WP1 - Policy, Stakeholder and Service Analysis

D1.1 List of stakeholders

Project Identification	
Project Full Title	Water scenarios for Copernicus Exploitation
Project Acronym	Water-ForCE
Grant Agreement	101004186
Starting date	01.01.2021
Duration	36 months

Document Identification	
Deliverable number	D1.1
Deliverable title	List of stakeholders
Type of deliverable	Report
Dissemination level	Public (PU)
Work package	WP1
Leading partner	USTIR

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History of Changes

Date	Version	Comments
07/06/2021	V0	Draft outline of the deliverable report (Linda van Duivenbode, dotSPACE)
07/07/2021	V1	Draft in progress (Nicola Horsburgh, USTIR, Stef Haarler, dotSPACE)
19/07/2021	V2	Draft complete (Nicola Horsburgh, USTIR, Evangelos Spyrakos, USTIR, Linda van Duivenbode, dotSPACE)
27/07/21	V3	Comments from internal review (Eva Feldbacher, BOKU, Alo Laas, EMU, Ioana Popescu, IHE, Carmen Cillero, 3edata)
28/07/2021	V4	Final after review and approved by the Executive Board

List of Acronyms

CSA	Coordination and Support Actions
CRM	Customer Relationship Management Software
EEA	European Environment Agency
EO	Earth Observation
GDPR	General Data Protection Regulation
JRC	Joint Research Centre
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development

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SME	Small to Medium Enterprise
Water-ForCE	Water scenarios for Copernicus Exploitation
WP	Work Package

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1. Introduction

1.1 Project & work package introduction

The **Horizon 2020** project **Water-ForCE** (Water scenarios for Copernicus Exploitation) will develop a Roadmap to better integrate the entire water cycle within the **Copernicus services**, thereby addressing current disconnects between remote sensing / *in situ* observation and the user community. Clarity in terms of the needs and expectations of both public and private sectors from the core Copernicus Program and the wider research and business innovation opportunities will be delivered. The Roadmap will then also advise on a strategy to ensure effective uptake of water-related services by end users and further support the implementation of relevant directives and policies.

The Water-ForCE consortium is led by the University of Tartu (Estonia) and consists of 20 organisations from all over Europe. It will bring together experts on water quality and quantity, in policy, research, engineering and service sectors. Through close collaborations with these communities, Water-ForCE will among others:

- **Analyse EU policies** to identify where the Copernicus services can improve monitoring programs and how the Copernicus data can be more effectively used in developing and delivering the next versions of the directives.

- **Specify the requirements** for future Copernicus missions (e.g. optical configuration of Sentinel-2E and onward, hyperspectral sensors).

- **Optimize future exploitation** for inland water monitoring & research and, consequently, (a) enlarge the service portfolio and (b) improve the performance of current services.

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The project is divided in eight work packages (WP), each of them focusing on a specific problem and/or target of the Copernicus service (see Figure 1). The project started 1 January 2021 with a duration of three years.

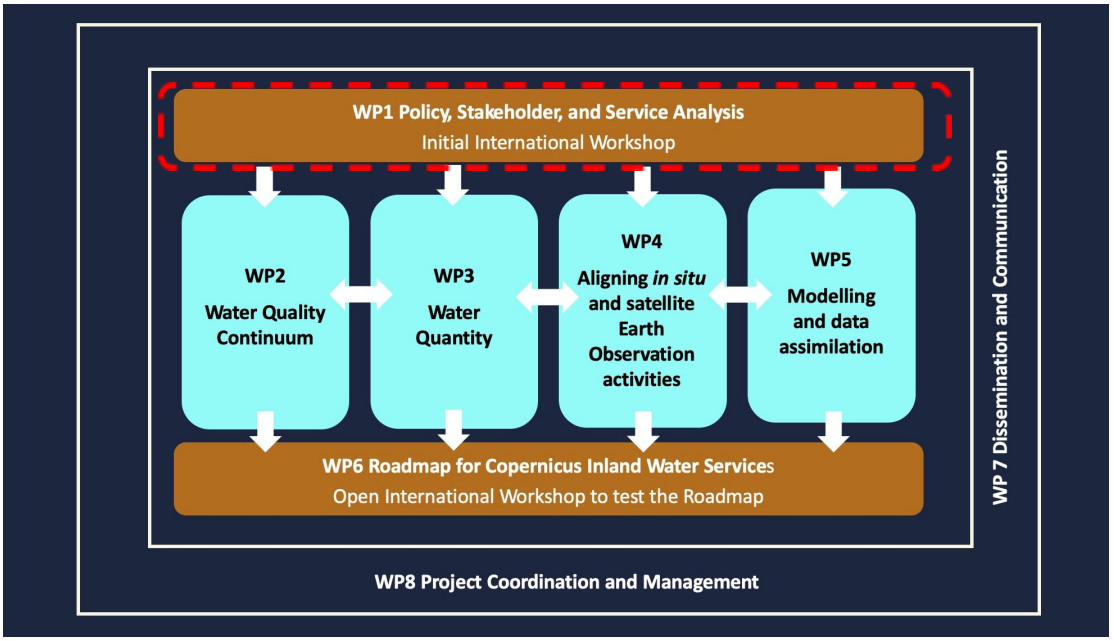

Figure 1 : Organizational structure of the different work packages in the Water-ForCE project.

This report comprises the deliverable **D1.1 List of stakeholders**.

1.2 Objectives

The objective of D1.1 is to create a list of stakeholder organisations in the inland and coastal water domain, and to gather stakeholder typology information. This will form the starting point for the value chain analysis of Task 1.1 (Value chain and stakeholder identification) and Task 1.2 (Public domain and business sector identification), and also allows us to identify sectors where engagement with the EO community is currently limited.

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1.3 Methods

As part of the WP1 project plan, we developed a comprehensive stakeholder engagement methodology, summarised below. (See Annex 1 for a full description.)

1. Identify the value chains across Copernicus services.
2. Build an inventory of stakeholders across the community.
3. Map the stakeholders (step 2) to the services value chains (step 1) to identify opportunities and build new value propositions.
4. Build awareness of and mitigate against uptake barriers and Covid-related challenges.
5. Act on feedback for continuous improvement.

To date, we have engaged with stakeholders via an online workshop (April 2021) and a virtual event which formed part of the Water Innovation Europe online exhibition (June 2021). These events have served as platforms to introduce the Copernicus programme and its future vision, share ideas and knowledge, as well as engage with a range of users to gather stakeholder information including contact details, typology information and service requirements to ultimately feed into the recommendation for the Copernicus Roadmap. This section describes how we store and process stakeholder data, and gives an overview of our engagement exercises to date.

1.3.1 HubSpot

In order to track the list of stakeholders and their typology information, HubSpot is being used. This Customer Relationship Management Software (CRM) system enables the project to systematically, consistently and centrally store contact details. All consortium members have access to this platform and are able to see the list of stakeholders. Stakeholders are added to this system via two ways:

1. Manually: Relevant stakeholders can be manually added to the database. This has been done, for example, for organizations that have written a letter of interest for the project.

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2. Through submitting a form: Stakeholders are also added into the database if they submit a form that has been created using HubSpot. Forms could be the registration for an event or a contact form.

HubSpot is fully GDPR compliant. For this to be the case, there has to be a legal reason (called a lawful basis in the regulation) to use personal data. In HubSpot, we have split this into the lawful basis to (a) process personal data and (b) communicate with participants (e.g. send an email invitation to an upcoming event)[1]. Stakeholders have to approve that their data is being stored in our system by either checking a consent box or specifically stating that they agree. Furthermore, under the GDPR, our contacts can request that we give them a copy of all the personal data we have about them, or delete/modify it.

The following stakeholder data is currently being stored in HubSpot:

- First name
- Last name
- Country
- Organization
- Role/position
- E-mail
- Sector *(Policy / Regulator, Aquaculture / Fisheries , Agriculture , Industrial - Consumer/Discharge, Energy, Water Utility, Urban Water Management, Recreational Water, Hazards / Emergencies, River Basin Management, Coastal Zone Management, Biodiversity, Research, EO Service Provider, Other)*
- Relevant thematic areas *(Water quantity, Water quality, Modelling, In-situ, Other)*
- Previous engagement with EO community
- Aquatic system *(Groundwater, Lakes, Reservoirs, Rivers, Estuaries, Wetlands, Lagoons, Coastal, Ocean)*
- Geographical level of activities *(Catchment, International / intergovernmental, Local, National, Regional, Other)*
- EO familiarity *(No previous knowledge, Basic knowledge, Advanced knowledge)*
- EO expertise (*Satellite, Airborne (incl. drones), Ground-based, Other*)

[1] https://www.hubspot.com/data-privacy/gdpr/hubspot-product-playbook

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1.3.2 Workshop 1

On 20 April 2021 WP1 hosted a workshop attended by the spectrum of non-users to expert users of Copernicus data in the inland water and coastal domain. The aim was to collect stakeholder input on current use of services, information needs and barriers to uptake of satellite EO data and services. 62 participants from 11 countries joined the three-hour workshop which consisted of two plenary sessions (Session 1 and 3) and one interactive breakout session (Session 2).

Session 1 gave an introduction on the Water-ForCE project and the objectives of WP1, followed by an overview of the ambitions and future vision of the Copernicus programme. This was followed by four end-user presentations across a spectrum of inland water applications.

In the interactive breakout rooms of Session 2, attendees were split into sector-specific groups, with discussions centered around the current use of Copernicus products and services, information needs, barriers and opportunities to the use of EO data. The following questions were posed to the groups:

- Breakout 1: Regulators and Policy Makers
    - Q1: Do current EO inland water products/services (Copernicus or other) meet monitoring requirements? Are products accessible and easy to use?
    - Q2: If not, why?
    - Q3: What are the barriers to uptake of satellite EO?
    - Q4: What are the policy-defined information needs?
- Breakout 2: Commercial Users of Water Data
    - Do current EO inland water products/services (Copernicus or other) meet your requirements? Are products accessible and easy to use?
    - Q2: If not, why?
    - Q3: How can confidence in EO data be increased?

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    - Q4: Which inland water EO products would add the most value to your operations?
- Breakout 3: In-sector Business and Industry
    - *Due to limited attendance from the EO business and industry sector, attendees were combined with Breakout 2.*
- Breakout 4: Researchers, Agencies, NGOs
    - Q1: How can Copernicus contribute towards societal challenges, in particular SDGs?
    - Q2: How can the Copernicus programme shape the development of future environmental/climate policy?
    - Q3: What opportunities could coupling remote sensing, *in situ* observations and modelling deliver?
    - Q4: How can inland water data be combined with land use / land use change data to improve policy recommendations and environmental management?

In summary, the following main themes were identified in the breakout sessions:

User needs

1. There is a definite need for a central data portal to increase accessibility.
2. There is a need for training material on how to access data and how to use data, especially to attract users from outside the EO domain.

Product needs

1. Increased resolution.
2. Comprehensive water quality indicators.
3. Water quantity products: flood and drought forecasting.
4. Products to promote sustainable agriculture: water use, soil salinisation, sedimentation, nutrients.
5. Water supply products: detecting leaks from the system and threats to water quality.

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Barriers to uptake

1. Exclusivity - A perception that Copernicus products and services are limited to expert users.
2. Standardisation - Compared to the *in situ* community, the remote sensing community has not yet agreed on recommended practices, processing algorithms, or calibration/validation standards.
3. Comparability - Satellite and historical *in situ* data are not directly comparable, and a discussion is still needed on how satellite data can be applied to existing frameworks.
4. Confidence - A lack of information on validation, accuracy, limitations and uncertainties in metadata undermine user confidence.

Opportunities

1. Satellite EO can make meaningful contributions towards water-related SDGs and environmental policy development.
2. Combining EO and modelling could improve data quality, water quantity and quality forecasts, and improve efficiency.
3. A combined approach coupling water quality/quantity data and land use/land use change data could aid water governance.

1.3.3 Virtual event at Water Innovation Europe conference

Although the WP1 workshop (20th April) was considered a successful event in terms of participation (62 attendees from 11 countries) and outcomes, some key stakeholders were underrepresented:

- Commercial water users
- Industrial water users/dischargers
- Agricultural water users/managers

To reach these groups, it was decided to make use of an existing high profile event, the Water Innovation Europe conference 2021. This gave us access to previously

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underrepresented stakeholders, and also gave us the opportunity to engage with users in a different format.

During the Water Innovation Europe conference, visitors entered a virtual booth containing Copernicus and Water-ForCE presentations. They were also given the option to complete the following questionnaire, which was created from the outputs of Workshop 1, and the expert workshop hosted by WP2&WP4 in May 2021. the following questions and multiple choice options were posed to participants:

1. What type of organisation do you work for? (Please pick all that apply)
    a. Private sector
    b. Public sector
    c. Small-Medium Enterprise
    d. Research
    e. NGO
    f. Producer of Earth Observation data/products
    g. Other (Please specify)
2. To what degree do you use water-related Earth Observation (EO) data? (Please pick all that apply)
    a. Not at all
    b. Occasional user of field data
    c. Occasional user of remote sensing data (Copernicus or other)
    d. Expert user of field data
    e. Expert user of remote sensing data (Copernicus or other)
3. What water-related information are you using in your organisation? (Please pick all that apply)
    a. Water quality
    b. Water quantity
    c. Water supply
    d. Sanitation
    e. Hydrology

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f. Climate
g. Resilience
h. Modelling
i. Other (please specify)

4. Which water-related policies do you deal with?
    a. None
    b. Please specify
5. What are the biggest barriers to the uptake of satellite remote sensing in the inland water and coastal domain? (Please pick all that apply).
    a. There are no barriers
    b. Lack of information about available products and services
    c. Lack of training on how to use data
    d. Lack of centralised data store
    e. Data difficult to download
    f. Lack of confidence in data quality and documentation
    g. Lack of comparability with traditional *in situ* monitoring programmes
    h. Lack of organisational commitment to invest in EO skills
    i. The perception that satellite data cannot be interpreted without extensive processing
    j. Other (please specify)
6. What are the biggest information needs with regards to satellite remote sensing for coastal and inland water? (Please pick all that apply, and select whether the data should be provided free of charge by Copernicus, or as paid-for products by the private sector).
    a. Higher resolution
    b. Comprehensive water quality indicators
    c. Water quantity - drought forecasting
    d. Water quantity - drought monitoring, detecting desertification
    e. Water quantity - flood forecasting

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f. Water quantity - flood monitoring
g. Water quantity - river flow monitoring
h. Water quantity - soil moisture
i. Agriculture - detection of soil salinisation
j. Agriculture - monitoring of water use
k. Agriculture - prediction of areas of reduced food production
l. Agriculture - monitoring compliance of buffer zones from waterways
m. Water supply - detection of nutrient inflows impacting water quality
n. Water supply - detection of leakage from the supply network
o. Risks to the water system - overgrowth, subsidence, sedimentation
p. Risks to the surrounding area - damage to flood defences, illegal buildings, subsidence
q. Geomorphology of rivers and estuaries
r. Robust integration with *in situ* monitoring
s. Other (please specify)

7. Is there a need for a whole-systems approach which integrates satellite water quality and quantity products with land use data to detect unsustainable land use practices?
    a. No need
    b. Moderate need
    c. Urgent need

After this initial engagement exercise, stakeholders were then invited to register via HubSpot, should they wish to be involved further in the project.

Results from this questionnaire have not been processed yet, as we will be circulating this questionnaire further to contacts gained during the Water Innovation Europe conference.

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2. List of Stakeholders

Approximately 150 individual stakeholders have registered in HubSpot as of July 2021, representing 105 unique organisations/institutions/companies, listed in Table 1 according to country.

Table 1: List of unique stakeholders by country (July 2021)

#	Country	Organisation / Institution / Company
1	Argentina	Instituto Argentino de Oceanografia
2	Australia	CSIRO - Commonwealth Scientific and Industrial Research Organisation
3	Australia	Griffith University
4	Australia	SatDek-CSIRO
5	Austria	BMLRT - Austrian Federal Ministry of Agriculture, Regions and Tourism
6	Austria	Environment Agency Austria / Umweltbundesamt GmbH
7	Austria	Municipal Department for Water Management for the City of Vienna
8	Austria	Office of Federal Government of Lower Austria, Department Water Economy
9	Austria	sme.group
10	Austria	University of Natural Resources and Life Sciences, Vienna
11	Belgium	Antea Belgium nv
12	Belgium	De Watergroep
13	Belgium	RBINS - Royal Belgian Institute of Natural Sciences
14	Belgium	Seascape Belgium
15	Belgium	VITO Remote Sensing

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16	Belgium	Vrije Universiteit Brussel
17	Belgium	Water Europe
18	Brazil	CIH - International Center for Hydroinformatics
19	Canada	GRIL - Interuniversity research group in limnology
20	Canada	Université de Sherbrooke
21	China	NIGLAS - Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences
22	Estonia	Enterprise Estonia
23	Estonia	Estonian Environment Agency / Keskkonnaagentuur
24	Estonia	Estonian University of Life Sciences
25	Estonia	Ministry of the Environment of Estonia
26	Estonia	University of Tartu
27	Europe	EEA - European Environment Agency
28	Europe	ESA - European Space Agency
29	Finland	University of Helsinki
30	France	ACRI-ST
31	France	CNES - Centre national d'études spatiales
32	Germany	Brockmann Consult
33	Germany	Federal Institute of Hydrology
34	Germany	DLR - German Aerospace Center
35	Germany	UFZ - Helmholtz Centre for Environmental Research, Department Lake Research
36	Germany	ICWRGC - International Centre for Water Resources and Global Change, German Federal Institute of Hydrology
37	Germany	Leibniz Institute of Freshwater Ecology and Inland Fisheries
38	Germany	LLUR-SH - State Office for Agriculture, Environment and Rural Areas

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39	Greece	EMVIS
40	Greece	ICCS - Institute of Communication and Computer Systems
41	Greece	Perfecture of Attika
42	International	FAO - Food and Agriculture Organization of the United Nations
43	Ireland	Dundalk Institute of Technology
44	Ireland	UNEP GEMS/Water Capacity Development Centre
45	Italy	CNR-IREA - National Research Council, Institute for Electromagnetic Sensing of the Environment
46	Italy	CNR-ISMAR - National Research Council, Institute of Marine Science
47	Italy	SMAT Water service provider
48	Kyrgyzstan	Regional Environmental Protection Agency of Calabria
49	Lithuania	Marine Research Institute, Klaipeda University
50	Netherlands	Delft University of Technology
51	Netherlands	IHE Delft
52	Netherlands	Leiden University
53	Netherlands	Rijkswaterstaat
54	Netherlands	Royal Haskoning DHV
55	Netherlands	TAHMO - Trans-African Hydro-Meteorological Observatory
56	Netherlands	University of Twente
57	Netherlands	Vewin
58	Netherlands	Water Insight BV
59	Romania	AFDJ - Lower Danube River Administration
60	Romania	INCDSB - National Institute of Research and Development for Biological Sciences
61	Romania	NIRD GeoEcoMar

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62	Romania	Romanian Waters National Administration - Mures River Basin Administration
63	Romania	Terrasigna
64	Romania	UPT - Politehnica University Timisoara
65	Russian Federation	State Hydrological Institute
66	South Africa	CyanoLakes
67	Spain	3edata
68	Spain	Agència Catalana de l'Aigua
69	Spain	ICRA - Catalan Institute for Water Research
70	Spain	Confederación Hidrográfica del Ebro (CHE)
71	Spain	CREAF
72	Spain	Dirección General de Protección Civil y Emergencias
73	Spain	Directorate General of National Geographic Institute (IGN), Ministry of Transport, Mobility and Urban Agenda of Spain
74	Spain	Environmental Hydraulics Institute - IHCantabria, University of Cantabria
75	Spain	GAIN - Galician Innovation Agency of the Regional Government of Galicia
76	Spain	GMV
77	Spain	INECO
78	Spain	isardSAT
79	Spain	EMALCSA - Municipal Water Company of La Coruña
80	Spain	INTA - National Institute for Aerospace Technology
81	Spain	Predictia Intelligent Data Solutions SL
82	Spain	SAIH-CHE
83	Spain	Water Directorate, Ministry for the Ecological Transition and the Demographic Challenge

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84	Spain	Universidad de León
85	Sweden	SITES - Swedish Infrastructure for Ecosystem Science/SLU
86	Switzerland	EPFL Swiss Institute of Technology
87	Switzerland	Eawag - Swiss Federal Institute for Aquatic Science and Technology
88	Switzerland	University of Geneva
89	Turkey	Middle East Technical University
90	UK	King's College London
91	UK	Plymouth Marine Laboratory
92	UK	Scottish Environment Protection Agency
93	UK	Scottish Water
94	UK	UK Centre for Ecology & Hydrology
95	UK	University of Stirling
96	Ukraine	Odessa State Environmental University
97	USA	Cary Institute of Ecosystem Studies
98	USA	GEO AquaWatch
99	USA	Morgan State University
100	USA	SSAI / NASA Goddard Space Flight Center
101	USA	Trust-IT Services
102	USA	University of Minnesota
103	USA	University of Wisconsin-Madison, Center for Limnology
104	USA	US EPA
105	USA	Washington State University

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3. Stakeholder analysis

Geographical information is available for all registered stakeholders, and is presented in Section 3.1. However, not all registrations have completed the stakeholder typology survey. Sections 3.2-3.5 thus shows an initial stakeholder analysis based on the information currently available in HubSpot.

3.1 Geographical distribution of stakeholders

As shown in Table 2 and Figure 2, there are stakeholders from 27 countries, with the majority from Europe, in particular Spain. Eastern Europe, Asia, Africa, Central- and South America are currently underrepresented.

Table 2: Number of unique stakeholder organisations/institutions/companies per country (July 2021, n=105, excluding international organisations of the UN, ESA and EEA).

Argentina	1	Kyrgyzstan	1
Australia	3	Lithuania	1
Austria	6	Netherlands	9
Belgium	7	Romania	6
Brazil	1	Russian Federation	1
Canada	2	South Africa	1
China	1	Spain	18
Estonia	5	Sweden	1
Finland	1	Switzerland	3
France	2	Turkey	1
Germany	7	UK	6
Greece	3	Ukraine	1
Ireland	2	USA	9
Italy	3		

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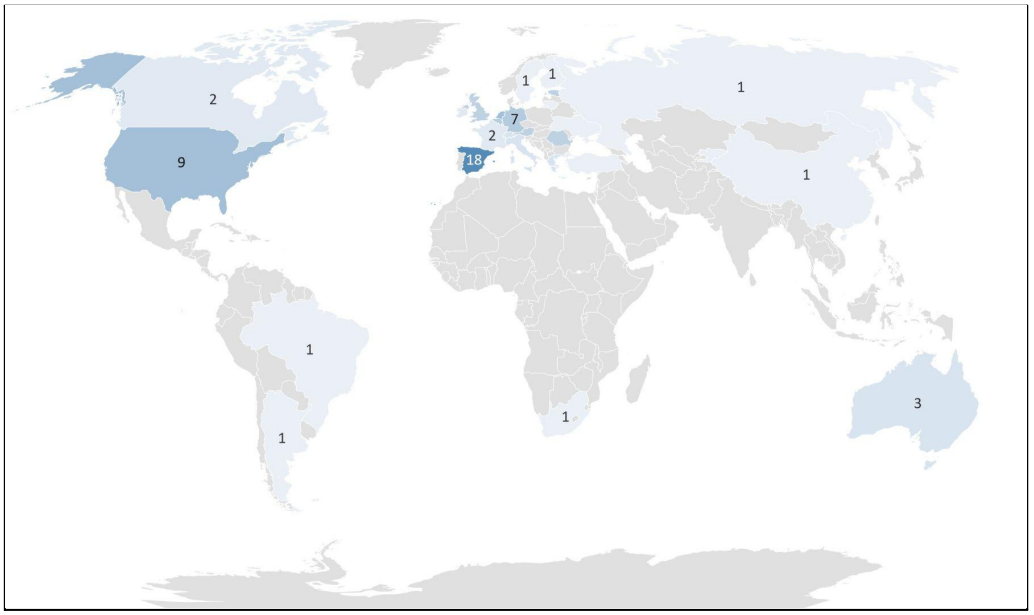

Figure 2a: Unique registered organisations/institutions/companies (July 2021, n=105)

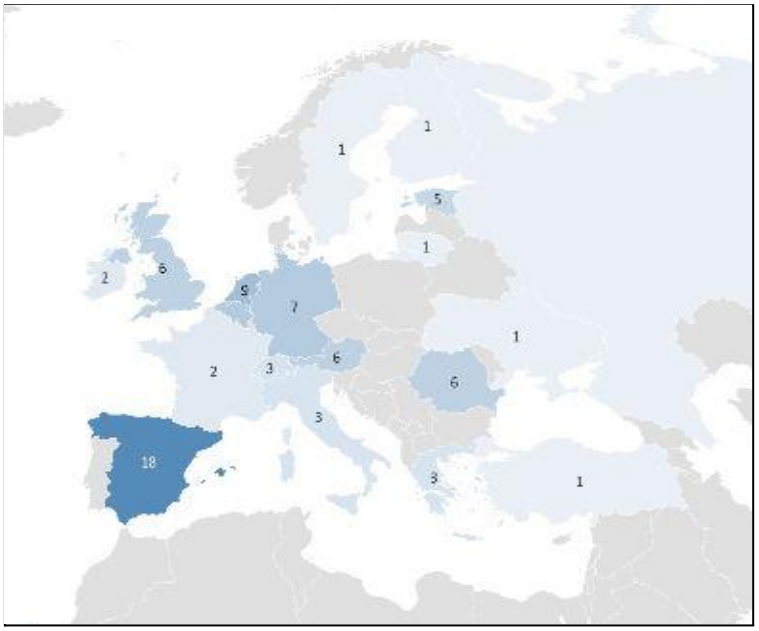

Figure 2b: Unique registered organisations/institutions/companies in Europe (July 2021, n=105)

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3.2 Stakeholders according to sector(s)

Stakeholders were asked to select all sectors in which they are currently active. As shown in Figure 3a, we have engaged most successfully with Research institutions, with 54% (37 out of 69) respondents choosing Research as one of their active sectors.

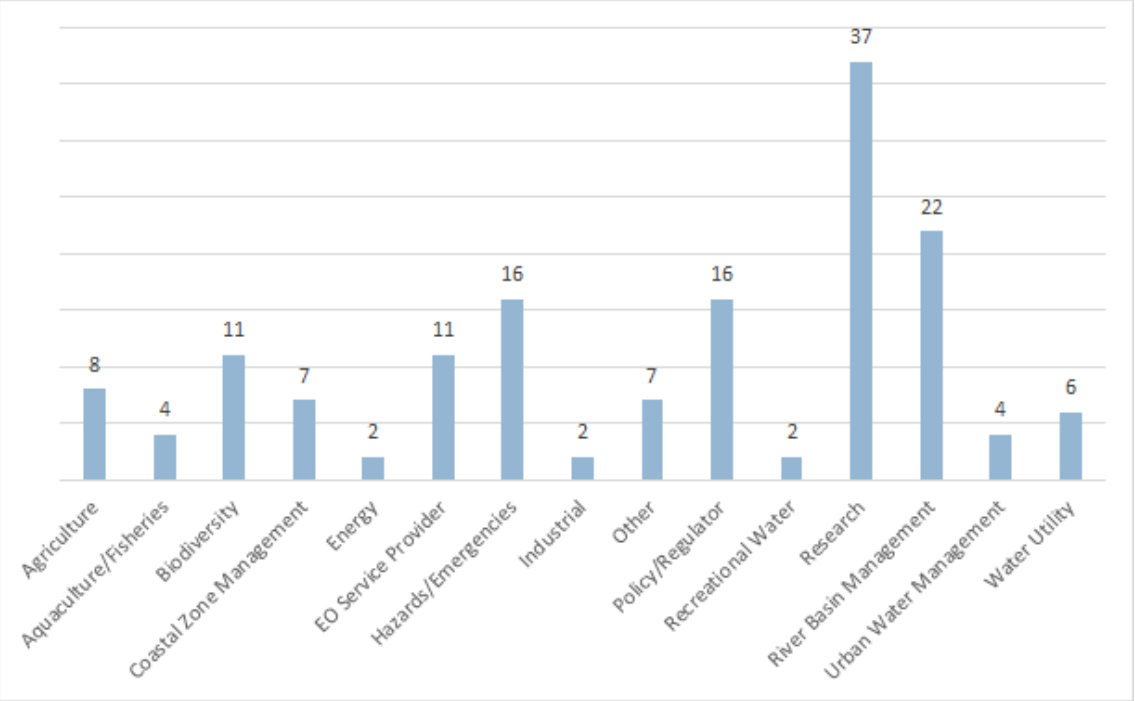

Figure 3a: Stakeholders according to active sectors (July 2021, n=69, active sectors = 155).

Viewed as a percentage of all active sectors listed, Research represents 24% (37 out of 155) of the total number of active sectors (Figure 3b). followed by River Basin Management organisations (14%), and Policy/Regulator and Hazards/Emergency (10%). Aquaculture, Energy, Industrial Users/Dischargers, Recreational Water and Urban Water Management are to date the least represented.

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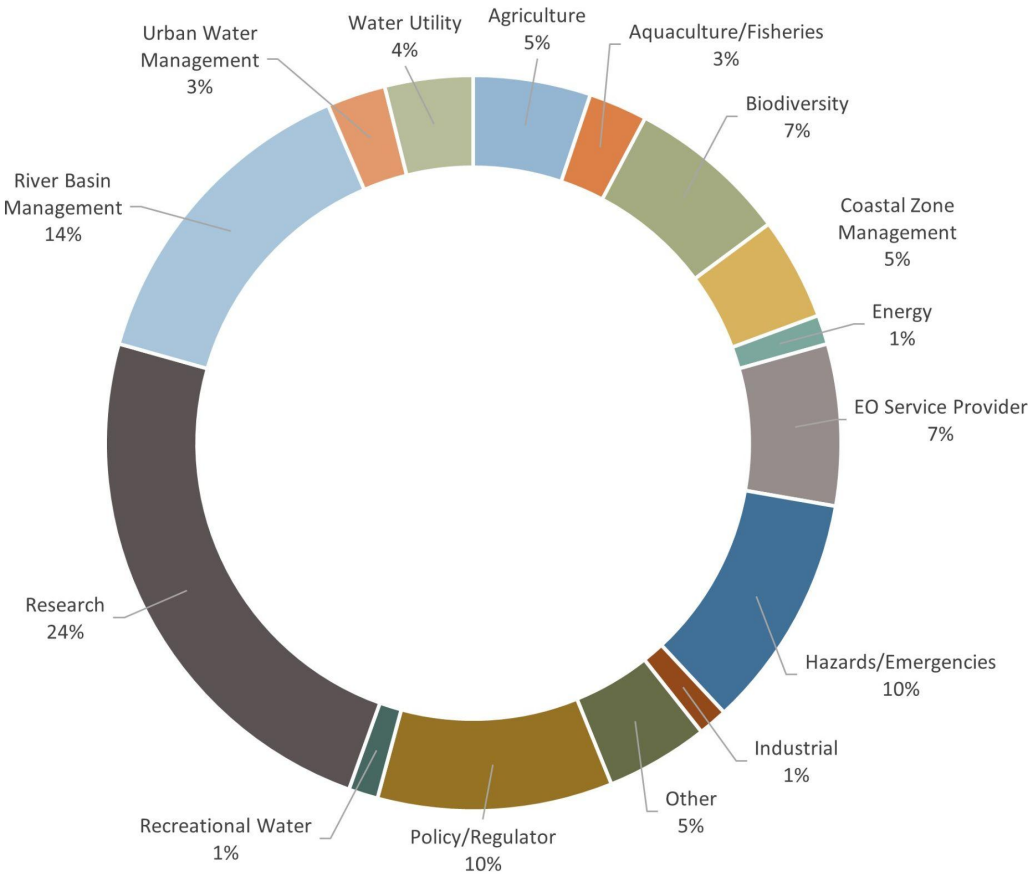

Figure 3b: Stakeholders according to active sectors: percentage of total number of active sectors listed (July 2021, n=69, active sectors = 155).

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3.3 Stakeholders by geographic level(s) of activity

Stakeholders were asked to select all geographic levels at which they are operating. As shown in Figure 4a, we have engaged successfully with stakeholders of all geographical levels of activity. National and Regional levels are currently the best represented.

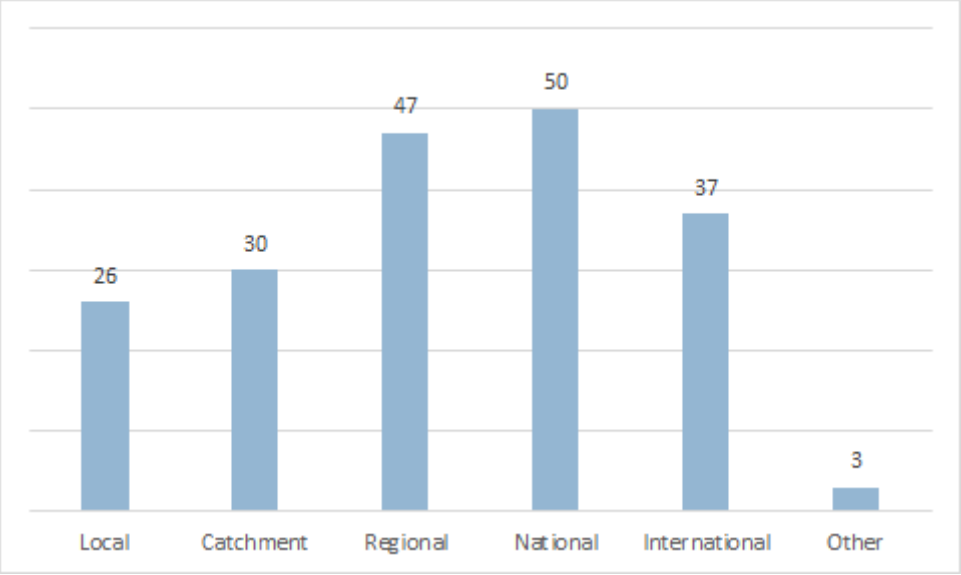

Figure 4a: Stakeholders according to geographical level(s) of activities (July 2021, n=89, geographical levels = 193)

Viewed as a percentage of all geographic levels listed in Figure 4b, National activity represents 26% (50/193) of all geographic levels, and Regional activity 24% (47/193). The remaining 50% of geographical levels of activity is divided fairly evenly between International, Catchment and Local scales of activity.

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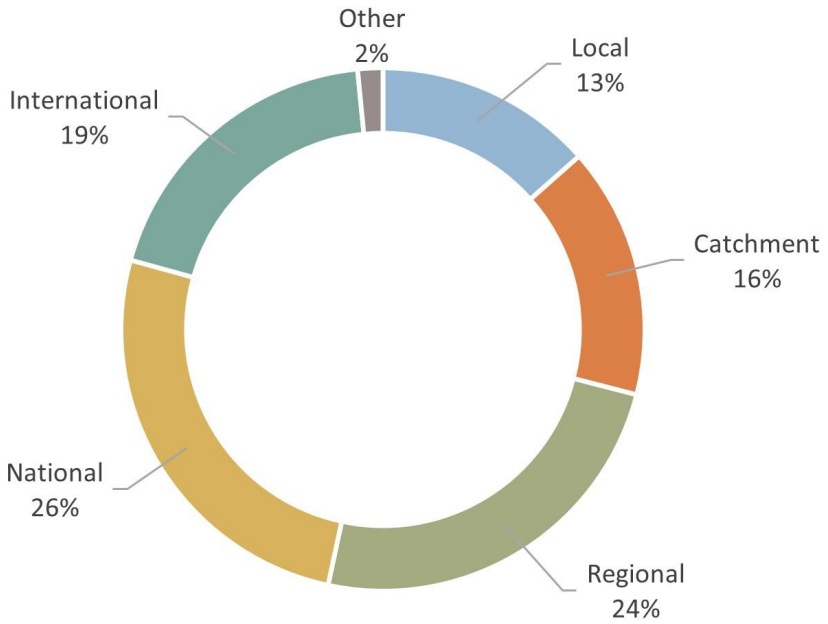

Figure 4b: Stakeholders according to geographical level(s) of activities: percentage of total number of geographical levels listed (July 2021, n=89, geographical levels = 193)

3.4 Stakeholders according to satellite EO expertise

Stakeholders were asked to choose their level of familiarity with satellite EO. As shown in Figure 5, 62% of responders claim to have Basic or No Previous Knowledge of satellite EO, perhaps confirming the user requirement of EO data usage examples and training material which arose from the WP1 workshop in April 2021.

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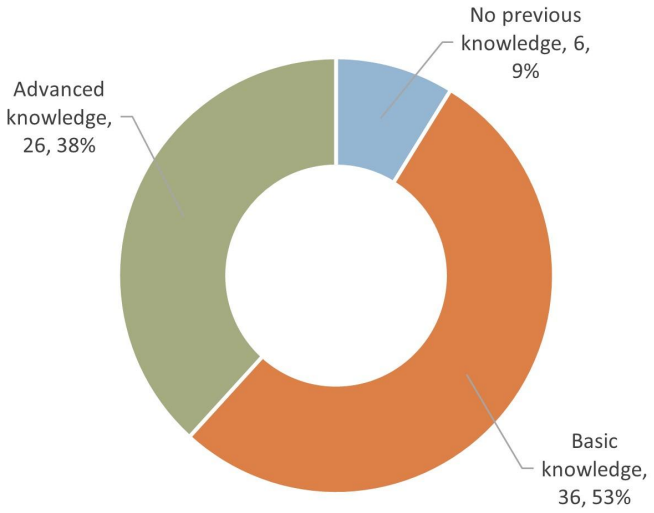

Figure 5: Stakeholders according to familiarity with satellite EO (July 2021, n=68)

Stakeholders were also asked to choose all their field(s) of expertise. As shown in Figure 6, we have engaged most successfully with stakeholders who have experience with satellite EO data, with 90% (54/60) of respondents claiming experience in this field. Ground-based data users are second with 63% (37/60) of responses, and Airborne data users third with 38% (23/60) of responses.

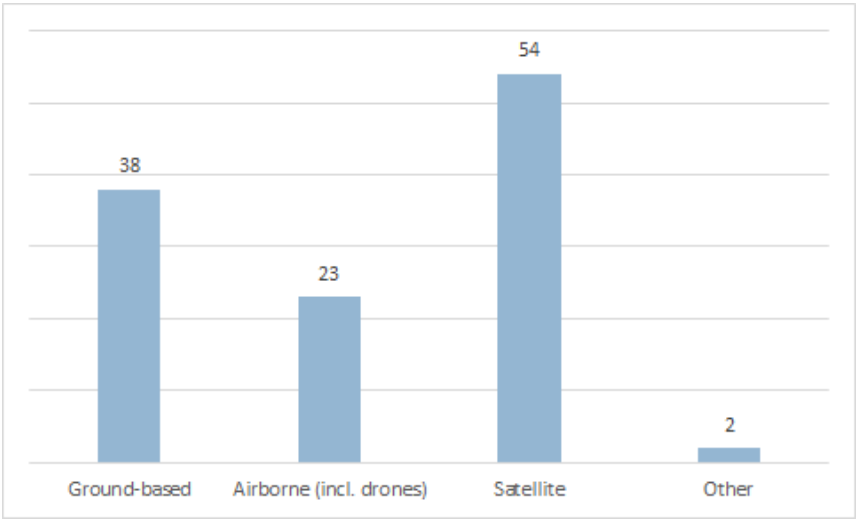

Figure 6: Stakeholders according to field(s) of EO expertise (July 2021, n=60)

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3.5 Stakeholders according to aquatic system(s)

Stakeholders were asked to select all aquatic systems relevant to their operations. As shown in Figure 7a, Rivers, Lakes and Reservoirs are currently the most represented aquatic systems, with Estuaries and Lagoons the least represented.

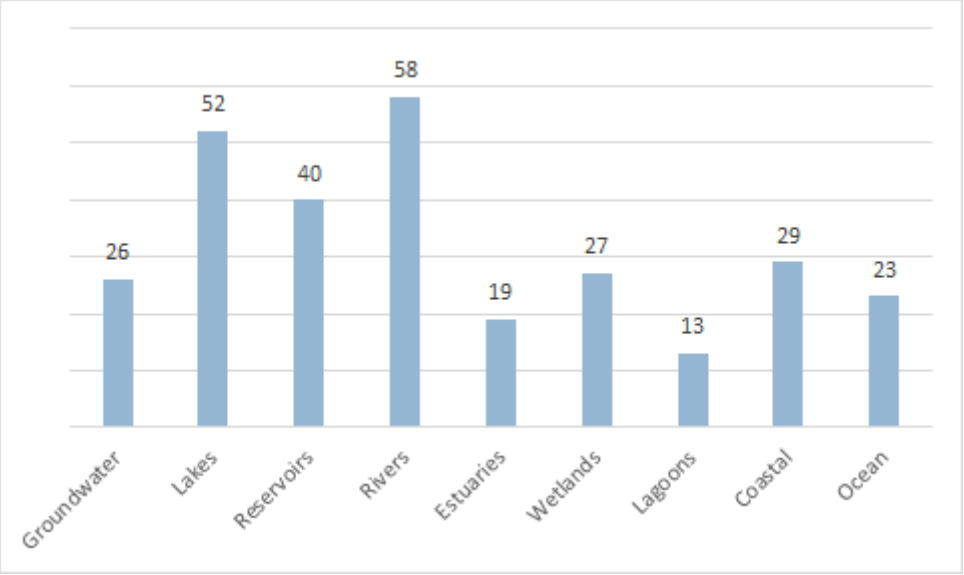

Figure 7a: Stakeholders according to aquatic system (July 2021, n=80)

Viewed as a percentage of total aquatic systems listed, Rivers, Lakes and Reservoirs represent 52% of aquatic systems listed, as shown in Figure 7b, highlighting the need for further engagement with the coastal wetland and groundwater communities.

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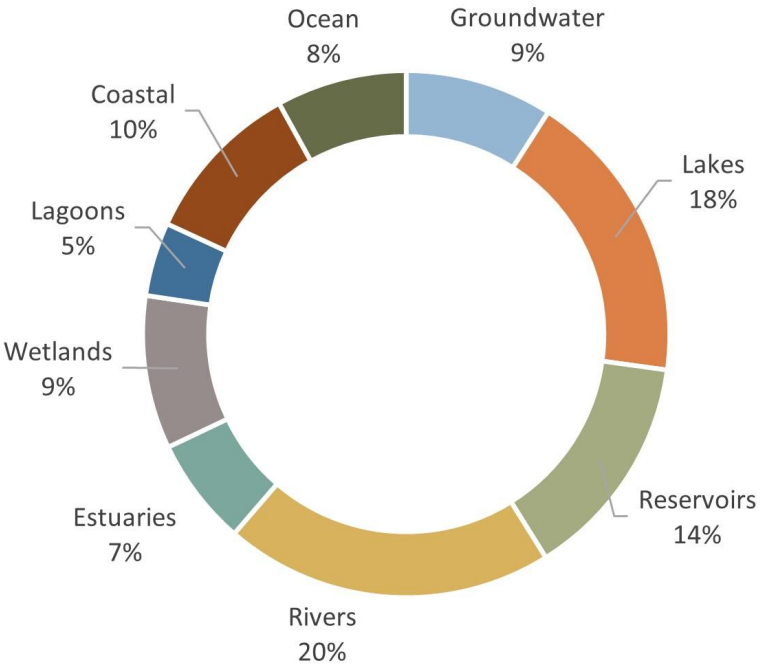

Figure 7b: Stakeholders according to aquatic system: Percentage of total number of aquatic systems listed (July 2021, n=80, aquatic systems = 287)

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4. Conclusions and next steps

A list of 105 unique organisations/institutions/companies, as represented by 150 individual stakeholders, has been presented in this report. This provides an excellent starting point for the value chain analysis and policy domain analysis to follow, and will continue to grow throughout the project as we reach out to more current and potential future users of satellite EO data. In this section we summarise the gaps we have identified thus far, and the next steps for WP1.

4.1 Stakeholder data collection and gaps

In the first seven months of the project we have focused on the stakeholder data collection in terms of type (who and what are they) and management (how and where do we store the data in a way that is appropriate and allows us to perform analyses as shown in this report). The development of a database with relevant and engaged stakeholders has started through the WP1 and thematic WP2&WP4 workshops. We have also started to reach out to "non-usual" communities such as the Water Europe partnership, by joining their annual conference with a virtual exhibition booth and approaching their thematic Working Groups. The stakeholder database is thus progressing well with approximately 150 registrations as of July 2021. However, we have identified the following gaps:

- Participants of the WP3&WP5 workshop are missing in this stakeholder overview, as their workshop (March 15) preceded the agreement on typology and setting up of a GDPR compliant CRM (HubSpot). We will address this gap with the respective WP leaders by asking permission to add stakeholders to HubSpot or by having individuals register themselves.
- Full data in accordance with the stakeholder typology are not present for all registrations in HubSpot, as different event registration processes were followed by the respective working groups. We will address this by asking these individuals

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to complete our typology survey, and by making a standardised typology survey available to all WP leaders.

- In the workshops we noticed that while speakers and participants were very engaged in the topic, some non-English speakers were hesitant to speak in a language that is not their native tongue and were thus perhaps not fully able to express their needs and ideas. For this reason we want to conduct surveys in different languages. The consortium partners cover 11 EU countries and multiple nationalities, which allows us to cover most - if not all - languages.

4.2 Next steps

The next steps by which we aim to increase the depth and breadth of stakeholder information, which domains they are active in, what sector they belong to, and which products and services they need or offer are listed below:

- An event is planned in September / October 2021 with the European Environment Agency (EEA). The EEA is an important user of water data for environmental reporting and regulatory compliance monitoring as well as an entrusted entity for the Copernicus Land Monitoring service. The aim is to bring together (institutional) organisations such as the JRC, ESA, EUMETSAT, ECMWF, EU Satellite Centre, Mercator Ocean, the DIAS and the EC to discuss their requirements and proposed activities under the Copernicus 2.0 delegation agreements.
- Implementation of the WP1 activities as per the DoA are summarised in the table below. A detailed outline of our stakeholder engagement and value chain analysis methodology, as recommended by the OECD (2015) for inclusive water governance, is described in Annex 1.

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Table 3: Implementation of WP1 tasks.

Tasks	**1.1** Value chain and stakeholder identification	**1.2** Public domain and business sectors	**1.3** Links between mission-service applica-tion	**1.4** End-user needs and req's identifi-cation	**1.5** Innova-tion needs and opportun ities	**1.6** Contr. toward societal challenges, missions and SDGs
Activities:						
Desk / literature review	X	X	X	X	X	X
Consultation: survey			X		X	
Consultation: interview		X	X		X	?
Co-design: brainstorm				X		
Co-design: focus groups				X		
Workshop(s)	X	X	X		X	

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Annex 1: Stakeholder engagement methodology

Stakeholder engagement is the backbone to the Water-ForCE CSA and builds strongly on best practice highlighted by the OECD (2015), which focuses on water innovation and governance. The methodology for gathering stakeholder knowledge has been developed to maximise and optimise the contributions from stakeholders with respect to the overarching objective: to develop the next Roadmap for Copernicus Inland Water services.

Step 1: Identify the value chains across Copernicus services.

Careful analysis and identification of the value chains that are currently presented by Copernicus services and what is delivered by these services and which structural drivers (e.g. climate change, economic need, social needs, technological opportunities) they address is important to the process of identifying and engaging existing and new stakeholders (why are some engaged, others not, what is missing?). At the same time, identifying the potential benefits and impacts of the engagement, conjunctural drivers (e.g. policy reforms, crisis and emergency situations, political pressures, business innovation) along with the longer term policy implications will help shape the rationale for stakeholder engagement, its longevity and the direct and indirect (reputational) benefits. The consortium is connected to multiple partners providing EO based services and products across the water related sectors, which will provide an excellent starting point for this CSA.

Step 2: Build an inventory of stakeholders across the community

This step will adopt an inclusive approach and proactively reach out to new (non-usual) actors to engage with the project through multiple channels including industrial and sector wide associations/bodies. This step will then categorise the stakeholders by for example:

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- Communities; following the target groups identified for engagement, these communities will be divided into: Operational/Commercial, Policy, Science, Civil Society Organisation or Non Government Organisation; and
- Sector/Domain/Services; Public/Private/Research Sectors. Domains such as the water industry, health, energy, emergency, transport, digital communications. Services including data provision, modelling, engineering, conservation, protection, and innovation.

Step 3: Map the stakeholders (step 2) to the services value chains (step 1) to identify opportunities and build new value propositions.

Having identified the drivers and opportunities for engagement, the next key step is to identify and map the stakeholders to the service value chain to identify where missing elements can be turned into opportunities. The mapping exercise will not only collect organisations and people matching the categories of stakeholder, but also build a framework to organise information flow and exchange and support community dialogue (through webinars and workshops as well as other mechanisms / platforms such as joining the Water Europe and other existing communities) to start building a comprehensive overview of stakeholders, their requirements and associated opportunities for Copernicus to feed into the Roadmap process (WP6). We have already identified a disconnect between remote sensing and *in situ* observation research, therefore emphasis will be on representation from both communities to highlight the opportunities of bringing these communities together and the novel developments that could be explored through for example AI. We will ensure that the people from stakeholder organisations have diverse backgrounds in science, engineering, legal, finance, socioeconomics and policy to maximise the opportunity for innovation and cross fertilisation of ideas. Sources include: Copernicus services and networks, ESA, EUMETSAT (e.g. Satellite Application Facilities/SAFs), H2020 projects, international organisations, public and private organisations, existing platforms such as the EIPs (Water; Raw Materials; Agri) and Water Europe (formerly ETP WssTP).

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The knowledge to be gathered from stakeholders will focus on where Copernicus services can be improved to support monitoring programmes and how Copernicus data can be more effectively used in policy, regulation and support innovation in operational applications.

Step 4: Mechanisms of Stakeholder Engagement and Data Gathering.

Being cognisant of the obstacles to engagement is critical to optimising the approaches being developed and implemented. Obstacles might include: (i) the lack of political will; (ii) the lack of resource; (iii) the lack of understanding of the opportunity; (iv) fragmentation across the sector (who is responsible?); (v) the perceived competition or duplication; (vii) the lack of clarity of the benefits of engagement; and (vi) miscommunication/bottlenecks of information flow.

This emphasises the need for an effective mapping process (step3) and to ensure most up to date and relevant contacts are included. This will build on the existing consortium expertise.

Covid-19 also presents an additional challenge, the new methods of online working can work to the project's advantage, conserve resources and facilitate wider reach for this CSA.

Experience tells that early engagement of stakeholders builds deeper, trusted and more sustainable relationships with stakeholders. Building on existing networks will add substantially to the value of this knowledge exchange and will provide advocates and ambassadors to help 'snowball' the engagement within their respective communities and support co-development opportunities.

In any engagement, informed consent will be required (GDPR) accompanied with appropriate project briefs which highlight how the data and information will be used as well as the opportunity to withdraw from the process.

The following bullets summarise the methods that will be used:

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- Planning and desk based research and literature review: to avoid over-asking people (avoid survey-fatigue) we will make the best use of already existing information and bring this together in a coherent and comprehensive framework;
- Surveys and interviews: a targeted approach will be used to enrich and validate findings through survey and thematic workshops.
- Meetings and Workshops: Water-ForCE starts with an international workshop (WP1), aiming to facilitate the synthesis of end-user needs and requirements that will guide the activities of the technical WPs. Additionally, a co-design methodology will be applied aiming to ensure that the outputs of WP1 will respond to concrete community, policy and innovation needs whilst also facilitating sustainability. The latter will be realised in the context of the abovementioned workshop while also coordinated sessions (focus groups) will take place with dedicated stakeholders' segments through an online format, attempting to establish a deeper understanding of the thematic areas under investigation. Moreover, linkage will be established with the thematic/technical workshops for WP specific requirements and to prepare input for the open final workshop to conclude the Roadmap for Copernicus Inland Water services. Here we will advocate:
- Formal engagement mechanisms. These include workshops and advisory groups where there is a representative democracy forming a crucial engagement event facilitating engagement between partners and stakeholders and between stakeholders. This will facilitate the exchange of knowledge and good practice and co-develop solutions and innovations. Formal events are more likely to build confidence that decisions and impacts are agreed amongst all parties.
- Informal engagement mechanisms. Informal mechanisms within focus groups and workshops can provide an open atmosphere enabling stakeholders to discuss issues more openly within a 'safe space' that may not have come to light in more formal settings.

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- We will explore new opportunities for engagement as a result of Covid-19, which may well work to our advantage, ensuring easier pan-European (and beyond) coverage. We will also send out regular newsletters to engage our stakeholders.

Data will be stored and managed according to principles of the Data Management Plan of the Water-ForCE project, while ensuring that project activities are compliant with established EC and national guidelines for the Protection of Personal Data (POPD) and the General Data Protection Regulation (i.e. informed consent-forms as well as information sheets handed to the participants of all project participatory activities, etc). The use of online polls (sli.do, mentimeter, kahoot) and questionnaires during workshops will also provide a basis for qualitative engagement to provide a deeper understanding of the motivations behind quantitative responses. This will at the same time make the workshops more engaging and rewarding for the participants by providing instant feedback and the opportunity to nuance the data. Online webinars/conferencing tools are developing continuously and provide new powerful tools for engagement and sharing of information (MS Teams, webex etc).

Step 5 Feedback and Continuous improvement

Both the delivery of products and services for Copernicus and the effectiveness of the engagement processes present many challenges. Ensuring relevance of Copernicus services for stakeholders is central to a sustainable relationship that is both adaptive as circumstances change and responsive to need. We will seek feedback to:

- Feed into the development of Copernicus services (WP6) and value the engagement and relationships that have supported this intelligence
- Seek feedback on the engagement practices to ensure that the voice of the stakeholder is heard and we are seen to improve engagement processes throughout the CSA (WP1 & WP6) and ensure project legacy beyond the H2020 funding lifetime.

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