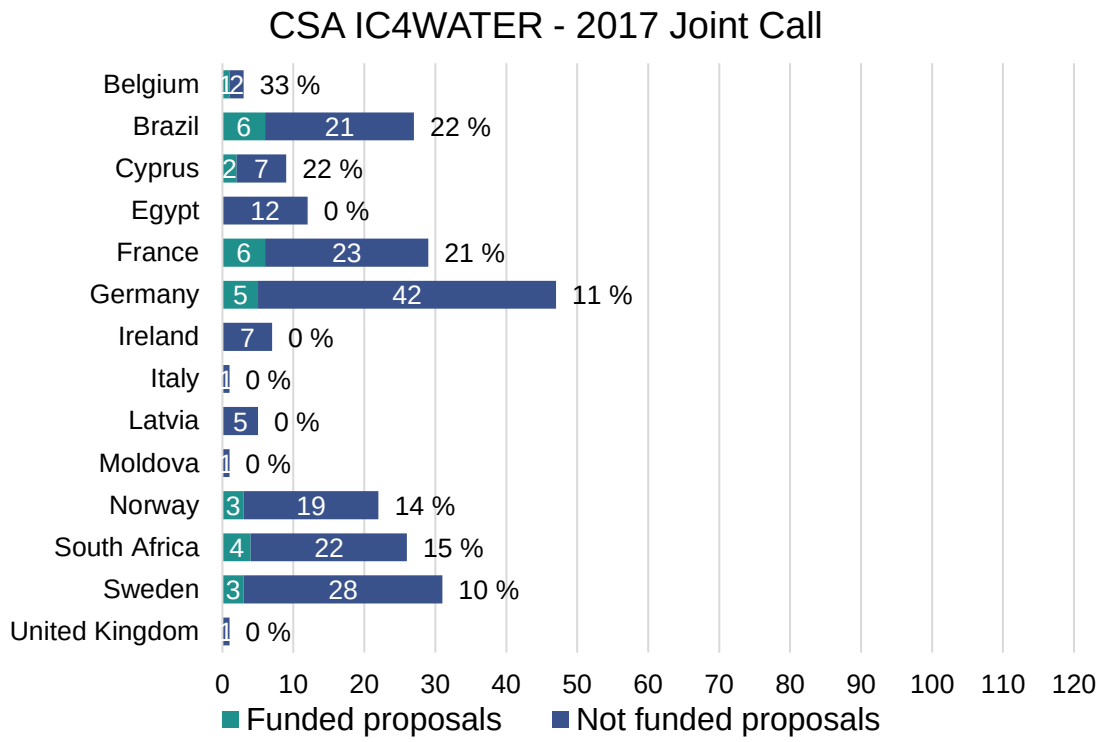

Figure 23. CSA IC4WATER – 2017 Joint Call: funded proposals, not funded proposals and success rates.

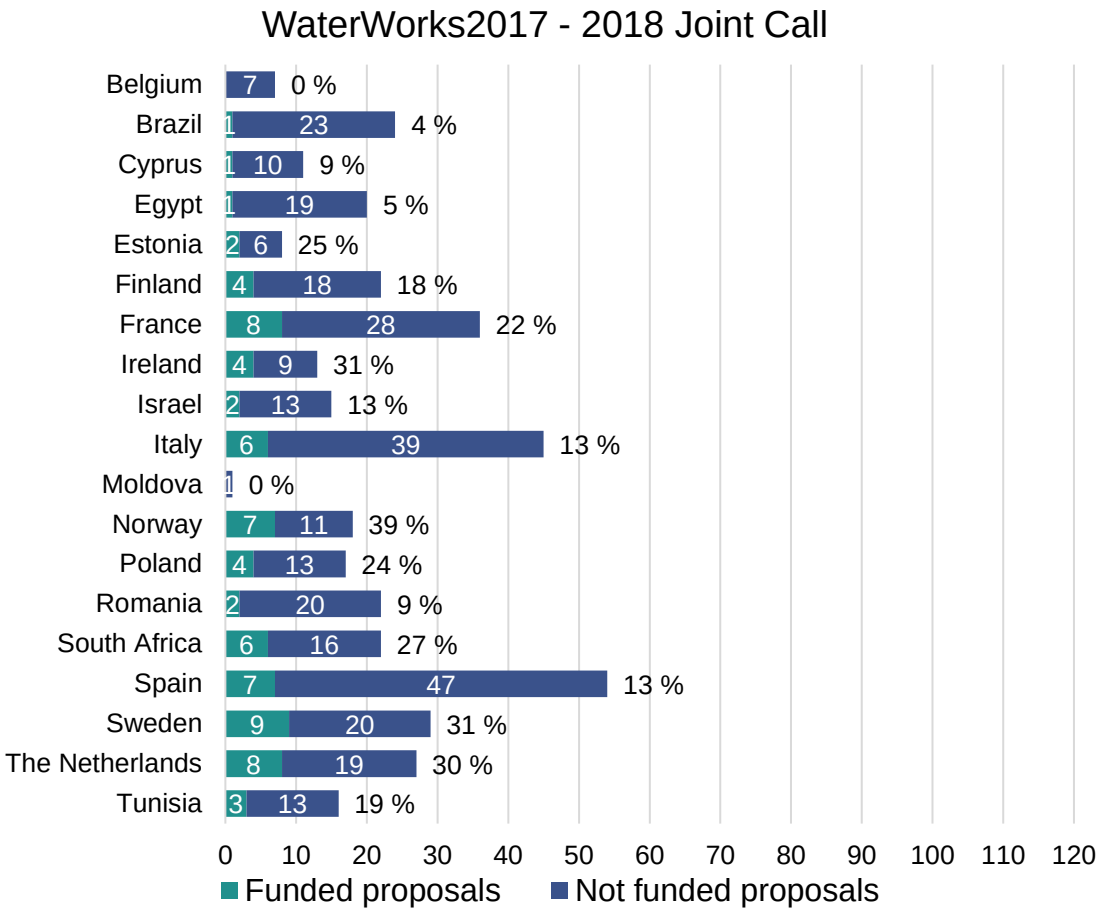

Figure 24. WaterWorks2017 - 2018 Joint Call: funded proposals, not funded proposals and success rates.

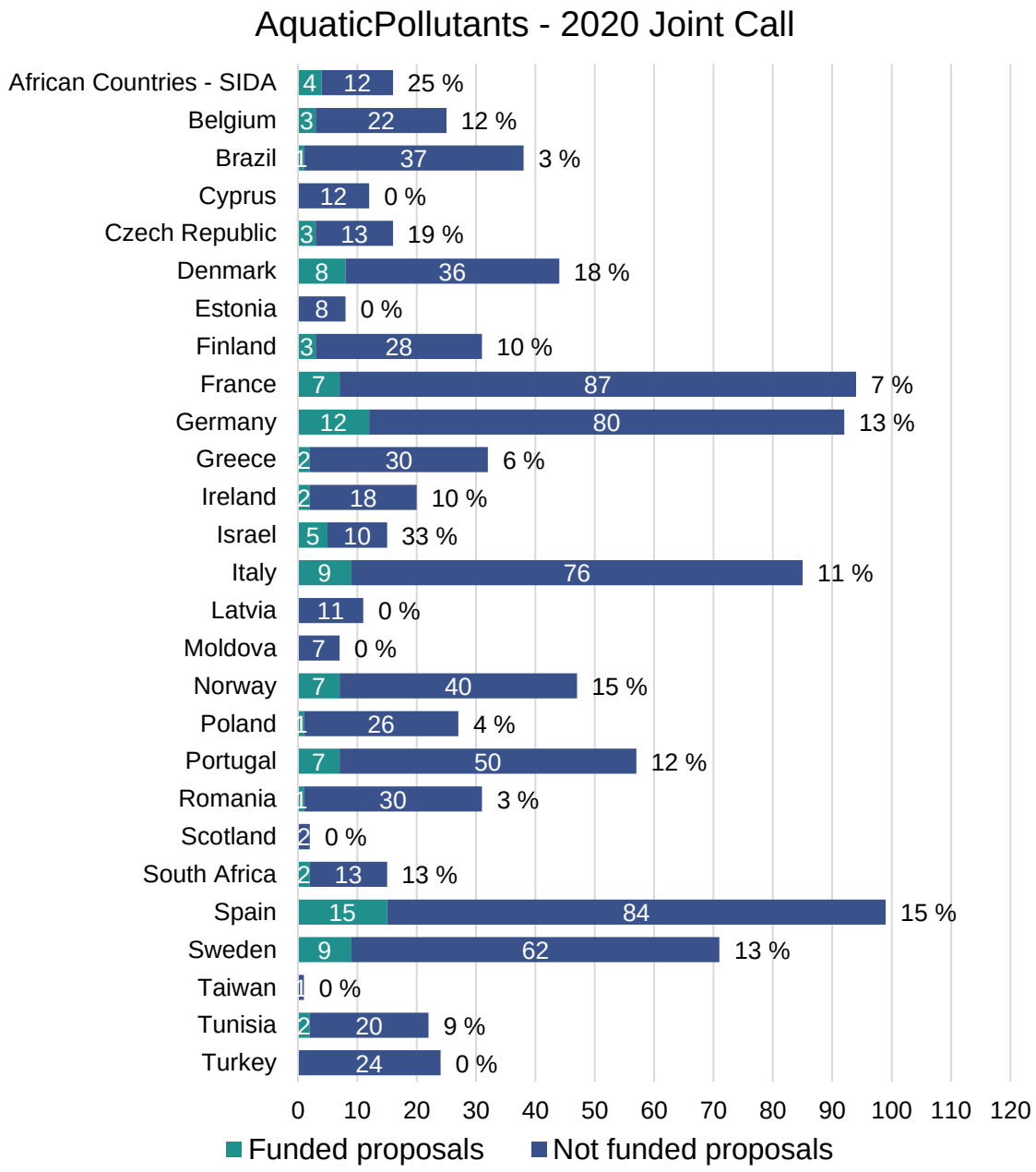

Figure 25. AquaticPollutants - 2020 Joint Call: funded proposals, not funded proposals and success rates.

ANNEX VI – Survey to Governing Board members

Water JPI Impact Assessment

Mandatory fields are marked with an asterisk (*) and must be filled in to complete the form.

As part of the IC4Water Task 6.3. Impact assessment of the joint actions and JPI activities, we are kindly asking you to fill in a survey about your views and experience as a GB representative. The aim of this survey is to collect data and information about impact related topics such as governance, organisation and decision making, communication, alignment, and future of Water JPI. The survey results will serve as material for the external evaluation of Water JPI to be conducted by an independent evaluation committee. Data will be handled and stored according to JPI Privacy Policy as well as IC4Water DL7.1. Ethics and GDPR.

Section 1 - Information about you and your organisation

This section concerns the background information of you and your organisation. Please provide us with information that characterises you, your organisation and country you represent in the Water JPI Governing Board.

1. Background information

First name *

Last name *

Email *

Country represented by you in the Water JPI Governing Board *

Organisation *

Role of your country in Water JPI (Full, Observer) *

2. Which of the following describes the primary function of your organisation? *

- ◯ Funding organisation
- ◯ Ministry
- ◯ Research organisation
- ◯ Other, please specify:

Section 2 - Governance, organisation, and decision making

This section concerns the Water JPI ability to coordinate among the Water JPI members. Although the main purpose of the survey is to evaluate the alignment of research activities and impact of Water JPI, the opportunity is taken to gather views on organisational aspects of Water JPI. The questions in this section refer to internal Water JPI processes, rather than to Water JPI actions themselves.

3. To what extent do you agree that Water JPI has established efficient decision making processes?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	◯	◯	◯	◯	◯	◯	very large extent

4. Please describe any cases where the decision making process has worked particularly well:

5. How could the decision making process be improved?

6. To what extent do you feel that you are well informed about on-going Water JPI actions?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
Not at all	◯	◯	◯	◯	◯	◯	Very large extent

7. If you have any comments related to internal communication, please elaborate (e.g. which information route is most useful for you: GB/Consortium minutes, meeting minutes, intranet, internal communications by emails, newsletter, webpage):

8. To what extent do you think that the partners in Water JPI represent European main actors in P&P funding on water-related challenges?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

9. To what extent do you think that Water JPI has achieved more efficient interaction?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6
Within the initiative	○	○	○	○	○	○
Outside the initiative	○	○	○	○	○	○

10. To what extent do you agree that the processes to develop SRIA and implementation plan are effective and efficient?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

11. How could the SRIA and/or implementation plan process be improved?

Section 3 - Alignment of national research strategies

This section concerns the ability of Water JPI to facilitate the necessary decision procedures for alignment of national research strategies. NB: Some questions refer to past and so the reference is made to SRIA 2.0 version instead of the new SRIA 2025.

12. To what extent does the SRIA2025 reflect the water-related priorities of your country?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	◯	◯	◯	◯	◯	◯	very large extent

13. In your opinion, what is needed for better commonality?

14. Please give your opinion on the effectiveness of alignment of national research strategy in relation to different core research themes identified for SRIA 2.0?

1 = not effective at all, 2 = somewhat effective, 3 = effective, 4 = very effective, 5 = extremely effective

	1	2	3	4	5
Ecosystem Sustainability and Human Well-being	○	○	○	○	○
Safe water systems for citizens	○	○	○	○	○
Competitiveness in Water Industry	○	○	○	○	○
Water-wise Bio-based Economy	○	○	○	○	○
Sustainable Water Resources Management	○	○	○	○	○

15. If you have any comments or specific examples related to research alignment, please elaborate:

16. To what extent has Water JPI met the expectations of GB member countries regarding research outputs in core themes identified for SRIA 2.0?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

1	2	3	4	5	6

	1	2	3	4	5	6
Ecosystem Sustainability and Human Well-being	○	○	○	○	○	○
Safe water systems for citizens	○	○	○	○	○	○
Competitiveness in Water Industry	○	○	○	○	○	○
Water-wise Bio-based Economy	○	○	○	○	○	○
Sustainable Water Resources Management	○	○	○	○	○	○

17. To what extent has the Water JPI SRIA influenced the focus of national research programmes or policy agendas?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

18. To what extent has the Water JPI SRIA influenced the focus of national

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6
research programmes	○	○	○	○	○	○
policy agendas	○	○	○	○	○	○

19. Please provide examples:

20. To what extent has Water JPI increased national stakeholder co-operation?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

21. To what extent has Water JPI increased national research collaboration in water sector?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

22. Please identify the main obstacles to the adaptation of Water JPI SRIA into national research programmes, and suggestions to overcome these barriers:

23. To what extent does Water JPI contribute to avoiding duplications and filling gaps between member countries?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

Section 4 - Water JPI joint actions

This section addresses the effectiveness of different instruments and activities used by Water JPI.

24. To what extent do you agree that following instruments/activities are effective in addressing aims and objecives of Water JPI?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6
CSAs	○	○	○	○	○	○
ERA-Net Cofunds	○	○	○	○	○	○
Joint Calls	○	○	○	○	○	○
Transnational calls	○	○	○	○	○	○
Knowledge Hubs	○	○	○	○	○	○
TAPs	○	○	○	○	○	○
Workshops	○	○	○	○	○	○

25. Are there any types of actions that you think are missing and should be implemented or used by Water JPI and why?

Section 5 - Internationalisation

This sections concerns the international (beyond Europe) activites of Water JPI.

26. To what extent do you consider that Water JPI has succeeded in extending activities and incorporating partners outside Europe?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

27. To what extent do you consider that Water JPI has gained visibility and become relevant at international level?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

28. To what extent do you consider the inclusion of international partners in Water JPI actions to be beneficial?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

29. If you have any comments related to cooperation beyond Europe, please elaborate:

Section 6 - Future of Water JPI

This section addresses the expectations on the future of Water JPI.

30. To what extent has Water JPI met the goals of achieving sustainable water systems for a sustainable economy in Europe and beyond?

1 = not at all, 2 = very small extent, 3 = small extent, 4 = moderate extent, 5 = large extent, 6 = very large extent

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	very large extent

31. How do you see the future of Water JPI?

1 = not relevant at all, 2 = somewhat relevant, 3 = relevant, 4 = highly relevant

	1	2	3	4	
not relavant at all	○	○	○	○	highly relevant

32. If you have any further comments related to the future of Water JPI, please elaborate:

33. In your opinion, what kind of impact has Water JPI achived so far?