STARS 4 Water

Stakeholder engagement work plan

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Deliverable 1.1: Stakeholder engagement work plan

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Summary

The main objective of STARS4Water is to develop improved stakeholder driven data services and tools for an integrated risk assessment of climate change with respect to water resources availability, including hydrological extreme events and social hydrological developments in the context of river basin planning towards increasing climate resilience of ecosystems, society and water consuming economic sectors.

In STARS4Water seven European river basins represent a regional diversity with different climate vulnerabilities. The project is supported by a broad stakeholder community, and this report describes the workplan established to facilitate the stakeholder engagement process.

For each river basin there is a research partner (focal point) and a river basin organisation. The focal point for each river basin will establish, where not existing, or engage a river basin stakeholder community. For each river basin a selection of key stakeholders (champions) is identified based on mapping the river basins, the main challenges, interests and needs, with specific focus on data services and tools. The research focal points are further responsible for the communication with stakeholders and facilitating the information and communication between the stakeholders and the project developers (e.g., Work Packages and deliveries).

Communication with stakeholders is done by bilateral discussions (calls, emails), by newsletters, by the STARS4Water website, meetings, and in workshops. There will be 3-5 workshops within each river basin, the number and form of the workshops depends on the needs and structure of each river basin hub. Themes for the workshops are needs assessments, co-design of dashboards, data services, data driven models, scenario narratives, story maps and what-if scenarios.

To facilitate the uptake of STARS4Water results into policies the project amongst others will: 1) organize dedicated briefings into policy debates and events, 2) promote project outcomes at relevant venues, 3) invite policy stakeholders to a one-day seminar at the concluding conference in Brussels.

Content

1. Introduction to the STARS4Water project

STARS4Water targets to enhance informed decision making on planning and actions for adaptative, resilient and sustainable management of fresh-water resources at river basin scale in the context of climate change. The STARS4Water project envisions an information-supported stakeholder engagement approach in which actors share their understanding of the integrated water resources system, voice their information needs, and relevant information and tools are made accessible and tailored to their needs.

1.1. Objectives of STARS4Water

The **main objective** of STARS4Water is to deliver improved stakeholder-driven data services and tools for an integrated risk assessment of climate change with respect to water resources availability, including hydrological extreme events (floods and droughts) and social-hydrological developments in the context of river basin planning, towards increasing climate resilience of ecosystems, society and water consuming economic sectors.

STARS4Water will advance existing tools and technologies into the next generation stakeholder-driven tools, benefiting from new data technologies, accuracy, and resolution. These tools will support an efficient assessment of climate risks and the development of strategies concerning adaptation and resilience of water resources management.

The project is supported by a broad stakeholder community. It exploits the capability and potential of current and future European monitoring and observation network and databases for water resources analysis and availability assessments. It also advances state-of-the-art integrated river basin modelling demonstrating usage of new data and technologies. Among the main outcomes will be the improved capability of stakeholders to generate a common understanding of the water system, to define through a participatory process the safe operating space regarding water availability and use, as well as frequency and intensity of flood and drought events, to assess climate change, water management and infrastructure impacts, identify water-related problems for society, economy and nature following a risk-based approach, and to take policy and investment decisions accordingly.

The specific objectives of STARS4Water are:

- To support effective engagement of river basin authorities and other relevant stakeholders from seven river basin hubs (RBHs) by (a) initiating and facilitating dialogue focusing on needs and opportunities regarding informed decision making on planning and actions for adaptative, resilient and sustainable water management, (b) co-developing and testing of services and tools resulting in ownership with and improved usability by the stakeholders, and (c) promoting uptake of the results;
- To enhance the evidence, base and scientific underpinning of climate risks and impacts that will affect the ecosystems, society and related relevant economic sectors for various scenarios and time horizons. For this purpose, co-designed and developed data services and tools will be applied in the RBHs to define the safe operating space in terms of water quantity and availability in order to identify the actions needed for sustainable water management and climate resilience of their basins and need for climate action;

- To improve the capability of stakeholders by developing an information system (dashboard) for informed decision making to promote participative understanding of the water system, the climate risks concerning water resources availability and their impacts on ecosystems, society and water consuming sectors, and visualise risk assessments outcome in a way that it is meaningful for stakeholders;
- To review and assess the current baseline of data processing, modelling, and computational capabilities to facilitate enhanced integration of hydrological datasets for water quantity and water quality forecasting and identify research and infrastructural gaps;
- To enhance data science by applying innovative data techniques to develop data services and data-driven models, benefiting from the full potential of data sources from existing motoring and observations frameworks;
- To develop a state-of-the-art data-driven modelling framework to support integrated, adaptive river basin monitoring and water resources planning, including new data services, data-driven models or updated existing river basin model software and modules;
- To upscale the use of data from community-driven global to local monitoring and observation frameworks to wider river basin networks by organising capacity building activities and to create a supportive meta-data platform to sustain STARS4Water services beyond the lifetime of the project.

1.2. The STARS4Water approach

In the project, **seven river basin hubs (RBHs)** within Europe serve as living labs for co-design of the advancements with government, citizens, and the private sector (Figure 1). The seven hubs represent a regionally diverse portfolio of climate vulnerabilities and adaptation needs across stakeholders. In each hub, Stars4Water has a direct beneficiary river basin organization (RBO) that has already internalised river basin management and adaptation planning and has strong institutional connections and relationships with other governmental and non-governmental organizations and other actors in their environment (indirect beneficiaries).

The STARS4Water consortium believes that data services and tools should be tailored to the river basin context perspective. Therefore, much effort will be put to map the needs of the stakeholders in the seven river basin hubs at the beginning of the project, and to present the information related to the issues in their own basin in an end-user friendly and attractive way.

Using a stakeholder joint-up co-design process, existing models and data collection, sharing and use processes will be innovated based on local conditions. Tailoring model improvements (e.g., by including local information and knowledge) and data services (e.g., making remote sensing available in higher resolution for local modelling) will lower the threshold to active participation. The data services and model advancement by the consortium will build upon and advance earlier Horizon2020, Copernicus, ESA, EDO, JRC activities, etc. These developments will be made available to the RBOs and other stakeholders through the improved and extended model suites for the basin and dashboards to be developed.

In the RBHs, the consortium together with the RBO will apply the data, models and/or dashboards and provide the advancements for collaboration with end-users, including citizens and the private sector, and service providers, in performing vulnerability and risk assessments. Active involvement, training and capacity building during the project will ensure sustainable use after the lifetime of the project. Working through the RBO as a spider in the web, with representatives from different countries,

institution, etc. and focal points for the basins, will accelerate the horizontal uptake or distribution of project results at the river basin scale in broader sense.

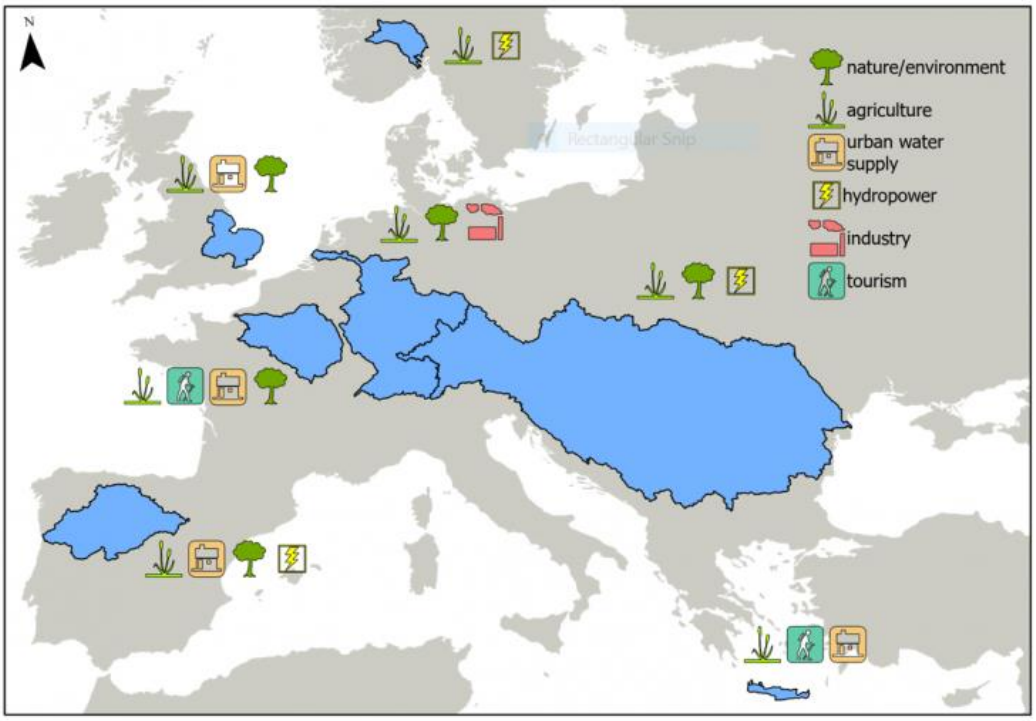

Figure 1 The seven river basin hubs (RBHs) represent a diverse portfolio of climate vulnerabilities and adaption needs across sectors and include the basins Drammen (NO), East Anglia (UK), Rhine (international), Danube (international), Seine (Fr), Duero (ES), and Messara (Gr).

In addition to the seven RBHs, model innovation and application at the pan-European level will support the **upscaling of Stars4Water results to the pan-European level.** Also, the creation of a community driven observation framework for data standards, schemes, and management practices in cooperation with JRC, ESA and other European organizations addressing river basin management needs (water quantity, water quality, water use, etc.) will provide a vehicle for upscaling the results. Further upscaling is achieved by networking, i.e., through:

- establishing a network of river basin organization champions and river basin managers practitioners, starting with the seven RBHs;
- expanding this network beyond the seven RBHs and building a relevant Community of Practice (CoP) with additional RBOs, supported by capacity development activities;
- leveraging on existing river basin networks such as INBO network, WLRI, UN-ECE etc.

1.3. What will STARS4Water do?

Central in the project are the RBHs, which will serve as living labs for co-creation, demand driven formulation of information needs and requirements (WP1), co-development of data services (WP2) and data-driven modelling tools (WP3), and testing and application of the data services and tools (WP4). WP5 will build capacity for river basin managers and other stakeholders for applying the services and tools developed in STARS4Water within their river basins within and outside the EU and to scale up to national and EU level. WP6 is organizing the overarching project communication and dissemination, in connection to the dissemination activities within the river basin hubs (WP1) and the

capacity and upscaling activities (WP5). WP7 is responsible for the successful coordination of the different WPs as well as the scientific, technical, administrative, and financial aspects of the project.

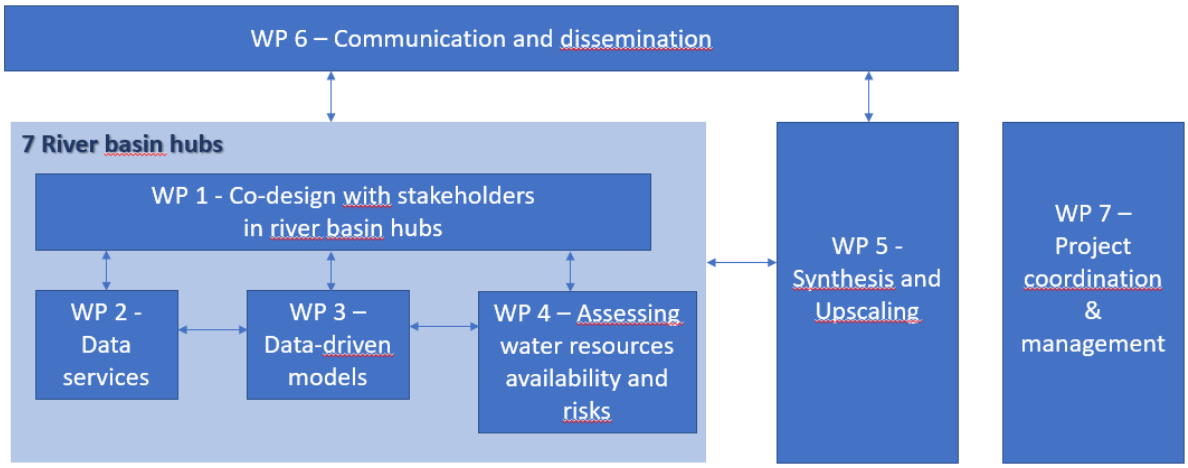

Figure 2 STARS4Water work package structure.

1.4. This report

This report describes the workplan established to facilitate the stakeholder engagement process. The report contains an introduction to the STARS4Water project (this chapter), a brief description of the river basin hubs (chapter 2), the stakeholder engagement process (chapter 3), the stakeholder engagement activities and planning (chapter 4), and the stakeholder mapping (chapter 5).

2. The STARS4Water river basin hubs (RBHs)

2.1. River basin mapping

The river basin mapping is the initial stage of a stakeholder engagement process and necessary to get an overview of the different river basins (main characteristics, existing status, needs and challenges, gaps, governance, etc.). The mapping started prior to and during the kick-off meeting of STARS4Water (October 2022), where presentations of the RBHs and preliminary discussions allowed us to get an overview of the water resources related challenges under climate change in each hub. A river basin factsheet was then developed to organize all information and distributed to the partners to complete before the first workshop (planned for month 5 and 6). The value of these preliminary mappings is to get the first indications on the main water resource challenges now and in the future, data needs and requirements, and the stakeholders that represent different user groups within the river basin. The factsheet information may evolve in the future, as new challenges, needs, or stakeholder groups are identified along the project.

2.2. Description of the seven RBHs

2.2.1. Drammen RBH

The Drammen river basin has a total drainage area of 17 114 km^2 and is the third largest river basin in Norway. It is divided into four large subbasins, Dokka-Etna, Begna, Hallingdal, and Simoa. The total river length is 310 km, the river source being in the high mountains (~2000 m asl) and glaciers and the outlet at sea level. Forests and mountains cover more than 50% and 20% of the basin area, respectively. Within the basin annual precipitation varies from 500 to 2600 mm/year. Specific runoff is between 10 to 40 $ls^{-1}km^{-2}$. The largest floods in the main river are caused by snowmelt in combination with rain and occur in the months May and June. Rain floods are typical in the autumn.

Projections of climate and hydrology in Norway are made by the Norwegian Centre for Climate Services (Hanssen-Bauer et al., 2017). Both precipitation and temperature will increase. In particular, the seasonal runoff is expected to change in the Drammen river basin, with an increase in runoff during winter and spring, and a decrease in summer. The seasonality of floods is expected to change, with fewer and smaller snowmelt floods and more and larger rain floods. Sea level rise will be further challenging for the vulnerable areas susceptible to flooding along the main river at the outlet. For land use planning and design, a climate change allowance for storm surges of approximately 0.5 m is recommended, based on sea level rise under high emission scenarios by the end of this century. An expected intensification in precipitation will affect the smaller catchments (smaller than 100 km^2), and an increase in both flood frequency and flood magnitude can be expected for these catchments. For many smaller tributaries to the Drammen river, a climate change allowance of 20 % for design floods is recommended. Climate projections for this region indicate only a slight increase in summer precipitation, but a large increase in temperature and thereby increased evapotranspiration (high emission scenarios). This may lead to more severe summer droughts and more frequent and longer low flow periods.

Ecosystems may be affected by changing seasonality, including more water stressed conditions and higher water temperature. Many sectors are affected by droughts and have competing interests on

the available water resources. Challenges in water use will possibly change due to increased need for hydropeaking (releasing pulses of water to increase hydroelectric power production at hydro dams to meet peak daily electricity demand), increases in irrigation, and an increased domestic water demand due to expected population growth in the urbanized parts of the basin.

There are 107 hydropower stations in the Drammen river basin. The first hydropower production started in the early 1900, and the reservoir capacity has been increased since the 1970s. The expected changes in precipitation and temperature will affect the power production. Management of reservoirs is important for optimal power production. Further the reservoirs can be used to avoid flood peaks from different rivers that coincide at critical areas simultaneously. The regulation of reservoirs can reduce flood magnitudes up to the 20 to 50-year return level. For larger floods, the effect of reservoirs is reduced.

The lower parts of the basin are the most densely populated. In this area, water supply is important. There is some water extraction for agricultural use. Except for the larger water supplies, the local water extraction and use are not well documented.

Ecosystems and pollution in the rivers are monitored and followed up according to the EU Water Framework Directive (WFD). Valuable ecosystems include salmon and trout habitats, while the Drammen basin has the second largest diversity of fish species in Norway. Hydropower companies have regulations specifying low flows to ensure, amongst others, the ecological conditions of the rivers.

In the Drammen basin, society has been affected by floods and will continue to experience flood damages in the future. Droughts, on the other hand, are expected to become an increasing challenge both due to an increased probability of droughts and population growth and thus an increased water demand. Flood preparedness plans are commonly in use, but the water resources management systems are less prepared for droughts.

2.2.2. Danube RBH

The Danube River Basin has an area of 800.000 km² and forms the second largest river basin in Europe (ICPDR, 2011; ICPDR, 2015; Sommerwerk et al., 2009). It originates in the Black Forest Mountains in Germany and discharges into the Black Sea. The basin is divided into three sub-regions (Upper, Middle, and Lower Danube) corresponding with a characteristic gradient and landscape features from source to delta. The flow from the mountains to the sea covers a distance of 2857 km. The mean annual river flow of the Danube at the mouth corresponds to 6486 m^3s^{-1}.

Located in the centre and the southeast of Europe, it includes territories of 19 riparian countries. A population of about 80 million people lives along the Danube and its tributaries. The economic function of the Danube River ranges from water supply for agriculture to hydropower and navigation.

Changing its characteristics from the source in Germany to the delta in Romania the Danube river offers diverse habitats for a large number of different species.

All 19 riparian countries are contracting parties of the International Commission of the Protection of the Danube River (ICPDR). The ICPDR engages in the coordination of river conservation, improvements and rational use of the Danube waters.

Observational data and climate projections show that the water availability is likely to decrease in the southern and eastern parts of the Danube River Basin (Bisselink et al., 2018; ICPDR, 2018). According to trend analysis three patterns can be extracted: 1) dry regions become even drier; 2) the precipitation gradient from northwest (high) to southwest (low) gets stronger; 3) a significant change in seasonality brings wetter winters and drier summers.

While an increase in the intensity and frequency of dry spells, hot days and heat waves shows a high certainty, changes in annual precipitation are insignificant. Extreme hydrological events, however, will occur more often and will be more intense throughout the entire basin, resulting in droughts and floods.

The achievement of environmental objectives is hindered by hydro-morphological pressures and disrupted sediment flows. A retreat of permafrost in the mountainous regions and the glacier receding is expected to increase sedimentation issues. Shifts in water availability and river flow have also an impact on the hydraulic, ecological and socioeconomical function of the floodplains. With respect to water quality issues, new pressures arise due to the changes to all temperature-dependent chemical and biological processes.

Conflicts between stakeholders and users are likely to intensify as runoff is projected to decrease significantly until the end of the 21st century. The expectations for future climate conditions and their water related impacts also pose challenges to sustainable river management. Authorities and national agencies need to release water use restrictions by balancing ecological, economic and societal interests.

2.2.3. Duero RBH

The Duero International River Basin District is the largest in the Iberian Peninsula with 98,103 km^2. It includes the territory of the Duero river basin, as well as the waters of transition in the Porto estuary and the associated Atlantic coasts. It's a shared territory between Portugal (19.6% of the territory) and Spain (80.4%). The Duero river basin hydrographic survey shows that the Spanish territory covers about 79,000 km^2 with 2,1 million inhabitants.

In the administrative sphere, the Spanish part of the Duero demarcation is included, at regional level, in eight autonomous communities, among which there are close to 2,000 municipalities and there are more than 4,918 population centers. 98.25% of that surface belongs to the Autonomous Community of Castilla y León being the most populated cities: Valladolid (293,504 inhabitants), Burgos (170,325), Salamanca (144,228), León (118,172) and Palencia (76,131).

The latest climate projections of the Intergovernmental Panel on Climate Change (IPCC) of the UN indicate that for Spain the annual rainfall will decrease, and the temperatures will rise. Within the scope of the powers of the Confederations Hydrographic the most probable conditions are: overall decrease in rainfall and seasonal changes; increased evapotranspiration; runoff reduction, declining snow resources and seasonal changes in snowmelt; reduction in aquifer recharge; increased eutrophication in surface waters due to increases in water temperature. The future impact of climate change on water resources in Spain was evaluated by CEDEX (2017). For the Duero, the scenarios of runoff reduction ranged from -46% to +25%.

In macroeconomic terms, the Duero basin offers notable socioeconomic weakness in the Spanish context, which is evidenced by a contribution of 4.3% to the total national GDP from a territory that covers 15% of Spain. A key factor is demographic weakness since the Cuenca gathers only 4.5% of the

Spanish population. By sectors of economic activity, the most relevant is the services sector (69.5% of GVA), encompassing 73% of workers.

In the design of the 2027, 2033 and 2039 scenario, the evolution forecasts of the determinants of water use are included. The population of the demarcation experiences a general decrease in future scenarios. In In the 2027 scenario the variation in the population stands at approximately -4% and in the 2033 and 2039 scenarios the population decreased by 7% and 11% respectively.

The migratory process, which affected most of the territory of the Duero basin has not led to a massive abandonment of agricultural activity. The agricultural productivity has been reduced as a whole, as has happened with the rest of the economic sectors productivity. The rural market suffered in the entire Duero river basin district. It is worth noting, however, the growth of the service sector, being the only one of the productive sectors with expectations of improvement and with production levels of around 65%, very close to the national level.

The main current and foreseeable problems of the Duero river basin district related to water are: 1) diffuse contamination; 2) sustainable use of groundwater; 3) urban and industrial pollution; 4) hydro-morphological alterations; 5) implementation of ecological flows; 6) irrigation sustainability; 7) adaptation to climate change, allocation of resources and guarantees, 8) Optimisation of the management of the supply of water resources infrastructures; 9) recovery of costs and financing of the programs of measures; 10) management and control of the hydraulic public domain; 11) inter-administrative coordination and public participation, 12) flood risk management.

2.2.4. East Anglia RBH

Eastern England is the driest region of the UK, receiving only two-thirds of the average national rainfall. A significant proportion of the water supplies originate from aquifers and reservoirs, which are slow to recharge increasing their vulnerability to drought. Many of Eastern England's chalk rivers, peatlands, wetlands, and sensitive water environments are in poor health due to decades of licensed over-abstraction alongside other pressures. Almost 30% of the land is below sea level and a significant proportion of the area is used for agricultural production. Housing growth and the region's agricultural production is at risk of being curtailed as access to existing water resources is reduced and the impacts of climate change are increasingly felt.

In future, the combination of an increased risk of drought and an augmentation of water demand for food, energy and growing economy, pose a real risk to constrain regional economy and nature's recovery in the absence of further action from all sectors. There will be a need to increase rainfall capture and storage, as well as improve water conservation and reuse.

With a population of circa 10.5 million people in Eastern England, public water supply is the largest user of water in the region. This region is also the key crop-growing region of England and is heavily reliant on water for irrigation to grow salad crops, vegetables, potatoes, and soft fruits. A significant increase in demand for spray and drip irrigation is anticipated over the coming years during the warmer, drier and extended growing seasons expected in future. Eastern England hosts over 60% of abstraction licenses for England, the water requirement follows a seasonal pattern which peaks from May to September. The second most important water user in the region is the energy sector. Power stations abstract freshwater for cooling purposes, it is worth noting though that many stations are situated near to costs and estuaries. In the future, water needs in this sector are likely to increase to meet the UK government target of net zero greenhouse gas emission by 2050.

2.2.5. Messara RBH

The Messara basin, located in the central-south area of Crete island, with a population of almost 45,000 inhabitants and an area of 611 km^2, constitutes the most important agricultural region of Crete. It is also the site of Phaistos Palace of the Minoan civilization and the Roman city of Gortys, and thus tourism is also an important economic activity. The main land-use activity is olive growing with some grape vine cultivation. The remainder of the cultivated land is used for vegetable, fruit and cereal-growing as well as for livestock grazing (on the higher grounds).

The basin receives on average about 650 mm of rainfall per year, of which about 65% is lost to evapotranspiration, 10% as runoff to the sea, and 25% is recharging the aquifers (Kritsotakis and Tsanis, 2009). Rainfall increases with elevation from about 500 mm on the plain to about 800 mm on the basin slopes while on the Asterousian Mountains it reaches 1,100 mm. The average winter temperature is 12 ^{0}C while in the summer it is estimated at 28 ^{0}C (annual mean is 16.6 ^{0}C). The relative humidity in winter is about 70%, whereas in the summer it reaches about 60%.

The valley of Messara is a typical graben formation and within it two hydrological catchments are formed: the Geropotamos-Festos and the Anapodaris-Xarakas. The plain area of Messara valley hosts the largest alluvium aquifer system of the island, extended in an area of 216 km^2. The Plain is covered mainly by quaternary alluvial clays, silts, sands and gravels with thickness from a few meters to 100 m or more. The quaternary deposits of the plain host the main aquifer system.

The chemical status of the surface water bodies (Geropotamos River) is good according to the WFD characterisation. Out of the 3 main groundwater bodies (GWB) in the basin, the GWB 'Porodes Moiron' (EL1300083, ~56 km^2 area) has already been characterized in poor quantitative and poor chemical status (nitrates presence). In terms of water supply, there are two reservoirs: the Faneromeni dam with a capacity of 16 hm^3 supplying water on the western area, and the Plakiotissa dam (under construction) with a capacity of 18 hm^3 which will supply water to the central area of the plain. Groundwater is a major source: approximately 1,400 wells operate in the valley, causing a drop in the water table of as much as 45 m due to overexploitation in some areas.

Natural water resources' availability, both groundwater and surface water, is also decreasing due to climate change trends. Changing precipitation and ET patterns drive changes in the springs' outflows, as well as in the crop water needs, and lead to increased water demands in the urban (incl. tourism) and agricultural sectors, which cannot be met by the current water supply and infrastructure. Floods and seawater intrusion issues are also exacerbated in the coastal areas. Robust climate change projections and forecasting are necessary for better planning and adaptation.

The annual water use amounts to 70 million m^3/year, of which 96.6% for agriculture, 3.2% for domestic use (including tourism), and 0.2% for industrial supply. The irrigated area is about 16,263 ha, which represents 56% of the total cultivated (29,109 ha) area.
The overexploitation of the aquifer has reduced water availability, while the uncontrolled pumping and use also creates tensions amongst the users. Climate change is expected to increase water demand for the different users, and thus water conflicts may be exacerbated, posing the need for robust water allocation schemes which incorporate alternative scenarios.

2.2.6. Seine RBH

The Seine River basin (drainage area of ca. 76,000 km²) covers 18% of the French territory but concentrates 30% of the French population. More than 25% of the French industrial sector is in the river basin, which also includes the largest French harbour (Le Havre) and many tourist destinations, including Paris. With a flat topography and slow flows, the mean annual streamflow is the lowest among the major French rivers. The observed flow regime shows an important interannual flow

variation, with high flows in winter (February) and low-flow periods in summer (August). Measurements at Paris (43,800 km²) indicate wet periods with monthly flows of approximately 500 m^3/s and dry periods with monthly flows down to 140 m^3/s. Evapotranspiration is relatively high and only 30% of the 800 mm of mean annual rainfall recharges the aquifers and/or reaches the streams. Groundwater resources are important: the basin lies on the largest groundwater reservoir in Europe, which strongly regulates the temporal variability of surface flows.

Most of the drinking water supply (60%) in the river basin comes from groundwater withdrawals. Water is also used by agriculture, with 60% of the land used for intensive agriculture (cereal production and industrial crops). Water demand is highly heterogeneous due to the high concentration of population and economic activities in Paris and its surrounding urban area. Four upstream dam reservoirs are operated to control floods downstream and maintain a minimum flow during the driest months. The management of these reservoirs has gained an important role in adaptation to climate change, as climate change projections show a 12% reduction in precipitation, a 23% increase in evapotranspiration, a reduction in river flow by 10% to 30% (40% for low flows) and a 30% reduction in groundwater recharge by mid-century.

Concerning water quality, the last assessment for the Water Framework Directive (WFD), conducted in 2019, points out to the necessity of increased efforts towards pollution reduction. Twice more river water bodies have shown nitrate contamination in comparison to 2013, leading to the development of toxic algae in the Seine estuary, which could worsen with climate change. It is projected that an increase of socio-economic pressures in the basin might result in the percentage of rivers in a good ecological status decreasing from the current 32% to 18% by 2027 if no additional actions are taken.

Over the past 30 years, the Seine River basin has been integrated in several large research projects such as the interdisciplinary environmental research program (PIREN-Seine) or the European Long-Term Socio-Economic and Ecosystem Research (LTSER) network. The PIREN-Seine programme, in particular, has brought together hydrologists, environmental chemists, ecologists, biogeochemists, geographers, environmental historians to generate knowledge on the past and future trajectories of the river basin status and evolution. Several datasets and modelling tools at various space and time resolutions were developed to address socio-economic features and the main environmental issues in the river basin, as well as the impacts of climate change on water resources availability (see a synthesis in Flipo et al., 2021). Some of these tools, however, largely remain in the hands of researchers or practitioners with modelling expertise (Chong et al. 2017). It remains a challenge, and one of the objectives of the work carried out within the STARS4Water project, to connect existing knowledge, research models and novel datasets to real-life operations for river basin water management and river quality improvement, fostering the operational use of decision-support tools by stakeholders. In particular, new data-driven modelling approaches and machine learning techniques have the potential to complement the available tools for rivers basins authorities and to facilitate complex data assimilation in large river basins.

2.2.7. Rhine RBH

The Rhine River Basin is one of Europe's major transboundary river basins, covering 18.5000 km^2 and home to 60 million inhabitants. The river flows through Switzerland, France, Germany, Luxemburg, and the Netherlands while the basin also stretches into Austria, Liechtenstein, Belgium as well as Italy. The main stream covers a length of 1223 km, of which 825 km is intensively used for inland navigation. Rhine water is used for industrial and agricultural purposes, for energy generation, for the disposal of

municipal wastewater, for recreational activities, and for the production of drinking water for more than 30 million people. Furthermore, the Rhine is a natural habitat for a diversity of plant life and many birds, fish and other species.

Climate change implies for the Rhine Basin, changes in precipitation and evaporation, as well as snow melt and glacier melt, and consequently also changes in the river flow of the Rhine river. Stahl et al. (2022) have indicated that under the RSP8.5 scenario, the proportion of snow and glacier melt in the river flow of the Rhine and its tributaries will turn around the year 2045, which may lead to a 23% lower minimum flow at Lobith in 2100. Based on used models/scenarios (RCP8.5), we may assume that the total stream flow will be stable - also in the long run - and that the low flows will remain in the familiar range during the next three decades, after which they will decrease quite rapidly during the last 50 years of this century.

In addition, changes in socio-economic activities may lead to changes in water use and water consumption, and also influence the river flow of the Rhine river. The results of a recent study have shown that under future scenarios, the total water consumption in the Rhine river basin could increase from 50-75 m^3s^{-1} to 200-250 m^3s^{-1} in summer, which is significantly during low flow periods (Ruijgh, 2019).

An overview of the water use is presented in the Table 1 below.

Table 1. Spatial variations in the functions of the Rhine catchment area, in key countries:

Functions	Switzerland	France	Germany	Netherlands
Drinking water			X	X
Process water	X	X	X	X
Irrigation	X		(X)	X
Hydropower	X	X	(X)	(X)
Amenity	X		X	X
Fishing water				X
Navigation	X	X	X	X
Sewage	X	X	X	X

(Source waterwiki.net)

The water consumption of the public sector and the industry sector is relatively small compared to the river flow of the Rhine. Irrigation, cooling water, lignite mining and irrigation are considered as the most important sectors with respect to the water consumption. The Rhine river is the most important shipping routes in Western Europe and therefore a very important economical factor for the member states.

The results of the risk assessment in EU Stars4Water using data and modelling framework will be the scientific underpinning for the new Rhine 2040 program (see www.iksr.org) from the International Commission for protection of the Rhine (ICPR). Results will also contribute to the policy planning of the Central Commission for Navigation on the Rhine (CCNR) to make the navigation sector aware of the impact of climate change and their discussion on which measures should be taken in priority to foster the resilience of inland waterways to future low waters and by whom. And finally, the results will be followed up by the commission on Hydrology of the Rhine, the scientific knowledge commission for the Rhine (CHR-KHR).

3. Effective stakeholder engagement process

In STARS4Water the main objective is to work with stakeholders through a co-creation approach to address the main entry points in their water resources information system where new data, tools and indicators can increase the effectiveness and timeliness of their water management decisions concerning climate resilient water resources planning. To ensure that stakeholders are involved and engaged in the project, the following stakeholder related objectives have been identified, which are important for the stakeholder engagement plan:

- Building stakeholder communities for each RBH where these do not exist, together with the River Basin Organizations (RBOs). The works is organized through the focal points of the river basins.
- Mapping the stakeholders' data needs and requirements for assessing water resources availability and water use.
- Making local and new data concerning the RBHs available through the river basin communities.
- Co-design and co-development of a dashboard for informed decision making. This will be developed for a selection of the RBHs.
- Co-design of narratives with stakeholders to explore future water scenarios in the RBHs.

One goal of stakeholder community participation is making sure that the process is socially inclusive, i.e., that the main groups that are or could be affected by water use and climate change are included in the process. STARS4Water will ensure an all-inclusive process in the stakeholders' participation. Among our important criteria is to ensure equal opportunities for all to participate in the decision-processes affecting them, regardless of background, ethnicity, or gender. As such, we will pursue gender parity as well as the inclusion of under-represented groups (where applicable) in the stakeholder community participation.

3.1. Organizational framework

For each RBH, we will set up a stakeholder community with relevant actors within the river basin to facilitate the co-design and co-development of data services and tools to provide information for monitoring, assessment and planning of water resources at the river basin scale. In this way, all relevant actors will be involved in contributing to the objectives of this project. The stakeholder communities will be established for the lifetime of the project and beyond. They will complement or rely upon existing (well established) communities and networks, depending on the level of stakeholder association in each hub. Besides governmental organizations, the stakeholder communities can include economic sectors as well as representatives from societal and environmental organizations. Together with WP2 and WP3 we will organize cross-sectoral workshops to provide input and feedback to support the development of tailored-made and basin relevant data services and tools for water resources monitoring, assessment, and planning and to promote uptake, upscaling, and transferability of the results of the project. Figure 4 presents an overview of the engagement process and interaction process with stakeholders for the project, including a timeline for milestones relevant for the stakeholder involvement.

Each basin has:

- a research focal point, i.e. (associated) partner in the STARS4Water project and scientifically responsible for the basin, and
- a river basin organization (RBO) type of partner, often a formal associated partner in the STARS4Water project.

In some basins the research focal point and the RBO are overlapping, i.e., Drammen (NVE) and Rhine (RWS)

To ensure a good return from the stakeholder workshops, it has been found useful to involve, at an early stage, a few key stakeholders who are important for making the workshop a success. For example, if it is important to develop environmental flow tools or a reservoir management optimization tool, it makes sense to involve representatives interested in these themes already in the co-development of the workshop. Thus, they will most likely play a more active role during the workshops. We refer to these key stakeholders as "stakeholder champions".

3.2. Stakeholder champions (SC)

The stakeholder champions are chosen amongst the main water resource interests/users that are vulnerable to or influencing future challenges or conflicts within the RBH. The stakeholder champions should be a small group with a position to identify challenges, gaps and needs, and contribute in a constructive way to presented solutions throughout the lifetime of the project. Depending on how the river basins are organized, the stakeholder champions could be between one and four stakeholders.

The stakeholder champions should have a high interest and preferably a high influence in the river basin hub. They should:

- be encouraged to participate in three workshops (see information on the workshops in section 3.5),
- participate in one or two stakeholder meetings each year,
- contribute to the follow up and give feed-back on data services, models, storylines, story-maps, and dashboards,
- be invited to the final STARS4Water conference at the end of the project.

3.3. Stakeholder communities

The stakeholder communities should represent different user interests in the river basin, and include governmental organizations, representatives from economic sectors as well as from societal and environmental organizations. The stakeholder communities will:

- be invited to participate in the first workshop and the final workshop/seminar,
- be kept informed on the progress in Stars4Water by newsletters and through the website,
- be invited to participate in testing of products when suitable.

The stakeholder community will probably feel less obligated to contribute to the project, compared to the stakeholder champions, but should be properly informed and invited to the first workshop and the last workshop/seminar in the RBH.

3.4. Communication plan

The communication with the stakeholders and the relevant WPs will be coordinated by the focal point of the river basin. WP6 is responsible for establishing a communication plan for the project (D6.1), here we focus on the communication strategy. STARS4Water information, content, and layout relevant for the stakeholder engagement and communication will be delivered by WP6 in cooperation with WP1. The communication with stakeholders can be upheld through the following channels:

- Newsletters – issued when important news and developments are available, or at least twice a year (depending on the feedback from the Stakeholder Mapping Workshop 1)
- The STARS4Water website (www.stars4water.com) with information on the project in general project in general
- The websites dedicated pages for each RHB and related storylines.
- STARS4Water LinkedIn account
- Meetings (physical and digital) and workshops
- Bilateral discussions and communication (calls, e-mail) between the focal point and stakeholder champions

The stakeholder community represents a spectrum of interests with different needs and wishes related to involvement in and information from STARS4Water. Additionally, the stakeholders' interest and involvement might further vary depending on deliverables in the project. For example, hydropower companies with competence in modelling might have a higher interest in WP2 (data) and WP3 (models), whereas municipalities are more interested in having easily accessible water resource information, processed data and storylines of water resources under climate change (WP5 and WP6). It is helpful to define an information strategy towards different stakeholder groups, to ensure that stakeholders receive information and can be engaged when relevant. The information strategy will be based on identifying the stakeholder engagement along two axes: by their influence on decisions, input etc. and by their interest in general or specific STARS4Water products/deliverables throughout the project (Figure 3). According to these 2 axes, we hereby identify 4 categories of stakeholders' engagement as presented in Figure 3 below:

- Category 1 (red box): low influence, low interest
- Category 2 (blue box): low influence, high interest
- Category 3 (yellow box): high influence, low interest
- Category 4 (green box): high influence, high interest

The stakeholder champions are hence in Category 4 with high influence and high interest.

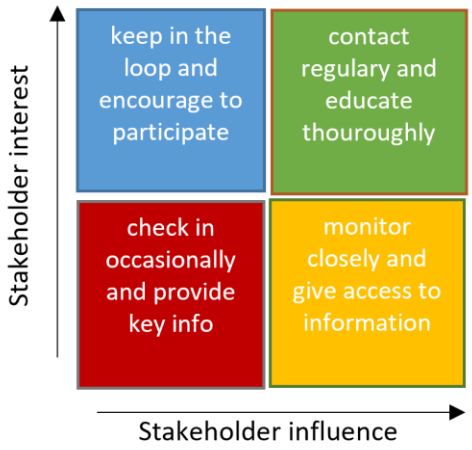

Figure 3 approach to identify stakeholder information strategy based on stakeholder influence and interest.

4. Stakeholder engagement activities and planning

4.1. Stakeholder engagement activities

We are organizing a series of workshops and meetings with stakeholders at the level of river basin hubs to co-design data-services, next generation models and tools to support river basin planning. The activities with the stakeholders hence include: 1) mapping of challenges; 2) prioritizing of stakeholder needs in terms of data services and tools; 3) identify the key elements of the services and tools to be developed in order to match their specific needs; 4) provide feedback to developers on the services and tools; 5) relevant stakeholders will be included in the development of storylines; 6) discussing/drafting of action plans on how our tools will be mainstreamed into the toolbox of the hubs and be up-taken; 7) participate to the Interactive Stakeholders' Forum and providing input to the Online Impact Reporter (i.e. reporting of biophysical and socio-economic impacts, changes in vulnerability and risk, and ex-post evaluations of applied adaptation measures by different categories of stakeholders related to climate change; 8) participate in the training & capacity building activities/webinars offered through the STARS4Water Academy

In addition to the seven river basin hubs, model innovation and applications at the pan-European level will support the upscaling of STARS4Water results to the pan-European level. Upscaling in this context implies the broader application of data, models and techniques that are developed in STARS4Water across to relevant European river basins.

To facilitate the uptake of STARS4Water results into policies, we will deliver dedicated briefings for policymakers at all levels (national, EU, river basin commissions) by linking into policy debates and events and through promoting project's outcomes. Including av one day seminar for policy stakeholders at the STARS4Water concluding conference in Brussels, policy briefs and a Laymans report, and networking briefings with relevant initiatives of the EU Green Deal, CIS EG, and other organizations.

4.2. Meetings and workshops

The stakeholder engagement process is presented in figure 4. The STARS4Water milestones that require the engagement with stakeholders at the level of the river basin hub are presented in table 2.

- Workshop 1 (by month 7): Broad mapping of interests, challenges and needs in each basin. Co-design decision support systems, dashboard (participants: stakeholder champions and stakeholder community).
- Workshop 2 (by month 12): Scenario narratives for each river basin hub (participants: stakeholder champions and selection from the stakeholder community)
- Workshop 3 (by month 22): data services and data driven models – feedback from stakeholders (participants: stakeholder champions and selection from the stakeholder community)
- Technical Meetings (by month 24 and 30): for the purposes of WP3 and WP4 the data-driven models and tools will be applied and validated by selected river basin user-groups. Technical meetings to support the application and validation of these models and tools and discuss on the feedback provided to the developers (participants: selected user-groups from the stakeholder champions and the stakeholder community)

- Meeting/optional Workshop 4 (by month 36): Story maps on future water resources availability and risk (participants: stakeholder champions and selection from the stakeholder community)
- Meeting/optional Workshop 5 (by month 38): What-if scenarios concerning green deal and water policies (participants: stakeholder champions, selection from the stakeholder community, selected national and EU level stakeholders)
- Online Impact Reporter sharing experiences and best practices by stakeholders (by month 24): The stakeholder champions and the stakeholder community will be invited to participate to the Interactive Stakeholders' Forum and provide input to the Online Impact Reporter (i.e. reporting of biophysical and socio-economic impacts, changes in vulnerability and risk, and ex-post evaluations of applied adaptation measures by different categories of stakeholders related to climate change)
- 1-3 Meetings/year: mainly with stakeholder champions. Follow up and give feedback to the work done in WP2, WP3, and WP4
- STARS4Water Academy (by month 31): Participate in the training & capacity building activities offered through the STARS4Water Academy, specific modules/webinars targeting stakeholders to interpret the STARS4Water outputs, discuss scenario planning, risk management, etc.
- Final conference: stakeholder champions will be invited to Brussel.
- Final local seminar: presenting the results from the project to all stakeholders in the RBH.

It should be noted that as part of collecting user feedback or participating in workshops, interviews, and other outreach activities, a basic informed consent form is included in Annex 1. This form is used to develop dedicated informed consent forms for specific activities. More specific information on data management is available in STARS4Water D7.1 Data Management Plan.

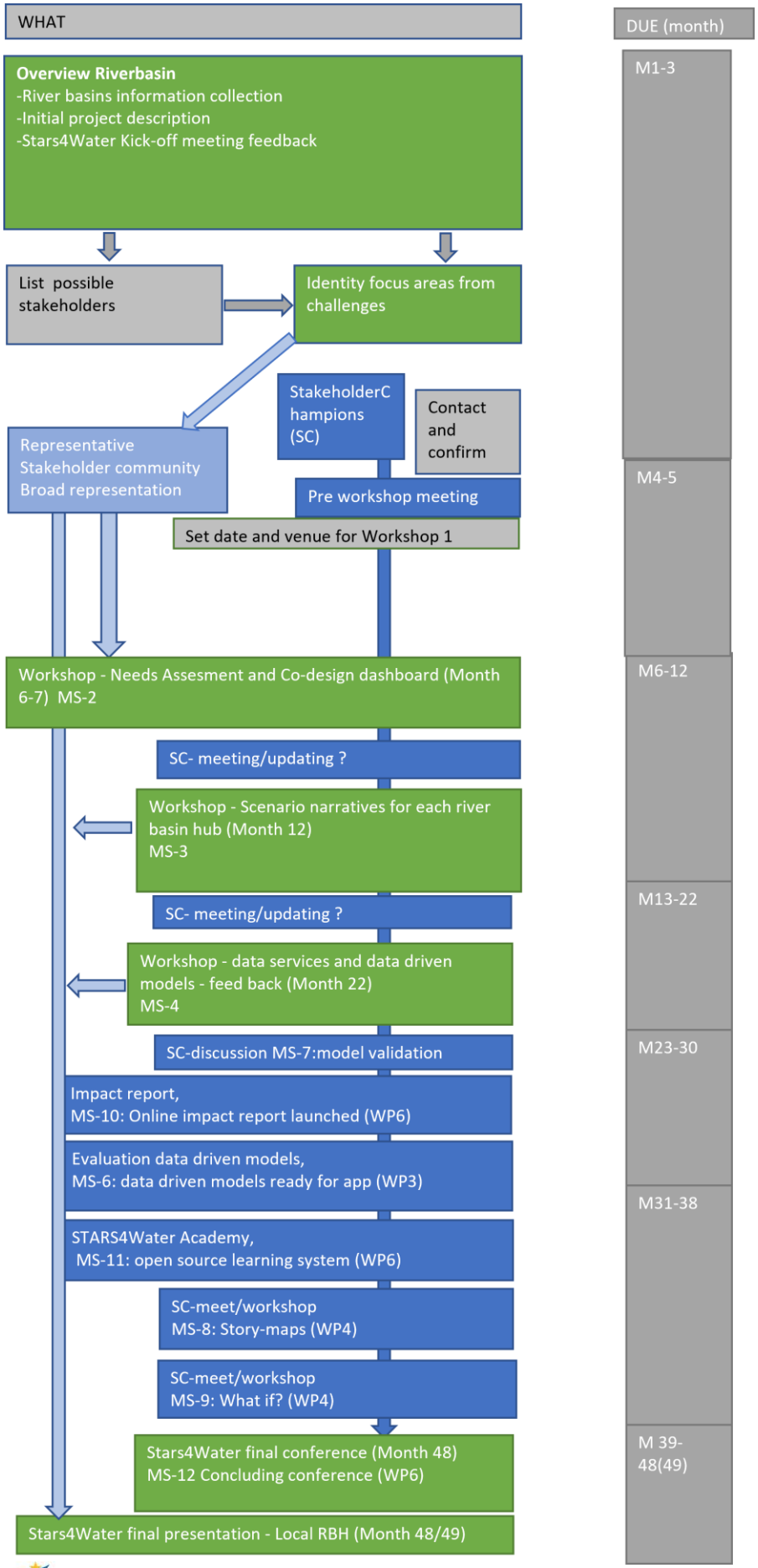

Figure 4 Flowchart for the interaction and engagement process with stakeholders within the river basin hubs. Each river basins are organized differently, and hence there will be local adjustment. Milestones are described in the table below.

Mile-stones	Due (month)	Milestone name	WP#	Means of verification
MS-1	3	Stakeholder communities established for each river basin	WP1	Relevant actors in the river basin hubs have confirmed their participation in the project
MS-2	7	Workshop co-designing dashboard	WP1	Information needs discussed and reported
MS-3	12	Workshop on scenario narratives for each river basin hub	WP1, WP4	Narratives are reported as input for water resources assessment
MS-4	22	Workshop on data services and data-driven models	WP2, WP3, WP1	Feedback from stakeholders on data services and prototypes for data-driven models collected
MS-6	30	Data-driven models ready for application	WP3	Models released and validated by user-groups (care stakeholders defined as user-groups)
MS-7	24	Validation of first set models	WP4	Models released and validated by user-groups and validation results reported for feed-back to developers
MS-8	36	Workshop on story maps on future water resources availability and risk	WP4	First results on future water resources availability and risks discussed with the stakeholder communities
MS-9	38	Workshop on what-if scenarios concerning green deal and water policies	WP4	Together with stakeholders a range of measures and interventions are defined as input upscaling of basin-wide assessment
MS-10	24	Online Impact Reporter launched	WP6	Online impact reporter is operational for sharing experiences and best practices by stakeholders
MS-11	31	Star4Water academy launched	WP6	Open-source learning management system is operational
MS-12	48	Stars4Water final Conference	WP6	Final conference to be held in Brussels

5. Stakeholder mapping

This chapter presents an overview of the river basin hubs (RBHs) research focal point, river basin organization, stakeholder champions and the stakeholder community.

5.1. Drammen RBH

Research Focal point: Trine Jahr Hegdahl (NVE)
River basin organization (authorities): Norwegian Water Resources and Energy Directorate (NVE)

Stakeholder champions:

Organization	Theme	Comments
Regulerings samarbeider for Drammensvassdraget (RSD)	Hydropower	Regulatory cooperation for all hydropower companies and associations in the Drammen river basin (107 HP plants) - confirmed
Norwegian water resources and energy directorate (NVE)	Water management and R&D	Examples: implementation of EU water directive, regulations and licenses for hydropower and water extraction - confirmed
River basin district board (Vannregion-område ansvarlig)	Water Framework Directive	River basin management with a special focus on monitoring and reporting water quality and ecosystems - confirmed
Glitre vann	Water supply	Water supply for 6 municipalities and 150 000 persons within the basin – confirmed

Stakeholder community:

Organization	Theme	Comments
Hydropower regulatory associations	Hydropower	All hydropower regulation associations in the Drammen RBH
Vannregioner (water regions responsible to implement the water framework directive at the regional and local level)	Water framework Directive, i.e., Water quality, environmental flows	Seven different water regions. within each region there are existing stakeholder communities representing specific user interest
Municipalities	Water supply, agriculture, risk reduction	Municipalities within the river basin
Skogeierforeningen	Forestry	Organization representing private forestry
Norsk Bondelag	Agricultural organization	Organization representing farmers and their interests
E.g. Drammenssportfiskerne	Recreational/sport fishing	Organizations representing recreational users

5.2. East Anglia RBH

Research Focal point: Gwyn Rees (UKCEH)
River basin organization (authorities): Anglian Water Services Ltd (AWS)

Stakeholder champions:

Organization	Theme	Comments
Water Resources East	Water resources planning	Invited
Essex and Suffolk Water		Invited
Environment Agency		Invited

Stakeholder community:

Organization	Theme	Comments
Canal & River Trust		
National Farmers Union	Agricultural water requirements	
The Broads Authority	Water resources planning, navigation	
Norfolk Rivers Trust	Environmental flows, Ecology	
Catchment abstraction groups		Need to be further defined
Local authorities		
Middle Level Commissioners	Flood defence and water level management	Internal drainage board

5.3. Rhine RBH

Research Focal point: Jan Kruijshoop (RWS) & Judith ter Maat (Deltares)
River basin authorities: Ministerie van Infrastructuur en Waterstaat - Rijkswaterstaat (RWS), Bundesanstalt für Gewässerkunde (BfG)

Stakeholder champions:

Organization	Theme	Comments
CHR - International Commission for the Hydrology of the Rhine basin (CHR)	Scientific research related to climate change & hydrology, morphology & sediments, socio-economics and water use	The CHR is an organization in which the scientific institutes of the Rhine riparian states formulate joint hydrological measures for sustainable development of the Rhine basin
ICPR - International Commission for the Protection of the Rhine	Harmonizing many interests of use and protection of the Rhine area by transboundary cooperation	For the benefit of the Rhine and of all waters running into the Rhine, the members of the ICPR – Switzerland, France, Germany, Luxemburg, the Netherlands, and the European Commission successfully co-operate with Austria, Liechtenstein, and the Belgian region of Wallonia as well as Italy. Nine states and regions in the Rhine watershed closely co-operate in order to harmonize the many interests of use and protection in the Rhine area. Focal points of work are sustainable development of the Rhine, its alluvial areas and the good state of all waters in the watershed.
CCR - Central Commission for the navigation of the Rhine	Rhine river and inland navigation	The CCR promotes inland navigation, primarily on the Rhine but also on all waterways in Europe. Main principles for this are: freedom of navigation and united system of regulation for Rhine navigation and equal treatment

Stakeholder community:

Organization	Theme	Comments
CHR & ICPR & CCR communities		ICPR and CCR are Commission who orga their own policy platforms and have the workgroup and stakeholder processes. Through ICBR and CCR we can mobilize stakeholder if relevant for the topic discussed in the workshop (e.g. representatives of the energy sector or drinking water organizations). The CHR mobilize the scientific community.

5.4. Danube RBH

Research Focal point: Helmut Habersack (BOKU) and Albert Scrieciu (GEOECOMAR)
River basin organization (authorities): Administratia Fluvial a Dunarii de Jos R.A. Galati (Lower Danube River Administration, LDRA).

Stakeholder champions:

Organization	Theme	Comments
ICPDR	Transboundary Commission; River Management	The commission was established 1994 and builds on the Convention on Cooperation for the Protection and Sustainable use of the Danube River.
Danube Commission	Transboundary Commission; Navigation	Established in 1948 the primary focus is the maintenance and improvement of navigation conditions of the Danube River.
WWF Danube-Carpathian	Ecology	Subgroup of the conservation organization WWF that deals with the Danube and Carpathian Region also termed as Green Heart of Europe. The Danube Carpathian Program dates back to 1992.
International Association for Danube Research	Water management and environmental issues	IAD is the oldest NGO of an active network of scientists in the Danube River Basin of Europe, with Expert Groups in 12 topics covering major ecological and management fields: Water Quality, Biotic Processes, Microbiology, Phytoplankton & Phytobenthos, Macrophytes, Floodplain Ecology, LTSER & Environmental History, Fish Biology & Fishery, Invasive Alien Species, Ecotoxicology, Delta/Fore-Delta, and Sustainable Development & Public Participation

Stakeholder community:

Organization	Theme	Comments
Ministries with related topics	Water, Navigation, Energy, Environment	
National Water Agencies	Water management	
WRI Slovakia	Water management	
ViaDonau	Navigation	
Lower Danube River Administration (AFDJ)	Navigation	
County council	Water management	
NGO’s	Environment	

5.5. Seine RBH

Research focal point: Maria-Helena Ramos and Alban Delavenne (INREA)
River basin organization (authorities): EPTB Seine Grand Lac (EPTB SGL)

Stakeholder champions:

Organization	Theme	Comments
Agence de l'Eau Seine Normandie (AESN)	Water resources management	Financial water agency in charge of coordinating the general framework of water resources management over the river basin
EPTB Seine Grand Lac (EPTB SGL)	Water management, flood protection, low flow support	Joint union of regional authorities in charge of designing and managing infrastructures to improve water resources management

Two main river basin authorities are targeted in the Seine river basin stakeholder engagement in the STARS4Water project. The 'Agence de l'Eau Seine Normandie' (AESN) is a financial water agency in charge of coordinating the general framework of water resources management over the river basin. It provides the financial means to improve water quality, the rational use of water resources, and the protection of aquatic environments. The EPTB Seine Grand Lac (EPTB SGL) is an Associate Partner in STARS4Water. It is a joint union of regional authorities in charge of designing and managing infrastructures to improve water resources management. It is an operational stakeholder that historically manages the four large dams upstream of the Seine (flood protection, low flow support). In additional, other key stakeholders may be engaged, such as 'Eau de Paris', which is a public company in charge of drinking water supply for Paris, with responsibilities on water quality monitoring from the abstraction to the supply.

5.6. Duero RBH

Research Focal point: África de la Hera (IGME-CSIC)
River basin organisation (authorities): Confederación Hidrográfica del Duero (CHD)

Stakeholder champions:

Organization	Theme	Comments
Water supply Junta de Castilla y León	Urban supplies	
Waters of Valladolid	Urban supplies	
Ferduero	Irrigations	

Stakeholder community:

Organization	Theme	Comments
Pisuerga Canal Irrigation Community	Irrigations	
Villagonzalo Irrigation Community	Irrigations	
Association of municipalities of La Atalaya	Irrigations	

5.7. Messara RBH

Research Focal point: Maggie Kossida (SEVEN)
River basin organization (authorities): Region of Crete (PERIFEREIA KRITI), Hellenic Ministry of Environment and Energy, Directorate for Protection and Management of Aquatic Environments (HMEE)

Stakeholder champions:

Organization	Theme	Comments
Region of Crete – Directorate of Environment and Spatial Planning – Department of Hydroeconomy	Protection and management of water resources	Design and implementation of measures, decisions on water use restrictions, design and implementation of water works, pollution monitoring
Local Land Reclamation Organizations (TOEB of Zone B of Messara, TOEB of Zone C of Messara, TOEB of Vassilikon-Anogion)	Irrigation management and irrigation water works	Responsible to operate the infrastructure and to provide water to farmers

Stakeholder community:

Organization	Theme	Comments
Water Directorate of Crete Decentralized Administration (WDC)	Protection and management of water resources	Main role in the development and implementation of the RBMPs and Programme of Measures, monitoring and data collection, regulation enforcement, coordination of stakeholders and public participation
Water Council of the Decentralized Administration	Social dialogue and consultation on water protection and management issues	Promotes and supports consultation with the general public and the various stakeholders, and dialogue with the civil society
	Protection and management on	Responsible for the development and implementation of the National Programs

	the water resources, national focal point for the WFD	for the Protection and Management of Water Resources of the country, and the coordination of agencies and national bodies regarding the protection and management of water resources
Municipalities of Phaistos and Gortynas – Technical Services Department	Water supply system for domestic use, municipal wastewater treatment units	Responsible for the design of the domestic water system to cover the water use, and also to design the sewage system
Municipal Water Supply and Sewerage Company (DEYA) of Phaistos	Water supply, wastewater treatment	Water supply, sewage system, wastewater collection and treatment development of infrastructure- resources and the supply network
Hellenic Survey of Geology & Mineral Exploration (EAGME)	monitoring system, water development	Responsible for the monitoring system of ground water, research for water development
Region of Crete - Directorate of Agricultural economy	Regional agricultural development plan.	Responsible for Regional agricultural development plan
Region of Crete - Directorate of Technical Services	Construction of infrastructure	Responsible for construction and maintain of the dams and also for the water allocation system
Messara Associations Network	Educational, social, humanitarian, environmental and cultural activities	A network of 24 Associations in the Messara wider region.
Agricultural School of Messara	Education of farmers, dissemination of best agricultural practices in Messara	Under the auspices of ELGO-DIMITRA and the supervision of the Ministry of Rural Development and Food

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Annex 1: Basic Informed consent form templates (From D7.1 – MB)

This annex includes a Consent form that will be used for the execution of the STARS4Water project. First section describes how to use it, while the next sections include two templates that will be used as by the consortium partners when demanding the

How to use of the consent forms templates

The templates included in next sections are provided as draft documents that the consortium consortium partners are expected to refine and adjust to suit their particular needs when interacting with project stakeholders. Text that should be always modified are identified as bold.

If the interested agent is not aware of the scope of the project, additional information must be provided so that they can make an informed decision about the consequences of their collaboration with the project.
The templates of the Informed Consent Form are in English. If other languages are required consortium partners are responsible for generating translations.

Consent form for interviews and other engagement activities

Dear **XXX**.

You have been asked for an **interview / participating in a workshop / participating in a survey, etc.** in the framework of the STARS4Water project of the Horizon Europe Research Framework program of the European Commission, grant agreement number 101059372, hereafter 'the Project'. This form of informed consent describes the project and the terms of this cooperation.
STARS4Water aims to improve the understanding of climate change impacts on water resources availability and the vulnerabilities for ecosystems, society and the economy at river basin scale, including two distinctive elements: first, the need for an international stakeholder community to address their specific needs and requirements. Second, the development and application of innovative data services, models, tools.
STARS4Water will develop and deliver new data services and data driven models for better decision-making support on planning actions for adaptive, resilient and sustainable management of fresh water resources, which will be co-designed with stakeholders to meet their needs, ensuring their relevance and uptake beyond the lifetime of the project. Following a process of co-creation we aim to capacitate stakeholders with next generation river basin tools and build a strong Community of Practice.
In this process, the Project closely collaborates with several stakeholders to facilitate the deployment of valuable tools and products. Your participation in the **interview/ workshop / etc. will** have the aim of **evaluating your needs and recommendations / test the tools/ co-design potential tools / etc.**
To guarantee your rights and allow you to contribute according to your interests, the project team undertakes to:

1. Your answers will be completely anonymous.
2. Your answers will be separated from any information from which your identity may be determined.
3. You will be given the opportunity to review the results of this activity and have the option to amend your input.
4. After completion of the project, the data you will provide will be stored for 5 years.

5. If at any time during or after the study you wish for your data to be deleted, you may contact **/** name / organization / email / phone.
6. You are free to stop collaborating with the project team at any time without penalty or loss of benefits.

If you have any questions or comments regarding this project, please do not hesitate to get in touch with the project partner conducting this interview/ workshop / survey / etc.
By signing this consent form, you declare that you have been informed of the purpose and nature of the project, that you understand what is expected of you and that you agree to voluntarily take part in the project.
Name of the interview/workshop/etc.: **XXX**
Date and location/link/etc. of the interview/workshop/etc.: **XXX**

Participant's name: **XXX**

Participant's signature: **XXX**

Consortium partner organization name: : **XXX**
Responsible interviewer's name and organization: **XXX**

Responsible interviewer's signature: **XXX**