ANNEX 3: METHODOLOGY EXTENDED

3.1. Questionnaire(s) design – Instrument, Methodology and Procedures.

3.1.1. Design of the instrument

First Phase

This instrument was developed in two phases. The first phase corresponded to the outline of a single questionnaire structure, development of its contents and creation of an electronic version of the document in the SURVS Platform, followed by a limited opening of this Platform to the Water JPI and WatEUr partners for completion the questionnaire.

Throughout the first phase of the design of this instrument, many reviews of the document was undertaken and several corrections and reformulations proposed by leaders and partners.. A final draft of the questionnaire was sent to all WP2 partners for discussion on 20th February 2013. The document was then considered too extensive and several issues were carefully reexamined. Until the launching of its electronic version on 7th May 2013, significant improvements were introduced to make it a more effective and user-friendly instrument.

The final questionnaire structure consisted of four distinct groups or sections:

1) Thematic priorities;
2) Government strategies;
3) Funding schemes;
4) Performance in Water RDI.

This partition aimed to satisfy the organization of the contents as they were described in the DoW. We highlight that one of the main purposes of this mapping exercise is not to limit its context to funding agencies, a target group that typically receives more attention in this type of exercises, but also call in lead researchers and performers in the in Water RDI and management sectors. The Water JPI is committed to listen to different agents and examine different subjects in the Water sector.

The perception that the instrument needed validation before being open to the public, led to the decision to carry out a limited submission exercise among Water JPI and WatEUr partners (including observers). Thus, between May and the 10th October 2013, partners were invited to complete the questionnaire in the SURVS platform. Results were discussed and published in an internal report (2013 Mapping Report). Final suggestions for modification of the document were presented.

Second Phase

The second phase corresponded to a review of the contents of the questionnaire after the first submission period, the split of the document into four independent questionnaires and opening of the SURVS Platform to the Water RDI community in general.

The desire to create a user-friendly questionnaire, avoid an excessive number of questions and a heavy data collection process was a general concern during this phase. The partition of the original questionnaire into four distinct documents followed the groups or sections structure of the first and significantly eased the handling of the online questionnaire:

1) Thematic priorities;

2) Government strategies;
3) Funding schemes;
4) Performing Organizations.

In what concerns the contents of each questionnaire, some questions that pose appreciable difficulties to be answered were withdraw, while some others were added, especially to try to collect opinions on certain themes as international collaboration, cooperation with stakeholders and evaluation procedures.

Although some suggestions to facilitate the management of the electronic document in the SURVS (possibility of access through login, inserting links and pop ups, etc.) were not feasible due to the technical features of the platform, in general, the overall structure of the questionnaires ended up lighter and more adequate to the targeted profiles.

In February 2014 dissemination of the mapping exercise started.

3.1.2. Description of the contents of the questionnaires and targeted respondents, according to WatEUr CSA DoW

As we mentioned above, each of the four questionnaires is dedicated to a specific theme:

- Questionnaire 1: Thematic Priorities;
- Questionnaire 2: Government Strategies;
- Questionnaire 3: Funding Schemes;
- Questionnaire 4: Performing Organizations.

The targeted data sought in these questionnaires is comprehended in a period spanning from 2007 to the end of 2013, in order to cover most of the 7thFP.

Thematic Priorities

The Thematic Priorities group was included in the original questionnaire structure at the request of partners responsible for the elaboration of the SRIA, which considered that the possibility of identifying thematic areas in an effective and simple way would represent a significant contribution to WP3 and avoid the multiplication of questionnaires with the same scope. This suggestion, fully justified, was attended and illustrates the importance of the relation between WP2 and WP3. After the split of the original document, it subsisted as an individual questionnaire.

This questionnaire should be answered by all types of organizations: - governmental, public, private, companies, NGOs, etc. Having as landmark the SRIA priorities (including Ecological Engineering), respondents were asked to identify their organization's thematic priorities, respective level of priority (high or low) and temporal priority (short, medium or long-term). Indication of other high-priority topics not mentioned in the SRIA was also requested from respondents. Finally, respondents were asked to assess each priority against the following criteria: Return of the RDI investments to society; Societal wellness; Competitiveness, entrepreneurship; Progress in science and technology; Contribution to improving the state of the European environment; Contribution to tackling the societal challenges problems identified in Horizon 2020; National strategies and Contribution to tackling European policy priorities.

In order to sharpen the wider spectrum of the SRIA topics, nine topics with multiple subtopics were presented to be selected according to the areas privileged by each respondent organization. These nine topics were: Water Use, Water Quality/Ecology, Water Availability, Water Technologies, Water Management, Economic Use of Water Resources, Evaluation of Impacts from Environmental Pressures and Others (Water Governance and Policy; Socioeconomic Aspects of Water Management).

Governmental Strategies

According to DoW (Task 2.1), "*Governmental strategies for water RDI will be assessed. The prevalence of top-down and bottom-up approaches will be analyzed for different RDI funding dimensions: a) research, development, and innovation; b) projects, infrastructure and mobility; and c) public and private (industry) research performers. The different approaches will be contrasted and analyzed in view of major International programmes, with particular emphasis on the Framework Programme of the EC.*".

The targeted respondents for this questionnaire were governmental organizations in charge of strategic definition in Water RDI: Ministries, public institutions, municipalities and other regional authorities.

The information requested is intended to explain the thematic behind the strategic design in the Water area. The subtopics included in this questionnaire were: scientific areas where water is approached; focus of the strategies of the implemented research programs (basic or applied research); information available on national and international researchers in the water field; type of stakeholders with whom governmental organizations develop cooperation; international cooperation and nature of its activities; and technology transfer.

Despite Thematic Priorities and Governmental Strategies are particularly related they do not necessarily match each other. The fact that some organizations may identify certain topics as drivers of their activities, both as funders or performers, does not mean that a government strategic policy is settled in these domains. By governmental strategies, we are referring to policies formally defined and implemented by governmental organizations.

It was provided in this questionnaire the possibility of submitting additional documentation, concerning foresight studies, reports, regulations, and other relevant documents to the SRIA.

Funding Schemes

The objectives of Task 2.2 of the DoW are to "*deliver an up-to-date inventory of national supply-side actors related to water RDI in Europe. Major programmes (addressing projects, infrastructure and mobility) will be targeted. Programmes will be analyzed to assess their structure, goals, procedures, funding and evaluation schemes, administration, timing and resources (both managerial and funding).*

This task will highlight:
• Gaps. These are thematic fields which are – in comparison with other fields – less covered or not covered by current national and EU RDI funding programmes.
• Needs. Gaps will be analyzed in terms of their significance, taking into account present and future societal, economic and scientific trends. This will lead to the identification of RDI needs in thematic fields: a) insufficiently covered; and b) clearly relevant.
The mapping exercise completed in 2011 by the Water JPI will be a clear precedent to this work."

This questionnaire aims to address institutions, agencies and companies responsible for Water RDI funding, regardless of their public or private origin.

Through the analysis of this questionnaire results we aim to understand how each entity distributes its investment in the area of Water, in comparison with the global funding effort in other domains. It is also intended to characterize, as clearly as possible, the types of Water RDI funded activities.

This is the questionnaire with a sharper quantitative component, essential to identify the distinct layers of Water funding and RDI activities. Emphasis is based on competitive funding, which is the most expressive and representative of financial support, and the one that continuously sustains the interface between funding agencies and the scientific and technological system. It aims at the identification of all the actors and factors involved: stakeholders, beneficiaries, eligible expenses, nature of the funded activities (basic, applied or innovation), regulatory sources of funding, and

amounts of funding per activity. This will outline the water sector in comparison with other areas, but will also objectively enhance the dominant themes within programs, projects, grants, mobility and infrastructures.

In addition, this questionnaire intends to understand the procedures related to non-competitive funding and specific areas where it applies. Cooperation with companies/industries, international cooperation modalities and call procedures are also highlighted.

Performing

As we can read in Task 2.3 of the DoW, "*This mapping area is unprecedented in the Water JPI. It will concentrate on activities developed in RDI performing institutions. The Task will provide an overview of:*

• Relevant RDI actors in Europe;
• Relevant RDI infrastructures, whether included in the ESFRI roadmap, or associated to National RDI agendas;
• Relevant RDI projects funded at all levels; and
• Mobility schemes with European dimension and institutional activities supported by Marie Curie actions. While this Task will focus on characterizing the main traits of the RDI scene, attention will also be paid to singular items which could inspire future Water JPI activities. The knowledge boundaries of the Water JPI will be explored for gaps and needs, analyzing the possible interaction with other JPIs in the fields of knowledge where they exist."

This questionnaire is meant to encompass diverse information and thus reveal thematic priorities and procedures in Water RDI performance organizations. As previously mentioned, thematic priorities are deployed in a specific questionnaire, whereas in the performing questionnaire we seek to particularize the environment in which the performance is undertaken.

For this purpose, and in addition to the type of performance held by the respondents (basic, applied and/or innovation), other key areas on Water RDI are also included in the inquiry, namely scientific programs, projects, infrastructures, scholarships/mobility and other actions. Questions about the typology and classification of infrastructures and about stakeholders with whom the performers collaborate are also considered in the query, as well as the characterization of subjects and actors in international cooperation. It was also accentuated the dimension of competitive funding compared to non-competitive, the type of expenditure executed and the source of the funding rules applicable to the performer organizations. The questionnaire concludes with the comparison between self-funding and external funding share.

3.1.3. Procedures for the questionnaires dissemination and completion

Procedures for the dissemination of the questionnaires

The targeted respondents for this mapping are organizations/institutions and not single individuals. It was agreed that each Water JPI/WatEUr CSA partner would be responsible for setting up their national mailing lists. The list would then be sent to WP leaders and co-leaders for a centralized dissemination of the questionnaires among the names provided and monitoring of results. Nevertheless, it was anticipated the possibility of interaction with any of the national contact points of the consortium whenever specific questions on each country's realities arise throughout the questionnaire completion.

Since the scope of this exercise is to cover all European countries, including those that do not integrate CSA or JPI, neither the EU, it was decided that the WP2 leaders and co-leaders would jointly establish the mailing lists for these countries, and consequently include them in the dissemination process of the questionnaire. This responsibility was, afterwards, extended to some JPI/CSA partners that offered to help with the endeavor.

Mailing lists were provided for the following countries: Austria, Cyprus, Denmark, Spain, Estonia, Finland, France, Ireland, Italy, Norway, Portugal, Turkey, United Kingdom, Sweden Czech Republic and Switzerland. Also, two contacts were provided in Slovenia and one each in Slovenia and Bulgaria.

Supported by these mailing lists, leaders and co-leaders centralized the dissemination process, sending to the contacts in each organization an individual email invitation to participate in the mapping exercise. This email contained the "rationale" of the exercise, the links to access the four questionnaires and instructions to reply.

Support documents: Rationale, NODOQ, Tips for Mailing Lists

During the first phase of the design of the questionnaire, some supporting documents were produced and sent to partners in order to clarify the objectives of the exercise and all procedures concerning the questionnaire.

The "Rationale", i.e., the dissemination message, explains the objectives of the survey and settles a message to be distributed via e-mail with the link of access to the electronic platform SURVS. This message was adapted in the second phase for the dissemination of the four different questionnaires.

The "NODOQ" (No Doubts on the Questionnaire) intends to answer questions on current objectives, structure and procedures for management and dissemination. This document was created for exclusive access of Water JPI and WatEUr partners.

The "Tips for Mailing Lists" (also a restricted access document), aims to help partners in the setting up of mailing lists of potential respondents by clarifying the type of target organizations, contacts within the organizations and also by presenting suggestions to expand the network of contacts for dissemination.

Online platform SURVS

The questionnaires were allocated in the internet-based SURVS Platform. This platform was selected due to the proficiency of the WP leaders in its use.

The platform offers possibilities for content editing and creates automatic statistics for analysis, as answers are submitted into the system.

The SURVS also provides an effective help desk to the managers via e-mail, which has proved to be very useful to clarify several issues and to assess the possibility of implementing some of the suggestions presented by partners. Leaders and co-leaders assumed subsequent responsibility for providing a helpdesk to the respondents.

Procedures for the submission of the questionnaires

Each type of questionnaire is accessible through an individual link that does not require personal access codes.

When entering, respondents are required to identify themselves (name, function, contacts) and their organizations (name and contacts).

The questionnaires contain "Yes/No" questions, multiple choice questions and open questions, where a brief description is required.

The first page of each questionnaire contains information about the targeted respondents and instructions on how to fill the survey. The 'Next' Button at the bottom of each page allows progression to the next page and saves the draft questionnaire. This will avoid loss of information and allows respondents to come back and resumes editing.

Completion of the questionnaire is signaled by pressing the button "Submit". Submission is possible with questions unanswered but seals the report.

Confidentiality issues

Even though the answer to the questionnaire requires the identification of the organization/institution and the person responsible for the survey completion, confidentiality of the responses/data is assured in a note in the first page of each questionnaire:

> *"Information provided through this questionnaire will be published aggregated, only referring to country and type of organization. No results will be published linking the name of the organization responding and their answer."*

Considering this commitment, in the data show and analysis of results all references to specific respondent organizations were deleted. Also, country analysis were avoided in cases where a single respondent was involved, leading to an easy identification (e.g. in the "Funding Schemes" questionnaire, most countries is represented by a single agency/institution).

Monitoring of responses

WP2 leaders and co-leaders are responsible for monitoring the responses and directly contact the respondents if questions arise.

Regular reminders were sent to the targeted respondents in order to stress the importance of the mapping exercise and encourage their collaboration. Postponement of deadlines was also used to ensure a larger number of respondents. Total availability to assist respondents in the process was offered.

WatEUr CSA and Water JPI partners were regularly encouraged to submit, revise and expand their respective mailing lists to feed the process of dissemination, in order to make it the most effective, comprehensive and consistent (balance among the number and representativeness of the recipients per partner) as possible.

Submission period

The current mapping exercise started in February 2014. Dissemination began with the Water JPI countries that in good time provided contact lists and continued as new lists were received.

The mapping of European countries not involved in Water JPI/WatEUr CSA is being ensured by WP2 partners that offered to set up mailing lists for these countries. Help in this task is also requested at different levels (GPC, funding agencies national contacts, etc.) since the accurateness of a list compiled by non-nationals is certainly impaired by language barriers and lack of national/regional/local knowledge.

All organizations contacted were given two months for responding. However, considering the fact that the exercise was to last until September 2014 and a large number of contacts failed to respond in time, postponement of the original deadlines were granted.

The ultimate deadline considered for submission of responses in the 2014 mapping exercise was the 30th September 2014.

Since the exercise is to continue throughout 2015, the SURVS Platform is kept open. Procedures for setting up mailing lists, dissemination and monitoring will proceed as agreed.

3.1.4. Validation of respondents and responses

In the beginning of October 2014, WP2 leader exported the data submitted in the SURVS to Excel files and started the validation phase.

The following criteria were agreed to validate both the respondents and responses to the survey:

- Only considered for data analysis 'Complete' questionnaire's reports. An 'Incomplete' questionnaire means that the respondent did not click in the "Submit" button, whether because he was still working on the answers or quit responding;
- Excluded submitted questionnaire's reports that presented more than 95% of the questions void or that did not disclose the identification of the respondent organization or responsible for the submission;
- Excluded duplication of responses by the same institution and by the same person responsible for the survey completion. The most recent submission was kept and all the previous deleted.

    Duplication of responses by the same institution but submitted by different people were carefully analyzed in order to confirm whether or not the data submitted was duplicated or complementary. The "Rationale" alerted that only one questionnaire per organization would be considered but in the "Tips for Mailing Lists" the possibility to address different research centers or departments within the same institution was permitted. In these cases, where the possibility of duplication was cleared, all reports were accepted;

- Responses by organizations/institutions not fitting the type of respondents targeted by a given questionnaire were disregarded (ex: In the "Governmental Strategies" questionnaire responses by Universities were disregarded).

When needed, JPI partners were contacted to help in the validation process. Contacting the persons responsible for the survey completion was envisaged but not necessary in the current exercise

3.1.5. Lessons learned

Although circa 961 organizations have been contacted, only 108 have completed their reports in the timeframe given. Despite the significance of the figure on its own (11.2%), one should consider the various restraints of this methodology and the numbers presented in this report.

First of all, there is an intrinsic barrier in responding to a questionnaire where a person has to provide his identity. At a different level, the person that completes the questionnaire is representing an institution as well and may not be comfortable assuming that responsibility. Moreover, specific questions require a certain depth of research, thought and, sometimes a time-consuming exercise of gathering answers/data from colleagues and/or superior officers, which discourages participation. This is why the contact persons in these organizations/institutions must be carefully selected.

About this issue, we note the imbalance between the number of visits to each questionnaire and the actual number of completed questionnaires: only circa 28% of visitants to questionnaire "Thematic Priorities" actually completed their reports and the figures for the other questionnaires are c.15% in "Governmental Strategies", c.19% in "Funding Schemes" and c.26% in "Performing Organizations".

Secondly, numbers may be conditioned by the perception of return. The absence of immediate and direct gains does not raise motivation. Also, organizations with marginal interests in Water RDI will show a diminished interest in this type of mapping exercise.

Finally, we need to consider the distrust regarding the safety of the data submitted, especially in the case of identifiable respondents and the identity of the leaders and co-leaders acting on behalf of the Water JPI / WatEUr CSA.

Despite all, the data extracted from the questionnaires can be described as an excellent first approach in understanding how much relevance is being given to Water RDI in Europe and the efforts that are being dedicated to joint programming initiatives and collaborative work.

3.2. Interviews design – Instrument, Methodology and Procedures

3.2.1. Design of the instrument

Interviews are a relevant component of the mapping exercise, like the questionnaires and desk research studies and share the same objectives.

The thematic basis for the interviews follow the mapping components in general and the questionnaires in particular, to allow another type of approach to the governmental strategies, funding schemes and performance in Water RDI, including the priority issues in each of these levels. Nonetheless, efforts were made to customize the interviews to each interviewee's profile in order to make it unique, personal and distinct from standardized instruments like questionnaires and desk studies.

Discussions were held between WP2 partners on how to conduct the interviews – face to face, on the telephone or by email. Considering the impossibility of traveling to meet different national personalities, the difficulties related to phone calls (contact numbers, scheduling, opportunity, etc.) and the need to have an accurate transcription of the interview led to the decision to conduct the interviews by email.

Also, it was agreed on a general interview guide approach, intended to ensure that the same general areas of information were collected from each interviewee but still was allowed a degree of freedom and adaptability in getting the information from the interviewee.

Thus, it was decided to address email invitations to the selected interviewees along with a group of 6/7 predetermined open questions especially formulated for each respondent. If needed, this method gives opportunity for probing or asking follow up questions, increasing the quality and effectiveness of the information extracted.

Interviewees were informed that their interviews would be published in the 2014 Mapping Report.

3.2.2. Description of the interviews and targeted respondents

The target respondents are, in accordance with the DoW, "*stakeholders and leaders of relevant initiatives*" in Water RDI in Europe.

For governmental strategies, the profile of respondents corresponds, for example, to elements of the ministries responsible for water policies (Management, Science and Technology), presidents/directors of public institutions also responsible for defining policies and strategies and members of the regional government with responsibilities at this level. Regarding funding schemes, presidents or heads of agencies/companies whose central role is to fund RDI Water should be considered. The targeted respondents for performance will be primarily relevant researchers (scientists, technologists and innovators) and presidents or heads of companies operating in Water RDI.

Each interview was designed to be unique and driven by the profile, achievements and area(s) of intervention of the respondent and by the component of the mapping to be deepen. Although focused, each set of open questions allows reaching different points of view, opinions and even realities insufficiently captured or even undetected through the use of questionnaires and desk studies. More than an additional source of information, interviews promote the enlargement of the mapping focus, highlight problems, barriers and expectations, substantially enriching the material of this study.

WP2 leaders and co-leaders debated the structure and scope of the planned interviews. A group of sample interviews was proposed by WP2 leaders and co-leaders and commonly examined. The general contents, aimed for particular profiles, were approved and it was decided that much of it could be adapted for other interviewees in the same Water RDI sector.

Along with common questions for identic profiles, specific questions were designed to address the particular knowledge and experience of the targeted respondents.

3.2.3. Procedures for selection and contact of interviewees

WP2 partners discussed the desired number of interviews to be performed and considerations regarding the interviewee's nationality, position/role, gender and other issues.

After agreement on all these accounts, WP2 leaders and co-leaders analyzed all proposals/suggestions for potential interviewees and selected a group of 10 personalities for a priority contact and a reserve list of 6 personalities. The list was sent to all WP2 partners for their information along with an estimated schedule for the first round of interviews. It is foreseen the update and expansion of the interviewees list along the mapping exercise.

The selected interviewees were invited in the beginning of October 2014 through email contact. The initial deadline for responses was the 31st October but was later postponed until 27th November 2014.

3.2.4. Selected interviewees and obtained interviews

In the first round of interviews conducted by WP2 leaders, 11 personalities were contacted but only 6 responded to the challenge. The full interview is available by clicking in the name of the interviewee:

Durk Krol (Belgium)	
Position	Director
Affiliation	**WssTP** - European Technology Platform for Water Research and Innovation
Homepage	http://cordis.europa.eu/technology-platforms/wsstp_en.html
Background	Deputy-Secretary General (*EUREAU*)

Marina Villegas (Spain)

Position	Director General for Scientific and Technological Research
Affiliation	**MINECO**
Homepage	
Other Affiliations	President of the Water JPI GB. Director General for Scientific and Technical Research at the Spanish Ministry for Economy and Competitiveness (MINECO). Deputy Director General for Research Projects at MINECO. Director of the Postgraduate and Mobility Programmes Department at CSIC. Scientific Research at CSIC.

Steven Eisenreich (Belgium)

Position	Professor/Fellow in Water Resources/HYDR and IUPWARE
Affiliation	**Vrije Universiteit Brussel**
Homepage	http://www.vub.ac.be/infovoor/onderzoekers/research/person.php?person_id=29932
Background	Chair of the Water JPI Pilot Cal Evaluation Committee. Advisor on Strategic Science Issues in the Joint Research Centre of the European Commission, Head of the European Chemicals Bureau and the Unit of Toxicology and Chemical Substances at the European Commission's Joint Research Centre, Head of unit at European Commission's Joint Research Center, Ispra, Italy

Jean-Philippe Torterotot (France)

Position	Deputy Director of Research, Development and Innovation
Affiliation	**Ministry of Ecology, Sustainable Development and Energy**
Homepage	http://www.developpement-durable.gouv.fr/
Background	Deputy Director of Strategy and Research (*National Research Institute of Science and Technology for Environment and Agriculture – IRSTEA*). Secretariat (*French Scientific and Technical Association for Water and Environment – ASTEE*). Former President of EWA - European Water Association.

Seppo Rekolainen (Finland)

Position	Director Freshwater Centre
Affiliation	**Finish Environment Institute (SYKE)**
Contact	seppo.rekolainen@ymparisto.fi
Homepage	http://environment.fi/syke
Background	Vice President of SAG

Laura Burke (Ireland)

Position	Director-General
Affiliation	**EPA – Environmental Protection Agency**
Homepage	http://www.epa.ie/about/org/ourboard/lauraburke/#.VC6IRk0tDcs
Background	Chair of the Advisory Committee for Horizon 2020 Societal Challenge 5. Chemical Engineering. Before joining the EPA in September 2004, Laura worked in the private sector.

Robert Schroeder (The Netherlands)

Position	Policy Officer
Affiliation	**Directorate General for the Environment, European Commission, Unit C.1 Protection of Water Resources**
Homepage	http://ec.europa.eu/dgs/environment/index_en.htm
Background	Presents the European Innovation Partnership on Water

3.3. Desk research design – Instrument, Methodology and Procedures.

3.3.1. European countries with standard codes, GDP and population data

The number of publications and patents compiled per country were normalized per population and per Gross Domestic Product, so as to produce comparable indicators between countries of different sizes from the points of view of population and economic strength. For this purpose we collected the ISO Codes as the standard country identifier, the Gross Domestic Product, and the Population.

The ISO 3166-1 alpha-2 – two-letter country official codes were used in all the tables, following the specifications of the Official Journal of the European Communities. These codes are the most prominently used for the Internet's country code top-level domains (with a few exceptions, such as GB, whose domain is UK). The European Commission generally uses ISO 3166-1 alpha-2 codes with two exceptions: EL (not GR) is used to represent Greece, and UK (not GB) is used to represent the United Kingdom.

The source data for the Gross Domestic Product was the GDP Nominal List by the United Nations (2012) (http://en.wikipedia.org/wiki/List_of_countries_by_GDP_%28nominal%29). Currency was calculated as 1.00 USD = 0.738231 EUR (June 2014).

Population (data available on http://en.wikipedia.org/wiki/List_of_countries_by_population) is based on the most up to date estimate or projections] by the national census authority where available, and are usually rounded off. Where updated national data are not available, figures are based on the projections for 2015 by the Population Division of the United Nations Department of Economic and Social Affairs.

Table 1. European countries with standard codes[1], GDP and population data. MS: Member State; AC: Associated country; AC*: Candidate country.

ISO code	Country	Type	GDP Millions of USD	GDP 100 x 10^3 M EUR	Population M Inhabitants
AL	Albania	AC*	12850	0.095	2.822
AT	Austria	MS	415366	3.066	8.505
BA	Bosnia	AC	17828	0.132	3.792
BE	Belgium	MS	506560	3.740	11.195
BG	Bulgaria	MS	53046	0.392	7.246
CH	Switzerland	AC	693532	5.120	8.014
CY	Cyprus	MS	21827	0.161	0.866
CZ	Czech Republic	MS	198312	1.464	10.512
DE	Germany	MS	3635959	26.842	80.716
DK	Denmark	MS	330958	2.443	5.634
EE	Estonia	MS	24484	0.181	1.316
ES	Spain	MS	1358687	10.030	46.610
FI	Finland	MS	256922	1.897	5.456
FO	Faroe Island	AC	2450	0.018	0.048
FR	France	MS	2737361	20.208	65.906
GB	United Kingdom	MS	2535761	18.720	63.705
GR	Greece	MS	241796	1.785	10.816

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[1] Two-letter country codes defined in ISO 3166-1, part of the ISO 3166 standard published by the International Organization for Standardization (ISO).

HR	Croatia	MS	58058	0.429	4.291
HU	Hungary	MS	132426	0.978	9.879
IE	Ireland	MS	217884	1.608	4.593
IL	Israel	AC	291500	2.152	8.170
IS	Iceland	AC*	14656	0.108	0.326
IT	Italy	MS	2071955	15.296	60.022
LT	Lithuania	MS	47560	0.351	2.939
LU	Luxembourg	MS	59838	0.442	0.550
LV	Latvia	MS	30953	0.229	1.998
MD	Moldova	MS	7935	0.059	3.558
ME	Montenegro	AC*	4377	0.032	0.620
MK	FYROM	AC*	10238	0.076	2.062
MT	Malta	MS	9545	0.070	0.416
NL	The Netherlands	MS	800007	5.906	16.854
NO	Norway	AC	511252	3.774	5.124
PL	Poland	MS	516128	3.810	38.496
PT	Portugal	MS	219972	1.624	10.478
RO	Romania	MS	189659	1.400	20.020
RS	Serbia	AC*	42525	0.314	7.182
SE	Sweden	MS	557938	4.119	9.676
SI	Slovenia	MS	46851	0.346	2.063
SK	Slovakia	MS	95805	0.707	5.416
TR	Turkey	AC*	827209	6.107	76.668
EU	Europe			146.229	624.559

3.3.2. Patents analysis

Patents were obtained in June 2014 from the ESPACENET WIPO database (http://www.epo.org/searching/free/espacenet.html). Data were extracted automatically per year (1999 to 2013) and per country, in a similar fashion to the bibliometric analysis. The query strings used in the Web of Science were adapted for ESPACENET. The multiple parenthesis and operators were not full operative in ESPACENET. The six queries were decomposed into 14 subqueries (see Table 2) and applied to 47 territories.

Table 2. Formulation of the SRIA thematic priorities as strings supported by ESPACENET

Q	SRIA Question	ESPACENET link	Search String per year (1999)
Q1	Maintaining Ecosystem Sustainability	http://wo.espacenet.com/searchResults?AB=water+AND+%28ecosystem+OR+ecohydrology+OR+%22ecological+engineering%22+OR+flood+OR+drought+OR+%22early+warning%22%29&ST=advanced&compact=false&PD=1999&locale=en_EP&submitted=true&DB=wo.espacenet.com	water AND (ecosystem OR ecohydrology OR "ecological engineering" OR flood OR drought OR "early warning") in the title or abstract AND 1999 as the publication date
		http://wo.espacenet.com/searchResults?compact=false&AB=water+AND++%22ecosystem+service%22&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND "ecosystem service" in the title or abstract AND 1999 as the publication date
Q2	Developing safe water systems for the citizens	http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28urban+OR+%22emerging+pollutants%22+OR+%22flood%22+OR+%22drinking+water%22+OR+%22water+treatment%22%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND (urban OR "emerging pollutants" OR "flood" OR "drinking water" OR "water treatment") in the title or abstract AND 1999 as the publication date
		http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28%22water+distribution%22+OR+%22water+storage%22%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND ("water distribution" OR "water storage") in the title or abstract AND 1999 as the publication date
Q3	Promoting competitiveness in the water industry	http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28industry+OR+distribution+OR+measurement+OR+telemetry+OR+%22remote+control%22+OR+reuse%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND (industry OR distribution OR measurement OR telemetry OR "remote control" OR reuse) in the title or abstract AND 1999 as the publication date
		http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28desalination+OR+sewage+OR+sludge+OR+%22economic+instrument%22+OR+governance+OR+regulatory%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND (desalination OR sewage OR sludge OR "economic instrument" OR governance OR regulatory) in the title or abstract AND 1999 as the publication date
Q4	Implementing a water-wise bio-based economy	http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28bio-based+OR+bio-economy+OR+bioeconomy+OR+agriculture+OR+%28irrigation+NOT+clinical%29%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND (bio-based OR bio-economy OR bioeconomy OR agriculture OR (irrigation NOT clinical)) in the title or abstract AND 1999 as the publication date
		http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28forestry+OR+%28non-point+AND+pollution%29%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND (forestry OR (non-point AND pollution)) in the title or abstract AND 1999 as the publication date
Q5	Closing the water cycle gap	http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28%22water+supply%22+OR+%22water+demand%22+OR+%22water+deficit%22+OR+transboundary+OR+%22sustainable%22%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND ("water supply" OR "water demand" OR "water deficit" OR transboundary OR "sustainable") in the title or abstract AND 1999 as the publication date

		http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28%22managed+aquifer+recharge%22+OR+%22soil-aquifer+treatment%22+OR+%22decision+support+system%22%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND ("managed aquifer recharge" OR "soil-aquifer treatment" OR "decision support system") in the title or abstract AND 1999 as the publication date
		http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28hydrolog*+AND+%28model+OR+modelling%29%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND (hydrolog* AND (model OR modelling)) in the title or abstract AND 1999 as the publication date
		http://wo.espacenet.com/searchResults?compact=false&AB=water+AND+%28socio*+AND+econom*%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	water AND (socio* AND econom*) in the title or abstract AND 1999 as the publication d
All	All water issues	http://wo.espacenet.com/searchResults?compact=false&AB=hydrology+OR+%28Water+AND+agriculture%29+OR+%28irrigation+NOT+clinical%29+OR+%28river+AND+basin%29+OR+watershed+OR+flood+OR+drought&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	hydrology OR (Water AND agriculture) OR (irrigation NOT clinical) OR (river AND basin) OR watershed OR flood OR drought in the title or abstract AND 1999 as the publication date
		http://wo.espacenet.com/searchResults?compact=false&AB=%28%28urban+OR+municipal+OR+residential+OR+treatment%29+AND+water%29+OR+%28%28industry+OR+industrial%29+AND+water%29&ST=advanced&locale=en_EP&PD=1999&submitted=true&DB=wo.espacenet.com	((urban OR municipal OR residential OR treatment) AND water) OR ((industry OR industrial) AND water) in the title or abstract AND 1999 as the publication date

3.3.3. Political Maps on Water Research (publications) and Innovation (patents)

All maps were obtained using the Jenks classification algorithm implemented in the ArcGis® software. This clustering method is a data clustering method designed to determine the best arrangement of values into "natural" classes . The four steps are:

- Calculate the sum of squared deviations between classes (SDBC).

- Calculate the sum of squared deviations from the array mean (SDAM).

- Subtract the SDBC from the SDAM (SDAM-SDBC). This equals the sum of the squared deviations from the class means.

- After inspecting each of the SDBC, a decision is made to move one unit from the class with the largest SDBC toward the class with the lowest SDBC.

Cartographers and map makers utilize the Jenks method to identify logical break points in a data set by grouping similar values that "minimize differences between data values in the same class and maximize the differences between classes. For more information: Jenks, G. F. 1967. "The Data Model Concept in Statistical Mapping", International Yearbook of Cartography 7: 186-190.