PRIMA
Full Proposal

Technical annex (Part II)

Title of Proposal: **Talanoa Water Dialogue for Transformational Adaptation to Water Scarcity Under Climate Change**	
Acronym: **TALANOA-WATER**	

List of participants

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1. Excellence

Water crises are the greatest global societal risk in terms of potential impact (WEF, 2020). If we keep using water as we are now, global water demand could exceed supply by 40% by 2030, decreasing GDP growth in water-stressed areas by 6% (2030 Water Resources Group, 2019). This is comparable to the expected yearly average economic slowdown induced by the COVID-19 in some of the worst hit economies during 2020-2021 (IMF, 2020), only in the case of water scarcity, the impact will continue into the future. Avoiding this "misery in slow motion" calls for *transformational* adaptation, i.e. systemic (much larger scale) and/or paradigm shifts (truly new to a particular location) that integrate adaptation to climate change with the coordinated development and management of water, land and related resources, driven by technological and management improvements and informed by cutting-edge science (World Bank, 2017).

The **objective** of TALANOA-WATER is to inform and *catalyze* the adoption of robust *transformational adaptation* strategies to water scarcity under climate change that contribute to the Integrated Water Resources Management (IWRM) objectives of social equity, economic efficiency and environmental sustainability. To this end, TALANOA-WATER will develop a **groundbreaking ecosystem of innovation** that combines an inclusive and transparent stakeholder engagement method, the *Talanoa Dialogue* (UNFCCC, 2018), with an actionable modeling framework inspired in interdisciplinary *socio-hydrology science* (Sivapalan et al., 2014), so to design, realize and demonstrate performance of transformational adaptation strategies at various levels (from farm to basin, from user to economic sector) in six large-scale '*pilot water laboratories*'. TALANOA-WATER will explore transformational adaptation strategies that combine complementary and mutually reinforcing (1) nature-based solutions (e.g. natural water retention), (2) technological innovation and climate/water services (e.g. non-traditional water sources, irrigation services advising the timing and intensity of irrigation and optimal protection of crops against extreme climate events), (3) risk management and financing instruments (e.g. payment for ecosystem services, insurance) and (4) economic and behavioral incentives (e.g. water charges, water markets, voluntary agreements).

TALANOA-WATER is structured across three pillars: 1) Talanoa Dialogue; 2) actionable socio-hydrology science; and 3) pilot water laboratories.

TALANOA-WATER will actively engage all relevant stakeholders leveraging on an innovative storytelling method, the **Talanoa Dialogue**, adopted within the United Nations Framework Convention for Climate Change (UNFCCC) for consensus-building on the Nationally Determined Contributions (NDCs) to reduce the emissions of greenhouse gases. The Fijian word 'Talanoa' refers to an inclusive, participatory and transparent conversation among participants to share stories, build empathy and trust, and make wise decisions for the collective good – in the case of climate change by restoring the balance between greenhouse gas emissions and removals, while exploring strategies that make carbon neutral NDCs compatible with inclusive growth. TALANOA-WATER will exploit the demonstrated ability of the Talanoa Dialogue in steering collective action to set sustainable water use limits that restore the balance between demand and supply in overallocated basins under climate change, through Basin Determined Contributions (BDCs); and to design and implement collectively agreed transformational adaptation strategies that align individual actions with BDCs while achieving equitable growth.

To underpin consensus-building and decision-making in the Talanoa Dialogue, TALANOA-WATER will employ, advance and demonstrate operability of the concepts originated in **socio-hydrology science**, which includes explicit consideration of ecological processes and human behavioral responses, and their integration through a deeper understanding and representation of the *two-way feedbacks* between human and water/ecological systems (Sivapalan et al., 2014). We will field a suite of integrated climate, hydro(geo)logic, agronomic and socio-economic models (experimented before by partners of the consortium, see e.g. Essenfelder et al. (2018), Parrado et al. (2020) and Pérez-Blanco et al., (2020)) that is *actionable*, i.e. created alongside stakeholders and capable of effectively informing and enhancing performance of transformational adaptation strategies. We will thoroughly sample uncertainty through ensemble experiments (multi-scenario, multi-model, perturbed physics), so to identify transformational adaptation strategies that show a satisfactory performance under most conceivable futures and ensure decision-making is *robust*. Modeling efforts and decision making will build on a sound water accounting framework that validates and applies FAO's WaPOR approach (FAO, 2020), using remote sensing techniques to produce reliable estimates of consumed water and return flows, and biomass production.

The Talanoa Dialogue and socio-hydrology concepts will be empirically applied in six **pilot water laboratories** across the Mediterranean: the lower Nile River Basin (RB) in Egypt, the Po RB in Italy, the Hérault Department in France, the Upper Litani Catchment in Lebanon, the Cega Catchment in Spain and the Jeffara Catchment in Tunisia. Each pilot water laboratory will engage *all* partners in the TALANOA-WATER Consortium based on their relevant expertise to exploit synergistic research potential; as well as all relevant stakeholders in the laboratory including public authorities (river basin authorities, ministries, municipalities), users' associations (agricultural, hydropower, tourism), civil society organizations (e.g. NGOs) and industry (e.g. insurance).

1.1 Objectives

The objective of TALANOA-WATER is to inform and *catalyze* the adoption of robust *transformational* adaptation strategies to water scarcity under climate change that contribute to the IWRM objectives of social equity, economic efficiency and environmental sustainability. This overarching goal will build upon **four specific objectives (SO):**

- SO-01: Design, realize and demonstrate institutional and technical feasibility and performance of a transition towards sustainable and inclusive growth in different natural and cultural environments in *6 pilot water laboratories*;
- SO-02: Design, test and inform the adoption of robust transformational adaptation strategies to water scarcity under climate change, harnessing technological innovation (including non-conventional water sources), nature-based solutions, risk management instruments and behavioral incentives (*10+ strategies designed and 1 adopted per water laboratory*);
- SO-03: Design multi-sector and multi-stakeholder partnerships and novel financial mechanisms to secure sustainable investment into, and cost recovery of, transformational adaptation strategies (*sustainable adoption of TALANOA-WATER ecosystem of innovation in 3+ water laboratories*);
- SO-04: Synthesize and upscale the results obtained in the targeted pilot water laboratories to inform supra-national (e.g. EU) and national strategies for water resources management, climate adaptation, disaster risk reduction, sustainable development, and ecosystem protection in the Mediterranean area (*mainstream TALANOA-WATER results and insights in 4+ national and 1 supranational/EU climate adaptation strategy/plan)*.

1.2 Relation to call and topic

TALANOA-WATER addresses topic 1.1.1 of the PRIMA 2020 call: "Implementing sustainable, integrated management of water resources in the Mediterranean, under climate change conditions". The scope and requirements outlined in the call, along with specification of how TALANOA-WATER consortium will respond to them, are explained below.

Table 1.2.a: Scope of the call and contribution of TALANOA-WATER

Scope / requirements of the call	**Our contribution**
The IWRM approach(es) should be implemented and tested by involving all the potential stakeholders...	-Multi-stakeholder and multi-sector approach through Talanoa Dialogue that involves *all relevant satekholders* in each water laboratory (Table 1.3.b), so to share stories, build empathy and trust, achieve consensus and make sensible decisions for collective good.
...in experimental or demonstration sites representative of Mediterranean water conditions in terms of water scarcity: 1) water accounting, 2) water efficiency, 3) non-conventional irrigation (saline and waste), 4) changing climatic and demographic conditions, 5) crop diversification, 6) conflicting use of water, 7) need for improved governance by different authorities (including transboundary),and other relevant factors.	-Creation of six pilot water laboratories in water scarce areas representative of Mediterranean water conditions in Egypt (representative of conditions 1-4, 6, 7), Italy (1, 2, 4, 6, 7), France (1,3-5,7), Lebanon (1, 2, 4-7), Spain (1, 2, 4-7) and Tunisia (1, 3, 4, 6, 7) (see Table 1.3.a).
*Given that the majority of the water is consumed in the agricultural sector, a comprehensive approach to water accounting is needed to obtain robust estimates of water use by developing and testing state of the art technologies that are affordable to all users. Reliable estimates of **consumptive** use are needed for (1) water allocation by policymakers at the basin scale and beyond; (2) for validation*	-Reliance on the **fractions approach** to water accounting (Willardson et al., 1994) to designate the potential disposition of water used (to beneficial/non-beneficial consumption or to recoverable/non-recoverable return flows), so to facilitate informed and transparent water (re)allocations while avoiding unintended consequences (e.g. higher consumption upstream at the expense of downstream systems) -Validation and application of remote sensing techniques to produce robust estimates of water use (including agricultural consumption, return flows, biomass production) using FAO's WaPOR approach

of current remote sensing techniques; and (3) for optimizing farm irrigation management under water scarcity.	-Mainstream water use estimates in simulations, and identify robust strategies with higher expected socioeconomic and environmental performance
Pilot projects should be launched to integrate innovative water accounting approaches into CCA and IWRM	-Use of reliable water use estimates and global change scenarios to assess climate change impact on water availability... -...which in turn inform adaptation strategies to climate change and water scarcity that more effectively contribute to the IWRM objectives of inclusive, sustainable growth
Existing Simulation Models Predicting the impact of climate change can be useful tools for developing and testing adaptation measures working under real conditions, involving stakeholders, and end-user groups, preferably at the river basin scale. Calibration and validation of these models is necessary to obtain site-specific results in terms of climate change impact and adaptation.	-Multi-system modeling suite, including climate models, calibrated and validated for pilot water laboratories (i.e. downscaled at catchment/river basin scale), to demonstrate the impact of adaptation strategies under multiple scenarios (RCP2.6, RCP4.5, RCP6, RCP8.5) and alternative model settings (considering multiple climate models in an ensemble) -Scientists and relevant stakeholders (including end-users) at a basin scale collaborate to co-design scenarios, co-develop the modeling framework, and test and explore adoption of robust adaptation strategies with higher expected performance in water laboratories
These Results shall be incorporated in the IWRM approach to develop water allocation strategies aimed at meeting various sectoral water demands under future climate change scenarios and with different socio-economic assumptions. The Developed Approach shall be implemented through capacity development and participatory approaches, promoting coordination among various stakeholders and companies (explicitly involving SMEs)…	-Explore impacts of alternative adaptation strategies to water scarcity under climate change considering multiple plausible climate and socio-economic scenarios and alternative settings of the modeling framework, so to identify strategies that show a satisfactory performance under most conceivable futures (i.e. **robust**) -Scenarios, strategies and model settings co-designed and co-developed, and their performance co-evaluated, alongside stakeholders (including SMEs), leveraging on continuous engagement and co-learning, including training and serious games -Private companies, including SMEs, will be actively engaged in methods and pilot water laboratories. WP1 (Stakeholder engagement) led by SMEs
…with frequent dialogues, training and advisory sessions to provide the support on designing and demonstrating real-life examples, ensuring and demonstrating linkages among diverse water resources managers and users and their involvement from the beginning of the project.	-Continuous engagement between Consortium partners and stakeholders through annual science-policy workshops in pilot water laboratories, two international science-policy workshops, complementary meetings for training and capacity building, interactive web platform and mobile app. -Thorough Communication Strategy and Contingency Planning to ensure fluent and continuous science-policy dialogue, training and advisory also in the event of mobility restrictions/lockdown. -Science-policy interactions inform, and are underpinned by, socio-hydrology science assessing performance of adaptation strategies, including linkages and feedbacks among systems, sectors and users
Biophysical, technological, social, economic, environmental, hydrological, institutional, and financial issues to achieve higher water use efficiency and improved water allocation and management will need to be the part of the implemented IWRM approach.	-We will explore multiple adaptation strategies to climate change and water scarcity that combine one or more of the following options: (1) nature-based solutions, (2) technological innovation and climate/irrigation services, (3) risk management and financing instruments, (4) economic and behavioral incentives. -We will assess the impact of adaptation strategies integrating the relevant systems to the decision: climate, hydrology, agronomic, microeconomic, macroeconomic; considering multiple scenarios -Talanoa Dialogue will derive heuristics of value from stakeholders' experience, so to identify additional biophysical, technological, social, economic, environmental, hydrological, institutional, and financial issues initially not accounted for, and integrate them.
Proposals might take into account and, where possible, the results of LIFE programme and H2020 Societal Challenge projects and among others, the Sustainable Water Integrated	-We have coordinated and contributed to several relevant FP5-7/H2020, LIFE, JPI and other international (NASA, USDA) projects -We will build on the complementary expertise developed in these projects, as well as other relevant projects (e.g. WES, SWIM), to propel synergistic research that accelerates scientific discovery and

Management And Horizon 2020 Support Mechanism (SWIM-H2020 support Mechanism). The Innovations Identified Within Projects could be disseminated within the EU Regional Project funded by DGNEAR "Water and Environment support in the ENI Southern Neighbourhood region (WES)"	informs and catalyzes decision-making. As an example, we will partner with WES/SWIM platforms for training and legacy activities -Cutting-edge research that aptly complements previous efforts in projects such as WES and SWIM, and contributes towards their objectives of environmental protection and efficient water management, including 3 pilot water laboratories in WES countries (Lebanon, Tunisia, Egypt)
Proposals should fall under the 'multi-actor approach' ensuring cooperation between research centers, governments, regulators, users and providers in the field of IWRM.	-In each water laboratory we will engage all partners alongside all relevant local stakeholders (i.e. multi-stakeholder/multi-actor), including relevant public authorities (governments, regulators), users (agricultural, hydropower, tourism), civil society organizations and industry (e.g. insurance), so to build consensus towards adoption of transformational adaptation to water scarcity under climate change that contribute to IWRM objectives of inclusive, sustainable growth

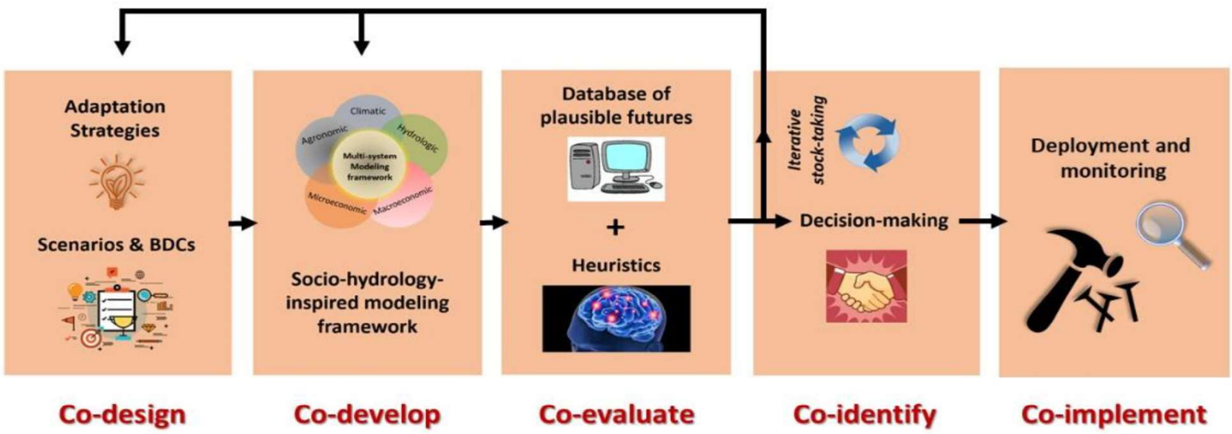
1.3 Concept and methodology

(a) Concept

TALANOA-WATER will create a groundbreaking ecosystem of innovation that combines an inclusive and transparent stakeholder engagement method, the *Talanoa Dialogue*, with an actionable modeling framework inspired in interdisciplinary *socio-hydrology science*, so to steer collective action towards transformational adaptation in six *pilot water laboratories* that serve as inspiration for similar processes elsewhere.

The **Talanoa Dialogue** will foster an open and inclusive environment, devoid of blame, where stakeholders and scientists share stories and exchange points of view, so to effect decision-making through consensus-building. Specifically, consensus-building and decision making will be realized through the following tangible outcomes*:* 1) stakeholders and scientists *co-design* credible climate and socioeconomic scenarios, and sustainable Basin Determined Contributions (BDCs); 2) *co-design* of relevant transformational adaptation strategies, including financial mechanisms and partnerships to secure cost recovery and sustainable investment; 3) *co-development* of modeling efforts (including the use of stakeholders' models in the modeling framework, e.g. river basin authorities' own hydrologic models); 4) *co-evaluation* of adaptation strategies, combining mechanistic modeling outputs with heuristics and inductive reasoning (e.g. leveraging on stakeholders' experience to speculate upon the consequences of a given transformational adaptation strategy) so to identify strengths and vulnerabilities to selected strategies; 5) *co-identification* of the robust strategy with the highest potential attending to the IWRM criteria of efficiency, equity and sustainability; and 6) science-policy collaboration in the deployment of selected strategies through *co-implementation*. Note that as a result of continuous interaction and deliberation among stakeholders and scientists, a likely outcome of the co-identification stage is to reset the analysis considering alternative/additional strategies, model settings and/or scenarios/BDCs. The result is an iterative 'stock-taking' co-generation process, where stakeholders and scientists learn from each other, collectively create knowledge and build consensus, until a decision is agreed upon and collectively implemented (Figure 1.3.a).

Figure 1.3.a: TALANOA-WATER iterative 'stock-taking' co-generation process



Socio-hydrology science. Current applications of social and ecological science and models to assess the economic and environmental impact of adaptation strategies are fragmented or insufficient to represent the interconnected dynamics of geophysical, ecological and economic systems in a comprehensive way, as exemplified by the "overly simplistic" piecewise equations used to assess human responses in conventional hydroeconomic models (Pande and Sivapalan, 2017). To bridge this gap, the transformative discipline of *socio-hydrology* has called for the development of interdisciplinary approaches that "explicitly account for the two-way feedbacks between human and water systems" (Sivapalan et al., 2014). Recent socio-hydrology-inspired science has explored feedback responses in social and ecological systems (Essenfelder et al., 2018; Parrado et al., 2020; Pérez-Blanco et al., 2020). These contributions run standard models at each system level independently in *modules*, which are defined as specialized, self-contained mathematical elements that process information and generate outputs; and connect them through sets of *protocols*, which are defined as rules designed to manage interrelationships (e.g. two-way feedbacks) between systems' modules. TALANOA-WATER will integrate and complement the contributions above into a comprehensive protocol-based modular framework including climatic, hydro(geo)logic, agronomic, microeconomic and macroeconomic modules. Alternative settings for the modeling framework will be explored in multi-system ensemble experiments, i.e. including multiple models (multi-model ensemble) and model parameters (perturbed physics ensemble) in each module, and experimenting with alternative protocols such as static (time-invariant approach that looks for convergence) v. dynamic (time-variant approach where information is carried over in time).

We will establish six **pilot water laboratories** (Table 1.3.a) in Egypt, Italy, France, Lebanon, Spain and Tunisia to test performance of transformational adaptation strategies at various levels (from farm to basin, from user to economic sector) in an operational environment, and realize and demonstrate feasibility of a transition towards sustainable and inclusive growth. For each pilot water laboratory we have identified and contacted the relevant stakeholders, who are already committed to work with us (Table 1.3.b).

Table 1.3.a: Pilot water laboratories

Water lab	Pressures and challenges	Focus – adaptation strategies
ITALY – Po RB	-24% of Italian territory, 30% of population, 30% of agricultural output and 35% of GDP -Polycentric water rights system: 9 regions allocate and charge water, limited coordination -Increasingly frequent droughts, asymmetric head-tail economic and environmental impacts, conflict.	-Inter-regional water sharing agreement -reform charges; unbundle water rights in i) allocation (determined by water availability) and ii) shares (% allocation) -Nature-based forested infiltration areas -Solidarity fund against extreme droughts
EGYPT – Lower Nile RB	-Waterlogging and soil salinity -Water overallocation -Grand Ethiopian Renaissance Dam (GERD) being built in Ethiopia-Blue Nile (57% of inflows to Nile) -GERD takes 5 to 40 years to fill -supply reduction -No filling/operation agreement for GERD	-Adoption of biosalinity -mobile-based irrigation service sensors, metering and remote sensing -(If the political situation makes it possible) International filling and operation agreement between Ethiopia, Sudan and Egypt for GERD
FRANCE – Aude, Hérault Department	-Expanding supplementary vineyard irrigation -Overallocation, risk of capital losses (vines) -Natural salinity issues -Wetland deterioration	-limit supplementary irrigation -treated wastewater reuse -drought insurance, irrigation services -agroecology, drought resistant varieties
LEBANON – Upper Litani Catchment	-breadbasket of the country -historical overexploitation of groundwater -influx of over 500,000 refugees into the basin -growing competition between irrigation and urban uses	-mobile-based irrigation services -quotas and voluntary reallocations for sustainable conjoint use -Insurance mutual funds that complement groundwater's insurance services
SPAIN – Cega Catchment	-one of the few non-regulated catchments in Spain -expanding groundwater-fed horticulture -existing nature-based water retention areas for aquifer recharge cannot meet growing demand -deep aquifer overexploited -dam construction under assessment	-Expand nature-based water retention areas for aquifer recharge; cost-recovery -Formal mutual funds that complement groundwater's insurance services… -... & water market to limit damage -deficit irrigation and irrigation services
TUNISIA – Jeffara Catchment	-Expanding tourism (Jerba Island) and irrigation -Groundwater overuse, saline intrusion -Desalination infrastructure for drinking water -Secondary treated wastewater not reused	-Use of treated wastewater for irrigation -Adoption of biosalinity -Water charging-induced substitution of conventional by non-conventional sources

Table 1.3.b: Relevant stakeholders in pilot water laboratories that are committed to contribute to the project

Lab	Name of organization (*type of organization*)
ITALY – Po RB	-Po River Basin Authority (*River Basin Authority*) -ARPAE (*Regional environmental protection agency*) -Piedmont, Lombardy, Veneto, Emilia-Romagna (*Regional governments*) -Consorizi di Bonifica (CdB) della Romagna e Burana (*Land Reclamation and Irrigation Boards*) -CdB Brenta (*Land Reclamation and Irrigation Board pioneering Forested Infiltration Areas*) -AREN Electric Power S.p.A (*Hydropower operator*)
EGYPT – Lower Nile RB	-Nile Basin Initiative (*Transboundary river basin commission*) -Ministry of Water Resources and Irrigation & Ministry of Agriculture and Land Reclaimation -Authority for Municipality and Drinking Water (*national agency*) -FAODA (*Association of irrigators*) -The High Dam Authority (*hydropower operator*) -GPAI (*biosalinity – Lower Nile purveyor*)
FRANCE – Aude, Hérault Department	-Agence de l'eau Rhone Mediterranée Corse (*River Basin Authority*) -Montpellier Métropole, Grand Narbonne (*Local governments including Water Agencies*) -Occitanie region, Hérault Department (*Regional government*) -PNR Haut-Languedoc (*Natural park*) -Chambre d'agriculture (*Farmers, irrigators*) -CCR/Groupama, Pacifica (*agricultural insurance public/private*) -France Nature Environnement (*NGO*)
LEBANON – Upper Litani Catchment	-Litani River Authority (*River Basin Authority*) -Litani River Authority (*hydropower operator*) -Ministry of Agriculture (*National Ministry*) -Royal Farms of Lebanon (*irrigators' representative*)
SPAIN – Cega Catchment	-Douro River Basin Authority (*River Basin Authority*) -Ministry for the Ecological Transition (*National Ministry*) -FERDUERO (*Association of irrigators*) -To be determined – contract awarding pending (*Hydropower operator*) -AGROSEGURO (*Pool of agricultural insurance firms*) -Plataforma Sí a las Fuentes del Río Cega (*Citizen initiative*) -WWF (*NGO*)
TUNISIA – Jeffara Catchment	-Bureau des Inventaires et des Recherches Hydrauliques (*Water resources management agency*) -Commissariat Regional au Developpement Agricole (*Public agency, agricultural development*) -SONEDE (*Utility – drinking water supply and desalinated water*) -ON AS (*Utility – treated wastewater*) -Union Régionale de l'Agriculture de la Peche de Médenine (*Association of farmers)* -Association of touristic businesses in Jeffara *(Association of touristic businesses*) -Association du développement et des études stratégiques de Medenine (*NGO*)

Location of the project in the spectrum from 'idea to application', or from 'lab to market'.

In the spectrum from 'lab to market', according to the Technology Readiness Levels (TRLs) of the H2020 program/PRIMA Annual Work Plan, the following technologies and management options are at TRL 7 (prototype demonstrated in operational environment): technological innovation (including non-conventional sources such as treated wastewater) and irrigation and climate services, risk management and financing instruments (e.g. insurance) and economic and behavioral incentives (e.g. water markets). Nature-based solutions such as groundwater recharge by forested infiltration areas are at TRL 6 (technology demonstrated in relevant environment). TALANOA-WATER will combine one or more of the technologies and management options above into synergistic transformational adaptation strategies, a preliminary description of which is available in Table 1.3.a. We will develop, test the performance, revise and identify alongside stakeholders robust transformational adaptation strategies in the 6 pilot water laboratories. We will deploy a sound plan for the dissemination and exploitation of results, including strategies to increase means for funding, enhance involvement of industry and SMEs, share knowledge and forge partnerships; so to achieve a critical mass of knowledge and resources that secures sustainable investment into, and cost recovery of, transformational adaptation strategies in 3+ pilot water labs. This will deliver transformational adaptation at TRL 8 (system complete and qualified) at the end of the project.

National or international research and innovation activities linked with the project.

TALANOA-WATER convenes scientific teams that bring together expertise on cutting-edge climate (e.g. CMCC, INRAE), hydro(geo)logy (CMCC, GPAI, USAL), agronomic (INAT, INRAE), micro- (INRAE, USAL) and macro-economic (CMCC, USAL) modeling; novel water accounting methods and remote sensing techniques (AUB, INAT); and innovative stakeholder engagement methods through advanced consulting, product development and data science (GECOsistema, GPAI); all of which have been developed across a wide portfolio of competitive research and innovation activities (Table 1.3.c). We will leverage on the complementary expertise of all consortium partners to set up TALANOA-WATER's ecosystem of innovation in each pilot water laboratory. By connecting interdisciplinary science teams and scientists with diverse skills, data, and perspectives, TALANOA-WATER will produce synergistic research and scholarship that accelerates scientific discovery and informs and catalyzes decision-making towards transformational adaptation.

Table 1.3.c: National or international research and innovation activities which will feed into TALANOA-WATER

Themes	Relevant inter- and national projects we will build synergies upon
Climate risk, impacts of climate change on water availability and extremes	We build upon and benefit from the coordination/involvement of the consortium partners in many cutting-edge climate H2020 innovation projects, i.a. **CLARA**, **PROVIDE**, **RECEIPT, COACCH, LITTORAL (IrriAlt'eau)**.
Remote sensing and data analysis, water accounting	Most of us have coordinated or contributed to relevant FP5-7/H2020, INTERREG, LIFE, NASA, USDA and other international projects, i.a. **PLACES, MUsLI, ITSET, SWIRM, BIOMETAL**.
Modeling adaptation to climate change and water scarcity	Most of us have coordinated or contributed to relevant FP5-7/H2020, INTERREG, LIFE and other international projects, i.a. **EPI-WATER**, **ENHANCE**, **WATER-REALIZE, BOOSTER BLUE**, **SWAN, XEROCHORE**, **CLICHA**, **NAIAD**
Stakeholder engagement, policy and governance	**NAIAD**, **SAFERPLACES, AGRO ADAPT, MEDCLIV, ATACC, W-DOURO** and several other international, national and regional projects.

(b) Methodology

TALANOA-WATER is structured in four thematic work packages (WP1-4), complemented by exploitation and dissemination activities (WP5) and scientific coordination and management (WP6). WP 1-3 is dedicated to the setup of the groundbreaking TALANOA-WATER ecosystem of innovation, while WP4 will test and implement the ecosystem of innovation in 6 pilot water laboratories.

WP2 (DATA) will provide the necessary inputs to calibrate, couple and run the models within the multi-system modeling framework in **WP3 (MODELING)**. WP3 is the 'cradle' for the interdisciplinary teamwork of the entire consortium. We will collectively scrutinize and consolidate shared understanding and knowledge of key concepts; develop, revise and refine the modeling framework; and conduct simulations to assess impacts of transformational adaptation under change scenarios. Rather than using a single system, model and set of parameters and a complete probabilistic description of possible scenarios to generate a point prediction, TALANOA-WATER will run multiple simulations to assess the performance of proposed transformational adaptation strategies against a variety of (1) possible scenarios and BDCs, and (2) multiple systems and protocols to represent their two-way feedbacks; where each system will be populated with (3) multiple models with alternative (3a) parameters and (3b) model structure. The result is a large database of simulations in which each simulation represents the economic and environmental impact of a given transformational adapatation strategy under one specific model setting and set of scenarios/BDCs. TALANOA-WATER multi-system, multi-model, multi-scenario ensemble experiment will thus offer a deeper understanding of complex socio-ecological systems; alongside larger uncertainty bounds, as the system grows in the number of processes, models and scenarios, and cascading uncertainties amplify the range of forecasts. Interpreting and managing such uncertainty bounds demands innovative approaches that go beyond mechanistic methods to incorporate stakeholder expertise and knowledge (Marchau et al., 2019). We will address this need through the employment of heuristic methods and the Talanoa Water Dialogue.

WP1 (ENGAGE) will establish a Talanoa Water Dialogue between scientists, public authorities, users and the industry that will inform and be informed by our modeling framework and simulations through co-generation. We will seek and obtain feedback from stakeholders throughout the development of the modeling framework, and explore the introduction of stakeholders' models in the ensemble, notably the hydrological models of river basin authorities (*co-development*). Each setting of the modeling framework will be used to run a series of simulations from a variety of scenarios and BDCs for each adaptation strategy, leveraging on inputs from the Talanoa Dialogue (*co-design*). Finally, we will combine simulation results from the modeling framework with stakeholder knowledge and expertise to interpret and manage uncertainty. Stakeholders can derive heuristics of value for the solution of complex problems through inductive reasoning, in our case from *ad-hoc* interpretations of their experience that are applied to speculate upon the consequences of transformational adaptation. This will allow us to detect futures where proposed adaptation strategies meet or miss their objectives, explore potential tipping points, and inform the development and implementation of *robust* adaptation strategies that show a satisfactory performance under most conceivable futures (*co-evaluation*, *co-identification* and *co-implementation* stages).

WP4 (LABORATORIES) will guide the implementation of the ecosystem of innovation developed in WP1-3 in six pilot water laboratories. The six pilot water laboratories will span the range of major ecosystem types and legal, political and regulatory systems across the Mediterranean. WP4 will build evidence on the impact of transformational adaptation; serve as proof-of-concept for the TALANOA-WATER ecosystem of innovation; and underpin legacy options in the six pilot water laboratories and elsewhere.

Gender dimension. The TALANOA-WATER Consortium appreciates and will build upon the outcomes and recommendations of the Beijing Platform for Action adopted at the Fourth World Conference on Women (UN, 1995) and the EU implementation reports on the critical area of concern "Women and the Environment", and specifically on “Gender Equality and Climate Change” (EIGE, 2012). We will specify gender-sensitive indicators to monitor access to and use of water in pilot water laboratories. Furthermore, we will pay regards to the outcomes of the Conference on the Gender Dimensions of Weather and Climate Services (UNESCO, 2014), which explored women and men empowerment for the sake of building safer, stronger and more resilient societies “through the provision and use of gender-sensitive weather and climate services”, and monitor and promote women access to training and transformational adaptation strategies such as irrigation services throughout the project; as well as a gender-balanced stakeholder engagement process.

1.4 Ambition

Water is notoriously known as both an economic and social good; essential for life, economic development, social cohesion, and the environment. The multitude of the at least to some extent incompatible uses of water and their impacts on natural water bodies makes policy choices both value-laden and intractable. Uncertainty, information asymmetries, pre-existing water permits or entitlements adhering to different legal doctrines, and hostile reception of water policy reform may antagonize introduction of transformational adaptation strategies, reinforcing path dependent trajectories characterized by lock-in of stakeholders’ technological and management responses (e.g. dam construction) to water scarcity under climate change.

TALANOA-WATER fields a groundbreaking ecosystem of innovation that combines an inclusive and transparent stakeholder engagement method, the *Talanoa Dialogue*, with an actionable modeling framework inspired in interdisciplinary *socio-hydrology science*, to share views, develop collective knowledge, build trust, achieve consensus and **unblock transformational responses** to water scarcity under climate change in six large-scale pilot water laboratories in the Mediterranean basin. In TALANOA-WATER ecosystem of innovation, stakeholders are an integral part of the research, contributing alongside scientists through the co-design, co-development, co-evaluation, co-identification and co-implementation phases to generate a personalized experience to a level that is best suited for their tasks (e.g. decision-making). This *co-opting users' competence* denotes efforts through which stakeholders: 1) are turned into co-creators and not only ‘customers’ of research outputs; 2) assume roles in shaping expectation and acceptance of scenarios and strategies; and 3) help to extract value of the modeling framework and ecosystem of innovation, and actively contribute to the deployment of agreed transformational adaptation strategies (Prahalad and Ramaswamy, 2000). Fluent **science-policy interaction** and collaboration within the ecosystem of innovation thus becomes the **hub for value creation and value extraction** through the design, realization and demonstration of complementary and mutually reinforcing technologies and management options in comprehensive transformational adaptation strategies. Although some of the technologies and management options that will be explored are already available in the market, their uptake is limited (e.g. studies at plot scale, as in forested infiltration areas for aquifer recharge in Italy). TALANOA-WATER will drive their large-scale adoption and create new avenues for innovation potential through transformational strategies with synergistic components whose total value is larger than the sum of parts. For example, we will combine the development of non-conventional treated wastewater and saline water with innovative water charging systems that induce substitution of overexploited surface and groundwater conventional resources; or combine commercial drought insurance with nature-based solutions for aquifer recharge, so to complement the insurance value of groundwater with formal insurance and thus reduce pressures on overallocated aquifers, while enhancing aquifer recharge through nature-based solutions.

We will build on recent advancements in information and communication technologies such as remote sensing, smart gauge sensors, cloud computing and data analytics to support more accurate water accounting and data collection that improves system knowledge. Socio-hydrology science and simulations will exploit increased real-time digital data accuracy enabled by remote sensing and other information and communication technologies, and translate raw water data into relevant and actionable knowledge to better inform private and public choices. Deployment of transformational adaptation strategies such as smart (e.g. mobile-based) irrigation services across the pilot water laboratories will demonstrate the added value of remote sensing, sensors and other information and communication technologies, combined with the ecosystem of innovation and transformational adaptation strategies, in turning accurate and reliable real-time digital data in increased real-time accuracy of knowledge and improved IWRM.

2. Impact

2.1 Expected impacts

TALANOA-WATER has been designed to meet, and where possible exceed, all the expected impacts specified in the topic 1.1.1 of the PRIMA call. Table 2.1.a maps our contribution to the impacts envisaged under topic 1.1.1, and indicates the relevant project Specific Objective (SO) (see Section 1.1).

Table 2.1.a: Contribution of TALANOA-WATER to the impacts envisaged in the call

Impacts envisaged in the call (topic 1.1.1)	Our contribution	SO
[1] Validation, testing and adoption of innovative and adapted technical, organizational, business and governance models aimed at enhancing the efficiency of water use by the integration of social and economic components into IWRM and CCA approaches	-Test and validate a groundbreaking ecosystem of innovation that combines an inclusive and transparent stakeholder engagement method (Talanoa Dialogue) with a multi-system modeling framework integrating climate, hydrology, agronomic and socio-economic systems in **6 water laboratories**. -Assess the economic and environmental performance of **10 or more (10+) adaptation strategies** in each lab, and identify **1 robust strategy** in each lab. -Adoption of the TALANOA-WATER ecosystem of innovation as a governance model in **3+ water laboratories.**	SO-01 & 03
[2] Demonstration(s) of how the proposed IWRM models approach will lead to better use, saving and preservation of water resources, with a positive impact in terms of quality, quantity, and sustainable use, without adverse impacts on other natural resources and in terms of benefit for users (socio economic issues) as well as ensuring preservation of natural ecosystem services.	-Compare socio-economic and environmental performance of each transformational adaptation strategy explored against a baseline (conventional adaptation/no adaptation) under **100+ scenarios and 10+ alternative model settings**, in terms of equity, sustainability and economic growth. -Assess tradeoffs and co-benefits within and across systems (e.g. water conservation and quality v. income and food security). -Serious game to demonstrate impacts of transformational adaptation policies and to compare them to the outcomes of the choices that would have been made otherwise (baseline), without backing from TALANOA-WATER knowledge. -Identify **6 robust strategies** (one per laboratory) that show a satisfactory performance under most conceivable futures.	SO-02
[3] Optimization of management of water for irrigation obtained from various sources, in particular, abstracted of recovered water from waste water treatment systems or recovered water from other sources (such as rain water, industrial, etc.) at the basin level as well as in collective networks (water users' associations), improving water use and distribution efficiency, as well as preventing socio-economic conflicts in the use of water resources; Water exploitation index in rivers, aquifers, and other land-based sources must be also ensured.	-All adaptation strategies considered will deal with irrigated agriculture, the largest water user in all water laboratories. -Comprehensive water accounting that follows the fractions approach. Water use estimates will be obtained following FAO WaPOR's approach. We will develop demand-supply balances and water exploitation indices in each laboratory. -Adaptation strategies will feature irrigation technologies and services to optimize agricultural water management; alongside non-conventional resources, including wastewater. Their impact will be assessed locally (irrigation network) and basin-wide leveraging on the comprehensive accounting framework. -TALANOA-WATER will spur a *transformational adaptation* that creates and realizes governance and business opportunity potential towards sustainable and equitable growth in six pilot water laboratories. -Inclusive Talanoa Dialogue, devoid of blame, will work towards consensus building and prevent socio-economic conflicts in the use of water. -for each water laboratory we will **identify and adopt, *among those strategies that are robust,* 1 preferred/optimal adaptation strategy** in terms of social equity, economic efficiency and environmental sustainability.	SO-02

[4] Improved regional, national and transboundary water governance in support of legal security and social trust.	-Pilot water laboratories operate at various scales, from regional (e.g. Cega) to international/transboundary (e.g. Nile). -The Talanoa Dialogue aims to build trust and empathy among stakeholders. -Remote sensing-based water accounting will improve detection of non-compliant behavior (e.g. illegal abstractions); Talanoa Dialogue will provide a forum to build consensus towards greater legal security and compliance.	SO-03
[5] Strengthened institutional/organizational and individual capacities in terms of adopting and applying IWRM models, concepts and strategies.	-**Train 3+ institutions** (including relevant river basin authority and ministries) **and 9+ individuals in each pilot water laboratory** on integrated IWRM and CCA socio-hydrology modeling. -**Train 3+ institutions** (including relevant river basin authority and ministries) **and 6+ individuals in each pilot water laboratory** on Talanoa Dialogue. -**Train 10+ PhD students** on integrated socio-hydrology modeling and stakeholder engagement/Talanoa Dialogue/co-generation approach	SO-03
[6] Improve multi-sectoral stakeholder involvement management and institutional capacity building	-Substitute conventional modeling and decision-making by TALANOA-WATER ecosystem of innovation in **3+ laboratories** -Ensure sustainability of the ecosystem of innovation in **3+ project laboratories for 3+ years** after project ends, through legacy strategies (see WP5), including securing **50 000+ EUR/year** from institutional- (e.g. basin authority), users' associations- or industry-driven projects -mainstream project results in **4+ national and 1 supranational adaptation plan** (EU) leveraging on project partners and stakeholders leading roles in them	S0-03 & 04

According to the SRIA, the "most important evaluation criterion" in the PRIMA programme is to "[i] develop and eventually [ii] adopt [iii] innovative and [iv] sustainable solutions for water management […]". TALANOA-WATER will fully respond to this criterion by creating an ecosystem of innovation to support the [i] development and [ii] adoption of robust [iii] transformational adaptation strategies that contribute to the [iv] IWRM objectives of efficiency, equity and sustainability. TALANOA-WATER will thoroughly addres all the **Key Performance Indicators (KPIs)** of topic 1.1.1, as well as other relevant PRIMA KPIs:

Table 2.1.b: TALANOA-WATER contribution to PRIMA KPIs

KPI description		Our contribution
Topic 1.1.1. KPIs	Number of *applied* R&I solutions to the challenges of water management	-Identify and **apply 1 robust transformational adaptation strategy** in each pilot laboratory (**6 in total**). *Each transformational strategy consists of a portfolio of multiple R&I solutions*, including nature-based solutions, technological innovation and water services, risk management and financing and/or economic incentives
	Number and efficiency performance of new irrigation technologies and scheduling protocols and models	-Assess performance of: mobile-based irrigation services, informed by sensors and remote sensing (in 4 laboratories); deficit irrigation (2 labs); biosalinity (2); wastewater reuse (2 labs); and agroecology - drought resistant varieties (1 lab) -Through adoption of transformational adaptation strategies, including new irrigation technologies, **enhance basin-wide economic efficiency** (GDP/withdrawals) **by 5%+ in each pilot water laboratory** without increasing water consumption
	SDG#6: indicator 6.5.1 Degree of IWRM implementation (0-100)	-Apply SDG6.5.1 survey instrument to stakeholders at the beginning and end of project in each water laboratory **-Increase SDG indicator 6.5.1 by 10+ points in each laboratory** in this period
Other PRIMA KPIs	SDG#6 - 06.41 Water exploitation index (WEI)	-Measure consumption and return flows using remote sensing data (WaPOR) -Quantify WEI in 6 water laboratories at the beginning/end of project **-Reduce WEI by 5%+ in each water laboratory** during the project
	SDG#2 - 2.4.1 Proportion of agricultural area under productive and sustainable agriculture	-Measure biomass production and water consumption through remote sensing (WaPOR) in 6 water laboratories at the beginning/end of project **-Increase the proportion of land under *sustainable water use*** (i.e. in compliance with BDCs) **and productive agriculture by 5% in each water laboratory**

	Percentage increase in Mediterranean agro-food products exported	-Measure and report, for each lab, the impacts of transformational adaptation on exports/imports through the macroeconomic module **-Verify a positive impact on exports** between the beginning/end of project in each laboratory (%change in exports > 0%) **-Verify a decrease in food imports dependency** between the beginning/end of project in each laboratory (Δ %imports/consumption < 0%)
	Percentage decrease in Food imports dependency (%imports/consumption)	
	Number of innovations in farming systems developed enabling sustainable and efficient agriculture and food systems.	-Assess performance of: mobile-based irrigation services, informed by sensors and remote sensing (4 laboratories); deficit irrigation (2 labs); biosalinity (2 labs); *treated wastewater reuse* (2 labs); and agroecology - drought resistant varieties (1 lab) -Through adoption of transformational adaptation strategies, including treated wastewater and other innovations in farming systems, **enhance basin-wide economic efficiency by 5%+ in each pilot water laboratory** without increasing water consumption
	Number of water treatment technologies for specific irrigation requirements	

Additional impacts not explicitly mentioned in the work programme

Beyond contributing to the SDG 6 targets and indicators explicitly specified in the PRIMA call, TALANOA-WATER will also contribute to the targets SDG 6.b (supporting and strengthening the participation of local communities in improving water management), SDG6.4 (substantially increasing water use efficiency) and SDG6.6 (protecting and restoring water-related ecosystems); and to SDG 13.1 (strengthening resilience and adaptive capacity to climate-related hazards and natural disasters) and SDG 13.3 (improving education, awareness-raising and human and institutional capacity on climate change adaptation). TALANOA-WATER will also contribute to several major multilateral frameworks underpinning UN's Agenda 2030, including the *Sendai Framework for Disaster Risk Reduction* (SFDRR), the *Paris Agreement on Climate Change*, the *Addis Ababa Action Agenda (AAAA)* on financing for development, and the 2016 *Agenda for Humanity*:

Table 2.1.c: Additional impacts of TALANOA-WATER - contribution to multilateral frameworks

Multilateral Framework & relevant objectives	**Our contribution**
The *SFDRR* advocates (1) inclusive, (2) science-based and (3) uncertainty-informed decision-making, for which it is necessary to (4) collect and share disaggregated data.	-Inclusive Talanoa Dialogue, informed by… (1) -…cutting-edge socio-hydrology science that… (2) -thoroughly samples uncertainty to inform robust decision making (3) -Comprehensive open access database including remote sensing-derived water accounting estimates (4).
The *AAAA* erected a financial framework for sustainable development, fostering inclusive economic prosperity and lining up financing resources and flows with the priorities of the 2030 Agenda for Sustainable Development	-Credible business plan and legacy strategy to deliver the ecosystem of innovation to the market, lining up financing resources with climate change and water scarcity adaptation (see Section 2.2.a) -Development of a fundraising plan to extend the ecosystem of innovation beyond the project lifetime in 3+ water laboratories (see Section 2.2.a)
The *Paris Agreement on Climate Change* explicitly includes climate adaptation, a part of which are the efforts to strengthen societies' ability to deal with the impacts of climate change as well as financial commitments to foster adaptation and climate resilience	-Design of climate change scenarios capable of characterizing the development of anthropogenic pressures on human and water systems -Assess multiple transformational adaptation strategies to *climate change* and water scarcity, including: nature-based solutions, technological innovation and climate/irrigation services, risk management and *financing instruments*, & economic and behavioral incentives
The *Agenda for Humanity* includes 5 Core Responsibilities (CR) of which at least 3 are related to TALANOA-WATER research: (i) CR3 addresses displacement and movements of refugees; (ii) CR4 entails emphasis on risk analysis and data investments; and	-Pilot water laboratory in the Litani Basin in Lebanon will explore transformational adaptation solutions that are inclusive and ensure inclusive sustainable water supply, including 500,000+ refugees currently in the area. -Thorough uncertainty sampling through ensemble techniques, and emphasis on robust decision making

(iii) CR5 recalls the Sendai Framework's and the Paris Agreement's pledges for investment in risk (reduction) and adaptation.	-Comprehensive database and water accounting, including original estimates of consumption, return flows and biomass production relying on pioneering remote sensing-based tools (WaPOR) -Credible business plan and legacy strategy to line up financing resources with climate and water scarcity adaptation (Section 2.2.a)

TALANOA-WATER will also contribute to inform the EU legal and policy framework on climate change adaptation and water resources management, notably the Water Framework Directive (WFD) and the EU Climate Adaptation Strategy. Achieving the good ecological status of water bodies (the main objective of the WFD) while adapting to diminishing water supply and the changing magnitude of droughts due to climate change calls for innovative solutions that restore the balance in overallocated basins, while enabling economic and welfare growth. However, **despite an expanding legal acquis, transformational adaptation against climate and water disruptions has remained elusive**. In an effort to prepare Europe to climate disruptions and accelerate transformational responses, the EC recently launched its Mission on climate adaptation and societal transformation, to which we will meaningfully contribute with valuable insights and in-depth knowledge. TALANOA-WATER will demonstrate the value-added proposal of transformational adaptation across 6 pilot water laboratories (3 of which in the EU: Italy, Spain and France) and give change momentum. Transformational adapatation in the water and climate sectors will also support the achievement of the EU Common Agricultural Policy sustainability goals (2^{nd} pillar). The Spanish and French laboratories will explore the potential of CAP subsidization of insurance mutual funds to encourage adaptation to water scarcity and climate change, and prevent informal mechanisms that deplete water bodies (e.g. informal groundwater abstractions). Finally, the Italian laboratory will explore the application of the Council regulation 2012/2002 and 661/2014 on the EU Solidarity Fund to the case of extreme droughts, and assess the potential of this instrument to mitigate their socioeconomic and environmental impacts.

Barriers to the achievement of expected impacts

The **Consortium has adopted measures to address existing barriers/obstacles** due to mobility restrictions to workforce and stakeholders as a result of the COVID-19 outbreak. Consortium partners will commit in the Consortium Agreement to grant timely access to the equipment and resources necessary to carry out the project, including key infrastructures (e.g. remote access to supercomputing centers), leveraging on well-designed and empirically tested COVID-19 health and safety protocols and access control screening protocols. Adequate working conditions within each Consortium partner will be underpinned by a comprehensive online communication hub (the **Water Agora hub**) that encompasses all channels of communication, including live access to project workshops and other meetings, so to actively engage, discuss, build consensus, take decisions and coordinate actions within the TALANOA-WATER network of scientists and stakeholders, also under mobility restrictions/lockdown. The online communication strategy is described in detail in Section 2.2.b. Contingency planning has also been established to effectively and efficiently respond to different degrees of mobility restrictions (Section 3.2.4).

2.2 Measures to maximize impact

a) Dissemination and exploitation of results

Principles and organization

Dissemination and exploitation of our groundbreaking ecosystem of innovation and results, particularly among relevant stakeholders, are critical to meet the project's intended impacts. To this end TALANOA-WATER will develop a ***Plan for the Exploitation and Disemination of Results*** (PEDR) on the onset of the project (deliverable D5.1), whose cornerstones are portrayed hereafter. The PEDR is written in full compliance with the recommendations specified in the European IPR Helpdesk Fact Sheet - The Plan for the Exploitation and Dissemination of Results in Horizon 2020; and leveraging on the feedback received through online and in-person meetings with relevant stakeholders from pilot water laboratories (see Table 1.3.b) held in August and September 2020. The realization of the PEDR will be overseen by the Project Coordinator and all partners will be closely engaged. To ensure that a high regard is given to strategic impacts through dissemination and exploitation, we have designated in all thematic work packages an Impact Champion whose role will be to constantly monitor realization and propose ways of improving exploitation (task T1.3).

TALANOA-WATER will target unresolved policy challenges, stimulate political engagement, forge new partnerships, and pave the way for a closer involvement of public and private stakeholders in the co-generation of transformational adaptation strategies towards sustainable and inclusive growth. The innovation potential which we will develop will be put into service and exploited by the public authorities, users' associations and industry participating in the Talanoa Dialogue, with feedback from civil society organizations and general public, resulting in better informed responses for coping with water scarcity under climate change.

We put high emphasis on dissemination and exploitation in all WPs, and in particular in WP5 and WP1. The WP5 is entirely dedicated to dissemination, exploitation and communication; equipped with adequate resources, and targeted to: (i) academic community (including young researchers and professionals); (ii) public authorities and policy makers at various levels of government (river basin authorities, relevant ministries, municipalities); (iii) users' associations (agricultural, hydropower, tourism) and industry (e.g. insurance); and (iv) civil society organizations (e.g. NGOs) and general public. WP1 is dedicated to fostering multi-stakeholder dialogue and trust and collaboration across public (public authorities and civil society) and private agents (users' associations and industry). WP1 and WP5 will target in particular groups (ii) – (iv), with dissemination products discussed, tested and developed jointly and based on feedback from the relevant stakeholder groups.

Multi-stakeholder Talanoa Dialogue

The Talanoa Dialogue (WP1) will ensure a continuous dialogue among stakeholders towards collective assessment, consensus building and the eventual adoption of transformational adaptation strategies to water scarcity and climate change in the six pilot water laboratories. We have identified and invited relevant public and private stakeholders in the six water laboratories to join the Talanoa Dialogue. The organizations who agreed to join and support this proposal are listed in Table 1.3.b. We plan to increase the number of organizations participating in the Talanoa Dialogue during the first few months into the project (see WP1), to create a large pool of relevant stakeholders participating in and contributing to the project implementation.

The Talanoa Water Dialogue is inspired by the same principles as UNFCCC's Talanoa Dialogue (UNFCCC, 2018). It involves the sharing of ideas, skills and experience through storytelling, so to build trust and knowledge among participants through empathy, understanding and constructive and respectful debate. Blaming others and making critical observations are inconsistent with building mutual trust and respect, and therefore inconsistent with the Talanoa concept. In the Talanoa Dialogue, stakeholders aim to respond three questions: *Where are we now? Where do we want to go?* And *How do we get there?* (UNFCCC, 2018). In TALANOA-WATER, these questions will be answered leveraging on co-generation approach. Co-generation means that all relevant stakeholders, including scientists, are an integral part of research, deliberations and implementation, so to ensure consensus is built and observed at every stage, from the design of credible and realistic scenarios to the effective implementation of robust transformational adaptation strategies. Co-generation in TALANOA-WATER will be structured in six stages, namely, 1) co-design of scenarios and BDCs; 2) co-design of transformational adaptation strategies; 3) co-development of modeling efforts; 4) co-evaluation of adaptation strategies; 5) co-identification of the robust strategy with the highest potential attending to the IWRM criteria; 6) and co-implementation of the selected strategy. Table 2.2.a maps how these co-generation stages will contribute to answer the three questions in the Talanoa Dialogue.

Table 2.2.a: Addressing Talanoa Dialogue questions through co-generation

Where are we now?	Where do we want to go?	How do we get there?
1a) Co-design credible climate, hydrologic and socioeconomic scenarios	1b) Co-design of sustainable BDCs	2) Co-design of relevant transformational adaptation strategies, including financial mechanisms and partnerships for cost recovery and sustainable investment 4) Co-evaluation of adaptation strategies, combining mechanistic modeling outputs with heuristics and inductive reasoning so to identify strengths and vulnerabilities to selected strategies 5) Co-identification of the robust strategy with the highest potential attending to the IWRM criteria 6) Co-implementation of the selected strategy
3) Co-development of the multi-system modeling framework (including the use of stakeholders' models in the modeling framework, e.g. river basin authorities' own hydrologic models)		

Stakeholders in the UNFCCC Talanoa Dialogue gather periodically to assess progress, identify barriers and explore opportunities following an iterative stock-taking process. The Talanoa Water Dialogue will also adopt an iterative stock-taking approach where stakeholders gather in annual science-policy workshops in the context of each pilot water laboratory, and in two international science-policy workshops involving all water laboratories; complemented with continuous engagement in technical and foresight meetings, training and capacity building, and other events. The objectives and timing of the workshops are described in Table 2.2.b. In workshops 2, 3 and 4 we will organize a serious game for evaluating and revising transformational adaptation strategies, understand how stakeholders make decisions, enchance transparency and trust, and build consensus. In the serious game in workshops 2 and 4 we will use detailed information from each water lab, and stakeholders will adopt their real-life roles, which helps to underpin the development of *ad-hoc* transformational adaptation strategies. The game in workshop 3 will focus on learning and will be executed on a more abstract level, allowing participants to take other roles than they have in real-life so to learn about the complex structure of the problem and interdependencies between actors.

Table 2.2.b: Objectives and date (in months from the start of the project, M) of the science-policy workshops

No.	Workshop title	Objectives	M
1	1st annual science-policy workshop	Scene setting, momentum building; research gaps and challenges; co-design scenarios, sustainable BDCs, transformational adaptation strategies, and baseline; presentation and co-development of the modeling framework	14
2	2nd annual science-policy workshop	Presentation of socio-hydrology modeling results; serious game; exploratory co-evaluation and co-identification; new iteration(s) (*iterative stock-taking process*).	21
3	1st international science-policy workshop	Presentation and revision of scenarios, BDCs, transformational adaptation strategies and modeling framework adopted; serious game; collective identification of gaps and challenges.	25
4	3rd annual science-policy workshop	Initiate new iteration(s), including co-design of alternative/additional strategies and/or scenarios/BDCs, revision of model settings (co-development); serious game; co-evaluation and exploratory co-identification	28
5	4th annual science-policy workshop	Presentation of detailed modeling results, co-identification of the robust strategy with the highest potential attending to IWRM objectives (inclusive, sustainable growth); plan for co-implementation of selected transformational adaptation strategies in labs	36
6	2nd international science-policy workshop:	Collective assessment of outputs; final synthesis of results; scope for action beyond pilot water laboratories through upscale and legacy actions, including identification of potential inspiration laboratories	43

UNFCCC's Talanoa Dialogue is one of the events attracting the greatest attention in the climate community, bringing together each year high representatives from national, regional and local governments, industry, civil society organizations, and media cover from all over the world. The Talanoa Dialogue has become a highly effective and impactful platform to present and assess outstanding transformational actions, which in turn can become hints or solutions to the challenges faced by various entities elsewhere. Inspired by the same set of principles, the Talanoa Water Dialogue represents an important constituency for disseminating new knowledge and approaches to adaptation to water scarcity and climate change and communicating the results of the project. The Talanoa Water Dialogue is also a potential "end-users community" that may partner up in the creation of new, innovative transformational opportunities also beyond the water sector; and a critical actor in the design and adoption of legacy strategies that contribute to the sustained adoption of TALANOA-WATER ecosystem of innovation and transformational adaptation strategies within and beyond pilot water laboratories.

Business plan

The imitation of conventional business and marketing strategies are not or less suitable for the provision of water and climate services such as the TALANOA-WATER ecosystem of innovation. *First*, the value of water and climate information is only revealed when end-users realize the cost saving or value-added potential which they may obtain from exploiting the TALANOA-WATER ecosystem of innovation (i.e. the service). *Second*, potential end-users of the TALANOA-WATER ecosystem of innovation are also an integral component of service development and value creation through co-generation. *Third*, we recognize that for the optimal and sustainable provision of the ecosystem of innovation as a new governance model the main beneficiary (i.e. the society as a whole) is not the most adequate/likely paying end-user of the service. The business plan, which will be fully developed within WP4, will address these aspects and design a credible path to deliver the service/ecosystem of innovation to the market.

Potential end-users of the TALANOA-WATER ecosystem of innovation include river basin authorities, relevant ministries, municipalities and other local, regional and national authorities that are responsible for the development, implementation and enforcement of water and climate adaptation-related policies, laws, regulations and recommendations. These authorities are in charge of achieving the objectives of the international (in particular the 2030 Agenda for Sustainable Development), regional (including i.a. the European Green Deal, Lisbon Agenda, Regions for Economic Change, Water Framework Directive, EU Climate Adaptation Strategy, etc.) and national water, climate, socio-economic and innovation agendas; and will be a critical driver for the growth in the demand for transformational adaptation policies, thus being the most important potential reservoir of TALANOA-WATER ecosystem of innovation end-users. We will work alongside potential end-users and other relevant stakeholders to develop, test and validate the innovative TALANOA-WATER ecosystem of innovation in 6 water laboratories, provide a transparent and exhaustive description of the cost structure, and assess the environmental, economic and financial return this service may offer. Thorough stakeholder engagement through co-generation will help us shape expectation and market acceptance and extract business value of the service. We will also explore the business and revenue models that are able to ensure that end-users of the TALANOA-WATER ecosystem of innovation are provided with relevant water and climate knowledge, while those agents whose activities put water bodies under stress or directly/indirectly benefit from the results of transformational adaptation contribute to the financial sustainability of the service provision. Highly instrumental to this process will be the sustained and ongoing close cooperation of Consortium partners with relevant stakeholders in water laboratories, including potential end-users.

Policy leverage

We will seek opportunities to contribute, with our expertise and outcomes of our innovation action, to ongoing policy developments and assessments. The TALANOA-WATER consortium is closely linked to major international water- and climate-related assessment exercises and platforms (see also sections 3.3 and 4), such as the Intergovernmental Panel on Climate Change (IPCC), the COMPASS Global Water Assessment, the UNDRR Sendai Framework for Disaster Risk Reduction, the EC Mission Board on climate adaptation and societal transformation (Mission Climate) and the European Environment Agency's Topic Centre on impacts, vulnerability and Adaptation (ETC/CCA, coordinated by CMCC), to mention but a few. Consortium partners are also closely connected to relevant European and national policy developments and networks in the water and climate sector. As examples of the manifold policy developments to which partners have made major contributions, Consortium partners have supported river basin planning across the Mediterranean, including in the pilot water laboratories (e.g. USAL coordinates the framework contract with the Douro River Basin where the Spanish water laboratory is located); contributed to national climate adaptation strategies and plans (e.g. CMCC has coordinated the Italian Climate Adaptation Strategy and Plan); and contributed to the EC assessment underpinning the EU Climate Adaptation Strategy and 2012 EU Water Policy Review.

We will leverage on this comprehensive expertise and networking capacity to maximize the policy leverage of the project. As a part of our exploitation strategy we will actively contribute to the design of river basin management plans in selected water laboratories and beyond, while seeking opportunities to contribute to climate adaptation strategies and water and agricultural policies at a national and transnational (e.g. EU strategy on adaptation to climate change) level. We will author/co-author chapters in the DRMKC report 'State of Science in DRM' and the EEA assessment report on 'Climate change adaptation and disaster risk reduction in Europe - Synergies for the knowledge base and policies', leveraging on the coordinating role of members of the TALANOA-WATER Consortium; and actively inform the development of the United Nations World Water Development Report and the UN Global Assessment Report on Disaster Risk Reduction. We will liaise with principal innovation platforms, including Climate KIC and European Innovation Partnership on Water/Agricultural Sustainability and Production, to amplify the impact of our dissemination and outreach activities and boost transformational adaptation.

Moreover, TALANOA-WATER will seek to contribute actively, with insights from our research and by channelling the views and consultation outcomes of the Talanoa Dialogue, to various international, national and regional initiatives such as the EU Loss Data Systems working group on standardization of disaster impacts data and databases; the Water Framework Directive Common Implementation Strategy; and the global framework on water scarcity in agriculture (WASAG). Partners will use their policy leverage and well-established connections to actively engage in the discussions of these groups, informing on the economic value unleashed by transformational adaptation to water scarcity under climate change, and the role of multi-system modeling and water and climate knowledge for successful adaptation.

Beyond the TALANOA-WATER project

The TALANOA-WATER Consortium aspires to achieve the means to ensure the periodic update of the ecosystem of innovation to adapt it to state-of-the-art literature, regulatory, policy and other relevant reforms, and to address new needs from users (e.g. new transformational adaptation strategies to be explored). The key assets and resources needed to deliver a sustained provision of the service after the project ends include the institutional and human capital developed in the context of the TALANOA-WATER project (*transformation agents*); and additional investments from end-users and relevant calls for projects that will be seeked and secured following a dedicated fundraising plan.

During the lifetime of the project we will develop a critical pool of institutional and human transformation agents to sustain, and where possible expand, TALANOA-WATER ecosystem of innovation and methods after the project ends. To this end we will train 3+ institutions (including the relevant river basin authority and ministries) and 9+ individuals in *each* pilot water laboratory on integrated IWRM and CCA socio-hydrology modeling; 3+ institutions (including the relevant river basin authority and ministries) and 6+ individuals in *each* pilot water laboratory on

Talanoa-Dialogue multi-stakeholder engagement; and 10+ PhD students on integrated socio-hydrology modeling and stakeholder engagement approach (see Section 2.2.b – stakeholder and academic training).

We will seek and secure additional investments building on a dedicated fundraising plan developed as a part of the third exploitation, dissemination and communication report (D5.5). Stakeholder engagement through co-generation will be highly instrumental to fundraising activities, revealing the cost-saving and value-added potential that end-users can obtain from the ecosystem of innovation, and creating the demand base to sustain service activities in the longer term. We will scope out follow-up applications of TALANOA-WATER ecosystem of innovation and methods, in collaboration with stakeholders that will adhere to the Talanoa Dialogue, either as stand-alone institutional- (e.g. basin authority), users' associations- or industry-driven projects, or embedded in more comprehensive LIFE or territorial cooperation projects. Follow-up actions will not be limited to pilot water laboratories in the project, and we will also identify 2+ inspiration water laboratories where the TALANOA-WATER ecosystem of innovation will be tested and potentially adopted as a governance model as part of the project legacy (see WP5). We will explore feasibility to establish a COST (European Cooperation in Science and Technology) action dedicated to transformational adaptation to water scarcity and climate change, and encourage individual and collective grant application by early-stage and experienced researchers via Marie Skłodowska-Curie actions (individual fellowships, innovative training network), industrial fellowships (e.g. AXA Post Doc and Chair schemes), or their combination (MSC Research and Innovation Staff Exchanges, RISE). We will collaborate with the Climate KIC, the Innovation Partnership on Water (EIP-WATER) and on Agricultural Sustainability and Production (EIP-AGRI), and Joint Programming Initiatives (e.g. Water JPI, Climate JPI) to help to isolate research gaps to address. Consortium partners will also apply to relevant calls from these initiatives, as well as those from Horizon Europe and national calls, so to implement and develop further the methods generated in TALANOA-WATER. We expect to seek and secure during the last year of the project, *at minimum*, 50 000 EUR/year from institutional- (e.g. basin authority), users' associations- or industry-driven projects in 3+ water laboratories, sustained for a period of 3+ years after the project ends. The figure of 3+ water laboratories with a minimum investment sustained for 3+ years is considered by the Consortium as the minimum basis to achieve, with high confidence and in the medium term (5-10 years), a *critical mass* of end-users that leads to a rapid increase in the adoption of transformational adaptation strategies and the TALANOA-WATER ecosystem of innovation in the Mediterranean area. The performance of fundraising activities and the ability of the project research and applications to be sustainable beyond its lifetime will be measured through an *ad-hoc* Impact Champion (see task T1.3) that captures the resources secured to keep the service functional, including direct financial contributions and monetized in-kind contributions (e.g. a worker/group of workers dedicated to the update of the ecosystem of innovation by a stakeholder in a water laboratory). Along with feedback from stakeholders, the performance of the fundraising activities measured by the Impact Champion will be instrumental to update and fine-tune the fundraising plan in the fourth and final exploitation, dissemination and communication report (D5.5), so to maximize its impact also after the project ends.

Management of the research data

The TALANOA-WATER Consortium will adhere to the *Pilot Open Research Data* initiative in H2020 and will make the datasets generated as a part of the project, along with the documented methodology, finadable, accessible, interoperable and reusable (FAIR) for other research projects, interested stakeholders and the civil society. The electronic data that will be collected or generated within this project include: (i) original open data water accounting datasets generated following FAO's WaPOR approach and (ii) secondary datasets built through the harmonization and merging of existing climate, hydro(geo)logic, agronomic, microeconomic and macroeconomic datasets, including remote sensing data (generated in WP2); (iii) simulation datasets from the modeling of transformational adaptation strategies using the multi-system modeling framework (generated in WP3); and (iv) research reports and peer-reviewed journal papers (generated in all WPs). Publications in international journals with high JCR impact factor (first quartile-Q1) will be made available making use of the Gold Open Access option; and in online open repositories through widely indexed Research and/or Working Papers series operated by Consortium partners. All datasets will be openly shared via FAO Aquastat and WaPOR portals and EEA data (WISE) and Climate Adapt portal. We will also upload research reports to the Climate Adapt portal. The selected data portals and Q1 journals are renowned and widely disseminated platforms among the water and climate community (*findable*), and will supply project data publicly and freely (either by default or through the gold open access option) in reliable, secure and trusted online platforms available to any interested agent (*accessible*); while ensuring high quality and *interoperability* of data by means of a thorough review by experts and application of commonly used and accepted formats and standards in the water and climate community, and allowing for fast publication of results and immediate *re-use* (we will preferentially target journals that allow preprints during the embargo period) – i.e. *FAIR*.

Technical and institutional measures for long-term data maintenance will be undertaken by the Consortium partners. A Data Management Plan describing the data management strategies in more detail will be developed within the first six months of the project. Periodic updates of the Data Management Plan are envisaged on a yearly basis through annual exploitation, dissemination and communication reports (WP5). Curation and preservation of the database after TALANOA-WATER ends will be ensured by partners leveraging on the public data portals above and on open and trusted online repositories (e.g. Open Science Framework, World Data Center). Expansions of the database through further research will be underpinned by complementary fundraising efforts, as detailed above.

Knowledge management and protection, and the Intellectual Property Right (IPR) management

A considerable amount of "background knowledge" will be brought into TALANOA-WATER by the Consortium partners, thanks to their extensive and active involvement in the relevant areas of investigation over the past decades. More importantly, the project will collect and generate abundant and varied information, in terms of methods, tools, and datasets. The attitude of the Consortium is to widely share such knowledge. In fact, our dissemination and communication activities aim precisely at ensuring the maximum level of diffusion (publications, workshops, website, mobile app, mailing lists). The aim of the knowledge management and IPR Consortium policy is to enable smooth exploitation of project's outcomes.

The knowledge management and IPR are addressed in full compliance of the rules identified by the Horizon 2020 Programme of the European Commission for Research and the H2020 Model Grant Agreement. The Knowledge management and IPR policy will be included in the Consortium Agreement, signed by all partner organisation at the onset of the project (see Section 3.2.2). The Knowledge management and IPR rules will regulate [1] granting the Access Rights to background needed for the implementation of the project and exploitation of the results; and [2] the ownership, transfer and dissemination of the foreground. The Knowledge management and IPR policy will be based on the following basic principles:

> [1] The background (i.e. the information and rights held prior to accession to the grant agreement) brought into the project remains the property of the partner that has generated it;
> [2] The foreground (i.e. the results of the project activities) generated under the project is owned by the partner who has carried out the work leading to that foreground. When several partners have jointly carried out the work and their respective share of work cannot be determined, they shall have joint ownership of such foreground, and a "joint ownership agreement" may be drawn up for this purpose (the default regime is applied if no "joint ownership agreement" is signed).

TALANOA-WATER will adscribe to Gold Open Access option, for which a budget amount of EUR 22 500/year has been allocated. Papers will be also made available in online repositories, including the publication of working papers during the review and embargo period where prior publishing as working paper does not interfere with copyright policies, to ensure wide and timely dissemination, verification and immediate re-use of research results.

b) Communication activities

Principles and organization

Properly designed communication will support both the dissemination and exploitation of our research results (Section 2.2.a) and contribute to achieving the intended impacts of the project (Section 2.1). The **Communication Strategy and Plan (CSP)** has been designed following the EC Guidance for science communication (EC, 2014) and for evidence-based policymaking (EC, 2010), with clearly defined objectives and intended outcomes, target audience, timing, content and language lined up with the target audience. We will deploy innovative online communication channels to respond to the challenge posed by mobility restrictions due to the COVID-19 pandemic. The CSP will be further detailed in the D5.1, continuously monitored and regularly updated.

A collectively conducted analysis by Consortium partners and stakeholders (see Section 2.2.a) *was instrumental for our SMART* (Specific, Measurable, Assigned, Realistic, and Timely) CSP that will be accompanied by professional design and communication standards (storytelling, policy imprinting, media analysis), and which draws on long-standing experiences of all Consortium partners. We have dedicated 12.24% and 11.6% of the project's personnel resources to communication and dissemination (WP5) and Stakeholder Engagement (WP1), respectively.

All partners have outstanding professional in-house capacity for science communication and outreach. CMCC and GPAI (WP5 leaders) will put in place means for information sharing among all partners' media centres leveraging on their communication offices and networks. For the scope of the organization of training activities and dissemination events, we will work in partnership with well-established major communication platforms in the Mediterranean area, including the Sustainable Water Integrated Management and Horizon 2020 Support Mechanism (SWIM H2020 support Mechanism) and DG NEAR "Water and Environment Support in the ENI Southern Neighbourhood region (WES)" platform. **Our outstanding outreach capacity is one of the key strengths and distinctive characteristic of this proposal**.

Target audience

Our target audience are the (i) academic community (including young researchers and professionals); (ii) public authorities and policy makers at various levels of government (river basin authorities, relevant ministries, municipalities); (iii) users' associations (agricultural, hydropower, tourism) and industry (e.g. insurance); and (iv) civil society organizations (e.g. NGOs) and general public. Further to the wide-ranging Talanoa Dialogue multi-stakeholder platform that embraces representatives of all these groups (section 2.2.a; WP1), we will employ additional communication channels. These will include academic networks of which the consortium partners are members (e.g. American Geophysical Union, IAHS' Pantha Rhei, International Water Resources Economics Consortium), policy networks (e.g. EC Mission Climate, WASAG), and others. All communication products will be centralized in an online **Water Agora** so to ensure fluent, inclusive and continuous dialogue, training and advisory across partners and stakeholders – also in the eventuality of mobility restrictions. Table 2.2.c summarizes our target audience and the dissemination media and groups we will prioritize to communicate with them.

Table 2.2.c: Dissemination products and media by target groups

Public authorities – river basin authority	**Public authorities – relevant ministries, regional governments, municipalities and other local, regional and national authorities**
• Science-policy workshops • Website, mobile app • Technical and foresight meetings • Training and capacity building • Newsletter, blog • Brochure and leaflets – options for addressing barriers to enhancing transformational adaptation • Twitter, Facebook and other social media • Video presentations (scribble) • Webinars • Technical reports (deliverables), Synthesis report • Methodological briefs and synthesis reports • Working papers, Scientific articles • Open data sets • Portals – FAO Aquastat, WaPOR, EEA, Climate Adapt • Online catalogue of TALANOA-WATER-enabled service	• Science-policy workshops • Website, mobile app • Technical and foresight meetings • Training and capacity building • Newsletter, blog • Project start up brochure • Twitter, Facebook and other social media • Video presentations (scribble) • Press releases in (local) newspapers • Open data sets, through tailored scenarios and related outcomes • Synthesis report of deliverables, Policy briefs • Online catalogue of TALANOA-WATER-enabled service
Academic community	**Industry**
• Science-policy workshops • Website, mobile app • Training and capacity building • Newsletter, blog • Technical reports (deliverables) • Methodological briefs and synthesis reports • Webinars • Working papers, Scientific articles • Open data sets • Portals – FAO Aquastat, WaPOR, EEA, Climate Adapt • Summer schools (young scientists), Staff exchange	• Science-policy workshops • Website, mobile app • Training and capacity building • Newsletter, blog • Brochures for business networks, e.g. networks of European farmers – COPA-COGECA • Twitter, Facebook and other social media • Video presentations (scribble) • Synthesis report of deliverables, Policy briefs • Open data sets, through tailored harmonized scenarios and related outcomes • Online catalogue of TALANOA-WATER service
Civil society organizations	**General public**
• Science-policy workshops • Website, mobile app • Video presentations (scribble) • Newsletter, blog • Twitter, Facebook and other social media • Synthesis report of deliverables, Policy briefs • Science-society events (e.g. Researchers' Night)	• Website, mobile app • Newsletter, blog • Project start up brochure in local language • Video presentations (scribble) • Twitter, Facebook and other social media • Press releases • Communication channels in social media • Citizen-science events

Online communication and the Water Agora hub

The need for a sound online communication approach has been amplified by the recent COVID-19 pandemic, which significantly restricted mobility to different degrees, including in regions and countries where TALANOA-WATER pilot water laboratories, partners and stakeholders are located. This calls for the revision and adaptation of communication approaches to the new context. Beyond the conventional approach that uses online communication as an "information clearing-house" or "info-point" (EC, 2014), we will use online communication also as a tool to actively engage, discuss, build consensus, take decisions and coordinate actions within the TALANOA-WATER network of scientists and stakeholders. Online communication will be centralized and managed through the **Water Agora**, the communication hub of TALANOA-WATER, which encompasses all channels of communication in the project, including live online access to workshops and other events.

The agora will be articulated through two main platforms: the **website** and the mobile **app**. Both paltforms will feature professional design and communication standards that ensure ease-of-access and ease-of-use. The website and the app will be designed in a way that is appealing to a diversity of users, guiding the different audiences to products of their interest, including: live online access to project workshops, meetings and training, short news, scientific publications, repository of dissemination products (digital library), access to social media, and a forum supported with videoconferencing that stages interviews, a blog with opinion articles and policy briefs. The website and app will connect to existing portals on drought and water scarcity management under climate change (e.g. SWIM H2020 support Mechanism, DG NEAR WES, WASAG). The web and the app will employ state-of-the-art web services including interface to Twitter, Facebook, YouTube and other social media; and connect to partners' profiles (Twitter, Facebook) and YouTube channels (e.g. www.youtube.com/user/CMCCvideo). We will use videos and other interactive tools for dissemination, where we will employ scribing techniques that are based on mind-mapping and graphical skills of a scribing artist to synthesize complex issues in a way that is accessible to users of different backgrounds and expertise.

The Water Agora will be designed to aptly complement and underpin, and where necessary substitute, in person communication during the project. **In person communication** will be adopted, where possible, for science-policy workshops (including annual science-policy workshops in each pilot water laboratory and international science-policy workshops), training events, and outreach events. In person meetings have a number of advantages over online meetings: they make possible the use of body language, make misunderstandings less likely, increase discipline and concentration, facilitate social exchange, create stronger bonds among participants, catalyze networking, and create a healthy team culture; all of which can be only partly achieved through online interaction. **Online communication** will be the default for meetings with limited content and participants, or largely one-way (e.g. webinars), so to economize time and other resources. Online communication will be also adopted where in person interaction in workshops, training and outreach events is not possible for some or all participants, notably due to mobility restrictions as a result of the COVID-19 pandemic. The agora will allow for simultaneous online and in person attendance to workshops and training events (i.e. online attendance through the agora for participants from regions under mobility restrictions, and in person attendance for other participants). Major stakeholder engagement activities in those events, such as the serious game in workshops 2-4, will include a virtual interface to allow for both remote and in person simultaneous participation while ensuring fluent communication. All workshops and events will be widely advertised, broadcasted live, recorded, and uploaded to the agora. This will inform all Consortium partners and stakeholders in the network on the progress and activities in the project, while making the process *transparent*, thus contributing to build trust among members, a key objective of the Talanoa Dialogue.

We will deploy **sensible virtual engagement techniques and tools** to fully unleash the potential of online communication and ensure continued and active interaction and knowledge-sharing in line with the Talanoa Dialogue spirit. Online meetings will leverage on video meeting tools owned by Consortium partners (Google meet, Zoom, Microsoft Teams, GoToMeeting, etc.), while building on best practices (use of chat, mute/unmute, document sharing, screen sharing) and making use of interactive applications to ensure effective communication (e.g. whiteboard and drawboard tools). Leveraging on the agora channels and platforms, we will apply deep listening and media monitoring tools to identify key stakeholders and better target our communication products; listen actively to online conversations, the media landscape and (key) stakehoders, so to understand underlying currents; audit stakeholder engagement and digital lobbying to map engagement dynamics; and revise online engagement towards strengthening stakeholder engagement/endorsement of TALANOA-WATER methods and results (advocacy). These functions cannot or can only be partly achieved through in person communication. The upshot is a comprehensive communication strategy that combines the strengths of online and in person communication, and aptly addresses obstacles to in person communication towards a successful Talanoa Dialogue and science-policy engagement.

Scientific publishing, project brochure, leaflets, policy briefs, newsletter

The initial dissemination package will include a leaflet (short presentation of the project) and brochure on the business imperative to consider transformational adaptation in the operations of relevant stakeholders (e.g. policy making). The executive summaries of major deliverables will be translated into policy briefs, whose timing and content will be laid down in the PEDR in D5.1. Each policy brief will address specific audiences and will be designed following the EC Guidance. Biannual newsletters will be elaborated targeting key stakeholders.

The TALANOA-WATER Consortium is closely connected to **scientific publishing**, and several of the team members are current or past members of editorial boards of renowned scientific journals in multiple disciplines, including Environmental Modeling and Software, Climatic Change or Agronomy, to name but a few. As a part of our communication and dissemination activities, we will produce scientific articles and special issues in the above and other Q1 journals showcasing project results and events. High academic standards will be ensured through the publication of 10+ gold open access papers *per year* in JCR-ranked Q1 journals. We will submit and publish two papers showing the results of the TALANOA-WATER Project to Nature and/or Science. The articles in high impact journals will be accompanied by short webinars summarizing the importance of the results, which will be hosted in the Water Agora using web conferencing tools, registered for our digital library, and widely distributed via CMCC, GPAI and other partners' social media and YouTube channels. This publication production is feasible and consistent with the publication records of the PIs. For example, Dr. Pérez-Blanco (project coordinator) has published 7 papers in JCR Q1 journals in 2020, as of October, including in Nature journals; while Dr. Mysiak (project PI) published 8 papers in JCR Q1 journals in 2019, again including Nature journals. Indeed, given the sound expertise of the academic partners in TALANOA-WATER, and the additional expertise we will build during the project, the figure of 10 papers per year is regarded by the Consortium as a lower threshold. If, as expected, more than 10 papers are published per year, partners have committed to use funds from strategic institutional projects to ensure all papers are made gold open access. Prior to their final publication, each paper will be presented and discussed at major international interdisciplinary conferences, further enhancing the impact and quality of the publications.

Papers will be also made available in online repositories through Research and/or Working Papers series operated by Consortium partners. All academic partners operate own **Research** and/or **Working Papers** series indexed i.a. by the Economics Research Institutes Paper Series of Social Science Research Network (SSRN), Research Papers in Economics (RePEC), Berkeley University Press, German National Library of Economics (ZBW), and American Economic Association's electronic bibliography (Econlit) (e.g. https://www.cmcc.it/publications-type/reflections). We will also publish opinion articles leveraging on periodic publications by Consortium partners, including Water Research Forum Magazine (a magazine that deals with major research outcomes and achievements in the water sector), Climate Policy News (a weekly column on climate policy), International Climate Policy (featuring among others recent research on climate economics), ICCG Reflections (a digital in-house series providing insights on key climate change issues) and Climate Science & Policy (a digital in-house magazine), among others.

Outreach events

We will hold seminars and panel discussions at major industry/users' associations/public authorities events, as well as at OECD, World Bank, EEA, JRC and EC events. We will organize side-events to present results/deliverables at major scientific and outreach events, including Climate-KIC Innovation festivals, EIP conferences and the World Water Congress, among others. Table 2.2.d identifies key international outreach events that we will attend, where we will convene targeted sessions and/or side events, aiming at extending our outreach and communication capacity.

Table 2.2.d: Preliminary list of international scientific and outreach events we will attend/organize

<table>
<tr><th>Activity/Event</th><th>Target Audience</th><th>Objectives</th></tr>
<tr><td>European Innovation Partnership (EIP) Water Conference</td><td rowspan="4">water users; industry; innovation funders, sponsors and promoters; policy and wider society</td><td rowspan="4">-Present project's innovation
-Spread and publicize outcomes
-Study other business models
-Learn about front-line innovation
-Research market and competition
-Forge coalitions and partnerships</td></tr>
<tr><td>EIT Climate KIC Innovation festivals</td></tr>
<tr><td>Decision Making Under Deep Uncertainty (DMDU) Society meeting</td></tr>
<tr><td>Water Future Conference</td></tr>
<tr><td>IWRA World Water Congress</td><td rowspan="5">decision makers, public authorities and agencies, academic community, civil society organizations, funders</td><td rowspan="5">-Disseminate project outputs: transformational innovation, value assessment, market research, labs.
-Establish collaboration
-Identify and define 2+ inspiration water laboratories (WP5)</td></tr>
<tr><td>European Climate Change Adaptation (ECCA) conference</td></tr>
<tr><td>WASAG Network meetings</td></tr>
<tr><td>IAHS' Conference on Sociohydrology</td></tr>
<tr><td>IWREC meeting (organizers)</td></tr>
</table>

Stakeholder training and courses

Our communication and dissemination activities will include the training of *transformation agents* that ignite and catalyze transformational adaptation strategies to water scarcity, including (young) scientists and stakeholders. Among the **stakeholders**, we will train public servants and policy makers, entrepreneurs and climate innovators. To this end, we will collaborate with WASAG, SWIM H2020 and DG NEAR WES training networks, as well as other training initiatives established at the consortium partners' organizations. For example, GPAI offers interdisciplinary stakeholder training in the Arab and African regions through collaborations with international organizations such as USAID, FAO, ICARDA, and IWMI; INRAE and CMCC, as partners of the Climate-KIC, participate in the Pioneers into Practice programme consisting of bespoke transitions thinking and systems innovation mentoring delivered through a structured workshop programme and online training; while USAL organizes biannual training events on sustainable growth and adaptation to entrepreneurs and innovators through its Interdisciplinary Business Institute, to which the USAL team is affiliated. We will also organize training events back-to-back international science-policy workshops to build the capacity of transformation agents to integrate the value of transformational adaptation into river basin planning. Legacy options to deliver this training beyond the project lifetime will be explored with partners and SWIM H2020 and DG NEAR WES.

Consortium partners also coordinate a number of postgraduate courses on water resources management taught in English and local languages, where the cutting-edge knowledge and methods developed in TALANOA-WATER will be further disseminated, and relevant stakeholders within the project network engaged. These include, i.a., the MSc programmes on *Irrigation*, *Food Safety*, *Food Security* and *Agricultural Economics* (AUB); the MSc programmes in *Gestion Durable des Ressources en Eau* and *Fonctionnement et Gestion des Ecosystèmes Aquatiques* (INAT); or the MSc on *Ingeniería y Planificación Integrada de Sistemas Hídricos* and the MBA and Executive Master on *Management of Agri-food businesses* (USAL).

Academic training, including summer/winter schools

The training of transformation agents in the scientific arena will be articulated through in-house academic programmes and facilities and summer/winter schools. Consortium partners coordinate postgraduate programmes on the management of water scarcity and climate change, including i.a. the PhD programmes on *Science and Management of Climate Change* and *Ecology and Climate Change* at CMCC; the PhD programmes on *Economie Rurale et Développement* and *Génie Rural Eau et Forêt* at INAT; or the PhD programme on *Environmental and Water Resources Engineering* at AUB. Consortium partners also organize regularly Summer and Winter Schools for young scientists and practitioners. As examples of the many summer and winter schools organized by consortium partners, the CMCC frequently organizes summer and winter schools for PhD students, such as the Summer School on Adaptation Policies and Practices in the Mediterranean Basin. Building on this relevant expertise, we will organize throughout the lifetime of the project **two Summer/Winter Schools**.

3. Implementation

3.1 Work plan — Work packages, deliverables

3.1.1 Overall structure of the work plan

The project structure is simple and effective, and drawn upon the vast collective experience of Consortium partners. The workflow is aligned with project's objectives, and supportive of fulfilling the project's expected impacts. The project has six workpackages (WPs), each consisting of several, well-designed tasks. All WPs are equipped with adequate resources that are proportional to the tasks. The contribution of various Consortium partners has been planned by matching the tasks with the skills needed, while preserving balance of roles and creating a good platform for teamwork among partners. Each WP has a designated lead organization. In addition, a designated co-lead organization will support the WP leader in planning and supervising the WP research and innovation activities. This choice reflects the interdisciplinary, intersectoral and multi-regional (including partners and private and public stakeholders from North Africa, the Middle East and Europe) character of the project. The WP leader maintains the sole responsibility for the scope of the management and decision making rules laid down in Section 3.2.

The project is structured in four thematic workpackages (WP1-4), complemented by exploitation, dissemination and communication activities (WP5), and coordination and management (WP6).

The **WP1 (ENGAGE –** *Stakeholder Platform and Talanoa Dialogue*) is project's vehicle for engagement, consultation and collaboration with a range of stakeholders. WP1 will bring together relevant stakeholders from pilot water laboratories, including public authorities and policy makers, users' associations, industry, scientists and civil society organizations; engage them in the Talanoa Dialogue; and co-generate relevant, targeted knowledge.

The **WP2 (DATA -** *Data gathering and water accounting*) will collect, process and harmonize data from existing climate, hydro(geo)logic, agronomic, microeconomic and macroeconomic datasets; and gather, process and harmonize remote sensing data and produce reliable water accounting metrics.

The **WP3 (MODELING -** *Actionable socio-hydrology science*) will develop an innovative, replicable and flexible multi-system modeling framework that represents two-way feedbacks among systems. Modules used in the framework will include cutting-edge climate, hydro(geo)logic, agronomic, micro- and macro-economic models, calibrated and validated for pilot water laboratories. Modules and protocols can be changed according to the specificities of the pilot water laboratories and following feedback from stakeholders. We will thoroughly sample uncertainty through ensemble experiments (multi-scenario, multi-model, perturbed physics).

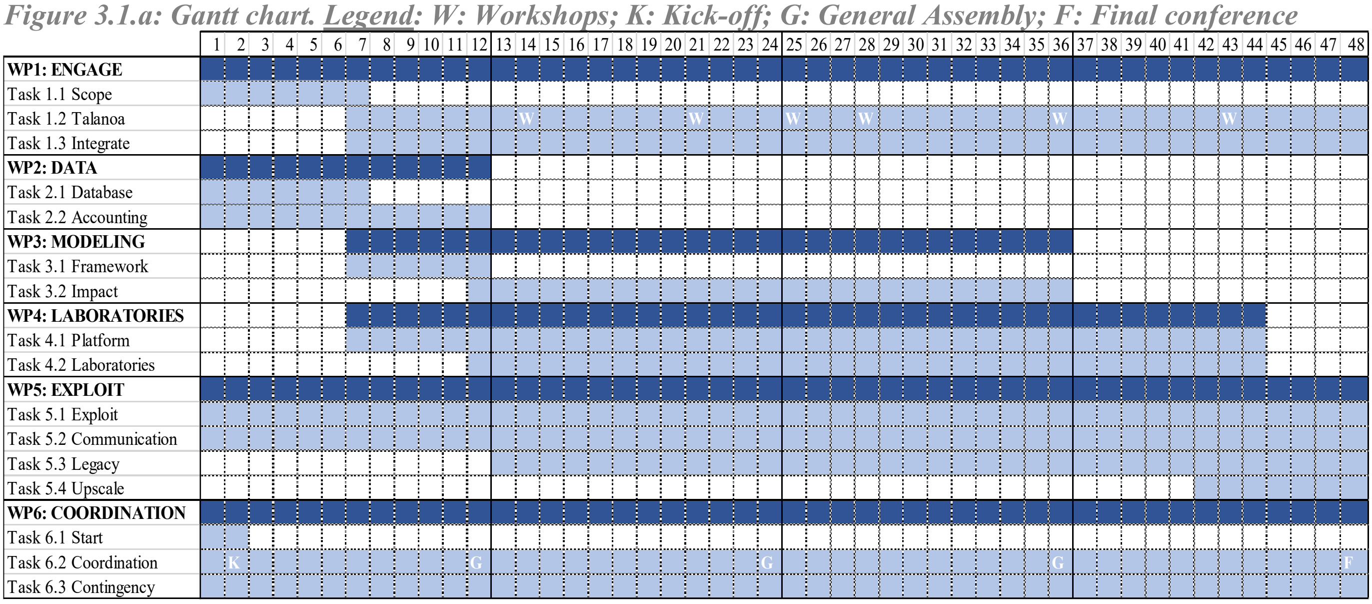
The **WP4 (LABORATORIES -** *Pilot water laboratories*) is dedicated to the implementation of the ecosystem of innovation developed in WP1-3 in each of the six pilot water laboratories. For each water laboratory, WP4 will identify robust transformational adaptation strategies, assess obstacles to their implementation, and explore and recommend policy, legal and/or regulatory changes towards the sustainable adoption of transformational adaptation strategies.

The **WP5 (EXPLOIT -** *Exploitation, dissemination and communication*) will implement a range of activities enabling an effective exploitation, dissemination and communication of TALANOA-WATER methods and results. Together with WP1, the WP5 will work towards improving awareness of value comprised in a knowledgeable deployment of transformational adaptation, contributing to its greater uptake. To this end, WP5 will oversee the preparation and implementation of the Plan for the Exploitation and Disemination of Results (PEDR) and Communication Strategy and Plan (CSP), develop and supervise the Data Management Plan and the Intellectual Property Rights (IPR) agreement, develop and execute dissemination and outreach strategy, and explore the extension and sustainability of the ecosystem of innovation through legacy and upscale actions.

The **WP6 COORDINATION -** lead: USAL, co-lead: AUB) will be devoted to project coordination and management, progress monitoring, periodic review, identification of risk of underachievement and contingency planning and internal communication among the Consortium partners. WP6 will ensure sound legal, contractual, financial and administrative management of the project, in compliance with the contractual obligations, good management practices and the provisions of the Consortium Agreement.

3.1.2 Timing of the different work packages and their components

Figure 3.1.a: Gantt chart. Legend: W: Workshops; K: Kick-off; G: General Assembly; F: Final conference



3.1.3 Detailed work description

Table 3.1a: List of work packages

WP Nº	Work Package Title	Lead Par-ticipant No	Lead Participant Short Name	Person-Months	Start Month	End Month
1	**ENGAGE –** *Stakeholder Platform and Talanoa Dialogue*	**7**	**GPAI**	**55**	**1**	**48**

2	**DATA** - *Data gathering and water accounting*	**2**	**AUB**	**42**	**1**	**12**
3	**MODELING** - *Actionable socio-hydrology science*	**1**	**USAL**	**90**	**7**	**36**
4	**LABORATORIES** - *Pilot water laboratories*	**4**	**INRAE**	**194**	**7**	**44**
5	**EXPLOIT** - *Exploitation, dissemination and communication*	**3**	**CMCC**	**46**	**1**	**48**
6	**COORDINATION**	**1**	**USAL**	**20**	**1**	**48**
				447		

Table 3.1b: Work package description

Work package number	1	**Lead beneficiary**		**GPAI**		
Work package title	ENGAGE (*lead: GPAI/Omar Khalid, co-lead: GECOsistema/Stefano Bagli*)					
Participant number	1	2	3	4	5	6	7
Short name of participant	**USAL**	**AUB**	**CMCC**	**INRAE**	**INAT**	**GECO**	**GPAI**
Person months per participant	4	4	4	4	5	10	24
Start month	M1		**End month**	M48			

Objectives
(1) Set up, manage and assist the Stakeholder Platform that will enable stakeholders to contribute to the design and implementation of TALANOA-WATER;
(2) Design and facilitate the Talanoa Water Dialogue among relevant stakeholders, so to stimulate collaboration, share stories and exchange points of view, co-generate research and knowledge, and build consensus;
(3) Share knowledge produced within and outside the project so to stimulate peer learning and partnership building within the consortium and beyond, and assist in the exploitation and dissemination of project results in WP5.

Description of work

WP1 is the project's vehicle for engagement, dialogue, collaboration and co-generation with a range of stakeholders with a shared interest in addressing the challenge of growing water scarcity under climate change. WP1 will bring together representatives from public authorities and policy makers, users' associations, industry, scientists and civil society organizations. The designated *stakeholder engagement and impact champions* (task 1.3) will ensure that the TALANOA-WATER Consortium responds to issues and scientific knowledge demands arising from the Stakeholder Platform.

Task 1.1 SCOPE: Defining the scope, composition, and working procedures of the Stakeholder Platform and Talanoa Dialogue (months 1 – 7) (*lead:* **CMCC**, *co-lead*: **GPAI**; *contributors*: USAL). Task 1.1 (T1.1) will elaborate terms of reference (ToR) covering the scope, composition, working rules and technical support of the Stakeholder Platform and the Talanoa Water Dialogue. We will identify additional relevant stakeholders to those in Table 1.3.b through stakeholder mapping. The Stakeholder Platform will comprise 6 local stakeholder platforms focusing each in one pilot water laboratory. Each of the 6 local stakeholder platforms will nominate leaders and rapporteurs among stakeholders. Each local stakeholder platform will have a *lab scientific coordinator* that corresponds to the water lab coordinator in T4.2, namely: AUB for the Lebanese lab; INRAE for the French lab; GPAI for the Egyptian lab; CMCC for the Italian lab; INAT for the Tunisian lab; and USAL for the Spanish lab. The participation of the Consortium partners, notably CMCC, in the science and technology platforms set-up by the United Nations Framework Convention for Climate Change (UNFCCC) will be instrumental in bringing the necessary expertise to develop a successful Talanoa Water Dialogue.

Task 1.2 TALANOA: Talanoa Water Dialogue (months 7 – 48) (*lead:* **GPAI**; co-lead **GECOS**, *contributors*: all partners). The Talanoa Water Dialogue will underpin the development, implementation and further advancement of transformational adaptation through co-generation approach, including co-design, co-development, co-evaluation, co-identification and co-implementation phases. Throughout the project we will organize 4 annual science-policy workshops per pilot water laboratory with the local stakeholder platforms; and 2 international science-policy workshops involving leaders and rapporterus from all pilot water laboratories. GPAI and INAT will facilitate the international science-policy workshops; while lab scientific coordinators will facilitate annual science-policy workshops in the 6 pilot water laboratories. The objectives and timing of the workshops are described in table 2.2.b. Workshops 2 to 4 will include a serious game towards building trust and consensus. Complementary to the workshops we will facilitate in person and online meetings to consolidate engagement.

Task 1.3 INTEGRATE: Knowledge sharing and incorporation (months 7-48) (*lead:* **GECOS,** *co-lead:* **GPAI**, *contributors*: USAL, INAT). Each WP will identify designated stakeholder engagement and impact champions to ensure that the project Consortium takes into account and responds adequately to the recommendations and suggestions from the Stakeholder Platform and Talanoa Dialogue in the pilot water laboratories. These champions are a key mechanism within TALANOA-WATER for the partners to prepare for and follow-up from the Talanoa Dialogue, encouraging knowledge sharing, peer-learning and the incorporation of relevant innovations and developments. The impact champion team will meet 3 months before and 1 month after each science-policy workshop using web meeting/conferencing tools.

Deliverables
D1.1 Terms of Reference for the Stakeholder Platform and Talanoa Dialogue (Month 7).
D1.2 Talanoa Dialogue report I (Month 12).
D1.3 Talanoa Dialogue report II (Month 24).
D1.4 Talanoa Dialogue report III (Month 36).
D1.5 Talanoa Dialogue report IV (Month 48).

Work package number	**2**	**Lead beneficiary**		**AUB**		
Work package title	**DATA** (*lead: AUB/Hadi Jaafar, co-lead: INRAE/Nina Graveline*)					
Participant number	1	2	3	4	5	6	7
Short name of participant	**USAL**	**AUB**	**CMCC**	**INRAE**	**INAT**	**GECOS**	**GPAI**
Person months p. participant	7	11	-	7	7	5	5
Start month	M1			**End month**	M12		

Objectives
(1) Gather, process and harmonize a comprensive and transparent database from available hydrologic, economic, agronomic and climate data sources to support the setup of the modeling framework and simulations.
(2) Use open access remote sensing data and remote sensing data processing techniques to conduct a systematic water accounting analysis and produce estimates of water use.

Description of work

WP2 will gather, process and harmonize the necessary data to apply the methods fielded by TALANOA WATER. We will develop a comprehensive water accounting exercise to obtain robust estimates of water use. Water use estimates will be complemented with hydrologic, economic, agronomic and climatic data needed for calibrating and running simulations with the multi-system modeling framework.

Task 2.1 DATABASE: Hydrologic, micro-, macro-economic, agronomic and climatic database (months 1-7) (*lead:* **INRAE,** *co-lead:* **INAT**, *contributors*: GECOS, AUB, GPAI, USAL). We will gather, process and harmonize the hydrologic, micro-, macro-economic, agronomic and climatic data necessary to calibrate, validate, couple and run simulations with the modeling framework in WP3. A thorough *ex-ante* review has been conducted to assess and verify data availability at each system level across the 6 water laboratories.

Task 2.2 ACCOUNTING: Comprehensive water accounting estimates of water use (months 1-12) (*lead:* **AUB,** *co-lead:* **INRAE**, *contributors*: INAT, GPAI, USAL). We will rely on remote sensing products providing information on components such as precipitation and evapotranspiration to produce estimates on the disposition of available resources across the 6 water laboratories. Our water accounting framework will follow the widely accepted fractions approach, which makes a distinction between beneficial and non-beneficial and consumptive and non-consumptive uses of water (Willardson et al., 1994). Water accounting estimates will be produced leveraging on FAO's WaPOR tool. We will use programming tools (including open-source Python tools made available by FAO, https://github.com/wateraccounting/) to automate the collection of open-access remote sensing data and computation of water accounting sheets. Thorough quality controls of associated spatial data components will be conducted. Throughout the process we will leverage on the relevant expertise from partners, including AUB (WP2 leader), which implemented WaPOR in the Litani Catchment. Water accounting data produced in TALANOA-WATER will be used to inform the design of scenarios and BDCs; and will underpin informed and transparent transformational adaptation while avoiding unintended consequences (e.g. rebound effects).

In the Litani Catchment water lab where accounting estimates are already available, we will provide the first validation of WaPOR in the region, including: i) validation of the actual evapotranspiration (i.e. consumption) estimated in WaPOR using field experiments for major crops (e.g. potato and wheat); ii) validation of biomass estimates of WaPOR on these crops by collecting above-ground, below ground, and yield data from the fields over which we will determine the actual evapotranspiration; and iii) use the output from the above tasks to tailor the WaPOR data for local conditions.

Deliverables
D2.1 Hydrologic, micro-, macro-economic, agronomic and climatic database – sourcebook (Month 7).
D2.2 Water Accounting database – sourcebook (Month 12).

Work package number	**3**	**Lead beneficiary**		**USAL**		
Work package title	**MODELING** (*lead: USAL/C.D. Pérez-Blanco , co-lead: CMCC/J. Mysiak*)					
Participant number	1	2	3	4	5	6	7
Short name of participant	**USAL**	**AUB**	**CMCC**	**INRAE**	**INAT**	**GECOS**	**GPAI**
Person months per participant	23	6	18	17	18	-	8
Start month	M7			**End month**	M36		

Objectives
(1) Develop interdisciplinary understanding of current state of modeling of water scarcity under climate change.
(2) Develop a multi-system, multi-model ensemble framework using a protocol-based modular approach.
(3) Quantify the economic and environmental impact of transformational adaptation, considering multiple scenarios and model settings (i.e. uncertainty sampling).

Description of work

WP3 is the 'cradle' for the interdisciplinary teamwork of the entire consortium. We will collectively scrutinize and consolidate shared understanding and knowledge of key concepts; develop, revise and refine the multi-system modeling framework; and conduct simulations to assess impacts of transformational adaptation under climate and socioeconomic scenarios.

Task 3.1 FRAMEWORK: Multi- system modeling framework (months 7 – 12) (*lead:* **USAL**, *co-lead*: **CMCC**; *contributors*: AUB, INAT, INRAE). Task T3.1 will build the multi-system, multi-model ensemble framework using a protocol-based modular approach. *Modularity* means models at each system level will be run independently in modules; and then connected through sets of *bidirectional protocols*, which are defined as rules designed to manage interrelationships (i.e. two-way feedbacks) among systems' modules (Csete and Doyle, 2002). Modules will be populated with models that have been used in cutting-edge ensemble experiments at the level of each relevant system, including the EURO-CORDEX ensemble experiment in the climate module; the HEPEX ensemble experiment (coordinated by INRAE during 2014-2018) in the hydrological module; the ISIMIP ensemble experiment in the agronomic module; mathematical programming ensembles in the microeconomic module (e.g. Sapino et al., 2020); and Computable General Equilibrium (CGE) and Input Output (IO) modeling ensembles in the macroeconomic module (e.g. Koks et al., 2015). We will leverage on partners' sub-national macroeconomic models (e.g. CMCC's ICES) calibrated at the regional scale or below (NUTS2-3) to produce a more accurate and detailed coupling with physical models and microeconomic models. Through co-development (WP1), we will work alongside stakeholders in pilot water laboratories to explore the relevant models to be included in each module, identify critical parameters and conduct sensitivity analyses, etc. The detailed analysis in the full-fledged multi-system modeling framework above will be complemented with a *rapid assessment* option that uses a simplified version of the modeling framework to process multiple scenarios and transformational adaptation strategies within a computational time that is acceptable for workshop deliberations. Rapid assessments make possible to run multiple stock-taking iterations during a single workshop, thus allowing for a rapid response to stakeholders feedback and demands. The rapid assessment option will be used during exploratory workshops (workshops 1-4, see Table 2.2.b); and to support interactive tools for decision-making applications (e.g. serious game). It is stressed that the use of rapid analysis is mostly only appropriate, and will be limited, to the exploratory workshops (workshops 1-4). Workshops 5-6 will entirely rely on simulation results from the full-fledged modeling framework.

Task 3.2 IMPACTS: Modeling transformational adaptation impacts on human and water systems (months 12 – 36) (*lead:* **CMCC**, *co-lead*: **INAT**; *contributors*: USAL, AUB, INRAE, GPAI). Task T3.2 will use the multi-system modeling framework above to quantify and map the impact of transformational adaptation strategies on human and water systems under future change scenarios. We will produce, across water laboratories and over time, indicators of: a) quantitative and qualitative status of water bodies, including surface and groundwater bodies (runoff, aquifer recharge, etc.); b) resilience of water bodies to environmental and socioeconomic change, including episodic events such as droughts; c) impact on water users, including irrigators and hydropower and cooling, industry, households, and others, through indicators of water use, employment and income and its distribution; and d) indirect impacts (e.g. agro-industry) through indicators of production, prices, trade and employment of production factors in both the water laboratory and the surrounding areas, calculated with the use of macroeconomic models. For each transformational adaptation strategy modeled, we will consider multiple relevant scenarios and model settings to thoroughly sample uncertainty.

Deliverables
D3.1 Methodological sourcebook of the multi-system, multi-model ensemble framework (month 12).
D3.2 Intermediate database of simulations and sourcebook (month 24).
D3.2 Final database of simulations and sourcebook (month 36).

Work package number	4	**Lead beneficiary**		**INRAE**			
Work package title	**LABORATORIES** (*lead: INRAE/Nina Graveline, co-lead: INAT/I. Nouiri*)						
Participant number	1	2	3	4	5	6	7
Short name of participant	**USAL**	**AUB**	**CMCC**	**INRAE**	**INAT**	**GECOS**	**GPAI**
Person months per participant	31	27	17	41	37	8	33
Start month	M7			**End month**	M44		

Objectives
(1) Design, realize and demonstrate institutional and technical feasibility and performance of a transition towards sustainable and inclusive growth in 6 pilot water laboratories representative of major ecosystem types and legal, political and regulatory systems across the Mediterranean.
(2) Design, test and inform the adoption of robust transformational adaptation strategies capable of achieving inclusive growth within sustainable water use limits.
(3) Develop and validate a portfolio of multi-sector and multi-stakeholder partnerships and innovative financial mechanisms to catalyze sustainable implementation of transformational adaptation strategies in the water labs.

Description of work

WP4 will apply the ecosystem of innovation developed in WP1-3 across the six pilot water laboratories. WP4 will generate new evidence and knowledge on how transformational adaptation strategies can achieve inclusive and sustainable growth, and quantify the costs and benefits of their implementation. WP4 will assess obstacles and feasibility of transformational adaptation, and recommend appropriate changes to legal, policy and/or regulatory frameworks for adopting and maintaining transformational adaptation.

Task 4.1 PLATFORM: Platform for coordinated and harmonized implementation of the ecosystem of innovation in water laboratories (months 7-44) (*lead* **INRAE**, *co-lead*: **INAT**; *contributors*: USAL, AUB, GPAI). Task T4.1 will guide, oversee and facilitate the implementation of TALANOA-WATER ecosystem of innovation (WP1-3) in the pilot water laboratories. We will follow an identical guidance (D4.1) for each pilot water laboratory consisting of sub-tasks (ST). The table below describes the ST; and maps the elements of the ecosystem of innovation (WP1 to 3) onto the relevant ST. All task partners will participate in every ST.

ST No.	**Title**	**Description**	**Relevant element of WP1-3**	**M**

	ST4 .1.1	Getting started	Research and assessment objectives will be agreed, along with analytical methods. Guidance will be produced.	WP1	7-11
Iterative (stock-taking process)	ST4 .1.2	Scena-rios	Future scenarios will be laid down. EURO-CORDEX and its regional climate model simulations will be used for the RCPs (representative concentration pathways). We will use SSPs (shared socio-economic pathways) for demographic changes and economic development, and land use scenarios for the Mediterranean region, including amended by a sensitivity analysis of their key parameters co-designed along stakeholders. These inputs will be used to force the modeling framework in WP3 and generate a baseline (conventional adaptation/no adaptation).	WP1—co-design WP2 WP3	12 - 36
	ST4 .1.3	Sustaina-ble water use limits	*Basin Determined Contributions* (BDCs) capable of restoring the supply-demand balance in overallocated basins under future scenarios will be designed	WP1—co-design WP2	12 - 36
	ST4 .1.4	Strate-gies	Design of *transformational adaptation strategies* capable of achieving BDCs targets through the combination of i) nature-based solutions, ii) technological innovation and water/climate services, iii) risk management and financing instruments and iv) economic and behavioral incentives. Investment costs of the strategy assessed.	WP1—co-design	12 - 36
	ST4 .1.5	Impacts & trade-offs	We will model the impact of transformational adaptation strategies under future scenarios and BDCs. We will assess changes in relevant indicators such as runoff, aquifer recharge, income and its distribution, etc. and compare impacts to costs of the strategy; sample uncertainty; assess tradeoffs; and compare performance to baseline (conventional/no adaptation).	WP1—co-develop, co-evaluate WP2 WP3	12 - 36
	ST4 .1.6	Robust decision-Making	Identify, for each lab, a *robust* adaptation strategy that contributes to IWRM objectives. Decision-making will be based on a combination of simulation results (mechanistic outputs) and *ad-hoc* interpretations of stakeholder experience that are applied to speculate upon the consequences of adaptation strategies (heuristics).	WP1—co-identify	12 - 36
Sequential	ST4 .1.7	Proof of concept	Preferred robust adaptation strategies will be assessed in depth, and analyzed in terms of regulatory and other obstacles, feasibility and support from the involved institutions. Business plan drafted.	WP1—co-implement	37 - 39
	ST4 .1.8	Brea-king ground	The practical implementation of the preferred strategy will in some cases necessitate sequential and transitory implementation. We will address actions needed to unfold the strategy in practice, including partnerships and novel financial mechanisms (e.g. fiscal incentives) to secure sustainable investment into transformational adaptation; and explore possible implementation drawbacks.	WP1—co-implement	40 - 41
	ST4 .1.9	Synthesis & recomm	The final step will summarize lessons learned, reflect about the transferability, and which risks to consider when designing similar schemes elsewhere. Draft business plan updated (input for D5.6).	WP1—co-implement	42 - 44

We will organize web meetings every two months to review progress in the water laboratories and to identify and help managing salient scientific and management risks. In person meetings with Consortium partners, rapporteurs and lead stakeholders from *all* water laboratories will be held in two international science-policy workshops (months 25 and 43). Halfway through the WP we will conduct an internal mid-term review through the High Level External Advisory Board (HLEAB) (month 24), organized side-to-side with the project's General Assembly (see WP6). This event will be open to the wider scientific community including representatives from international research projects with complementary research scope and objectives (including partner PRIMA projects retained for funding under relevant calls). We will also organize knowledge sharing webinars in collaboration with WP5.

Task 4.2 LABORATORIES: Pilot water laboratories (months 12-44) (*lead* **INAT**, *co-lead*: **INRAE**; *contributors*: all partners). Task T4.2 will implement the ecosystem of innovation across the six pilot water laboratories, following guidance from T4.1. By engaging closely with the Stakeholder Platform through Talanoa Dialogue (WP1) and fluent interaction and exchange with the modeling exercise in WP3, Task T4.2 will help (i) move from concept to practice in operationalizing transformational adaptation; (ii) understand how various transformational adaptation strategies contribute to mitigate water scarcity impacts under various scenarios, and the uncertainty associated; (iii) identify robust transformational adaptation strategies; and iv) explore options towards the adoption of transformational adaptation strategies. T4.2 comprises six sub-tasks (ST), one for each pilot water laboratory (see Table 1.3.a). Each laboratory will follow the guidance and ST in T4.1.

ST No.	Title	Participants	Months
ST 4.2.1	Lower Nile River Basin, EG	All partners led by GPAI	12-44
ST 4.2.2	Po River Basin, IT	All partners led by CMCC	12-44
ST 4.2.3	Hérault Department, FR	All partners led by INRAE	12-44
ST 4.2.4	Upper Litani Catchment, LE	All partners led by AUB	12-44
ST 4.2.5	Cega Catchment, ES	All partners led by USAL	12-44
ST 4.2.6	Jeffara Catchment, TU	All partners led by INAT	12-44

Deliverables
D4.1 Guidance document shared across the six pilot water laboratories (month 11).
D4.2 Mid-term water laboratories assessment report (ST1-6, iterative *stock-taking* process) (month 36).
D4.3 Report comprising results from ST7-8 and draft business plan (Month 41).
D4.4 Options paper for stakeholders (focus on potential end-users) to support the integration of transformational adaptation into their decision making processes, based on the results of D4.2-4.3 (Month 43).
D4.5 Final water laboratories synthesis report (Month 44).

Work package number	5	**Lead beneficiary**		CMCC		
Work package title	**EXPLOIT** (*lead: CMCC/J. Mysiak, co-lead: GPAI/O. Khalid*)					
Participant number	1	2	3	4	5	6	7
Short name of participant	**USAL**	**AUB**	**CMCC**	**INRAE**	**INAT**	**GECOS**	**GPAI**
Person months per participant	7	2	9	1	3	9	15
Start month	M1			**End month**	M48		

Objectives
(1) Design and monitor the Plan for the Exploitation and Disemination of Results (PEDR); Data Management Plan (DMP); and Intellectual Property Rights agreement (IPR).
(2) Design and monitor the Communication Strategy and Plan (CSP).
(3) Develop communication platforms and instruments, design high-quality communication products and ensure their effective dissemination.
(4) Explore legacy strategies.
(5) Identify the extent to which current legal, policy and regulatory frameworks in Mediterranean countries enable large-scale implementation of transformational adaptation; and explore reform options for addressing barriers.

Description of work

WP5 is devoted to exploitation, dissemination and communication activities. WP5 will oversee the preparation and implementation of Plan for the Exploitation and Disemination of Results (PEDR) and Communication Strategy and Plan (CSP), develop and supervise the Data Management Plan (DMP) and the Intellectual Property Rights (IPR) agreement, develop and execute dissemination and outreach strategy, and explore the extension and sustainability of transformational adaptation strategies and the TALANOA-WATER ecosystem of innovation through legacy and upscale actions.

Task 5.1 EXPLOIT: Strategic direction of the PEDR and IPR management plan (months 1 – 48) (*lead:* **USAL**, *co-lead*: **CMCC**; *contributors*: all partners). Task T5.1 will develop, oversee and ensure execution (and annual revision) of the project's PEDR, DMP and the IPR agreement. We will overview the transfer and dissemination of the background knowledge and actively encourage, while fully respecting the agreed IPR rules, the wider reuse and exploitation of the original foreground generated throughout the project execution. As preferable dissemination channels we will sign agreements with the FAO Aquastat and WaPOR portals, EEA data and Climate Adapt portals. Throughout the project life span we will cooperate with the Climate KIC, European Innovation Partnerships (e.g. EIP Water), and other entities with the aim to ensure our data and tools catalyze transformational responses.

Task 5.2 COMMUNICATION: Communication Strategy and Plan (months 1 – 48) (*lead:* **CMCC**, *co-lead*: **GPAI**; *contributors*: all partners). Under this task we will develop, oversee and ensure execution (and annual revision) of the CSP. The Plan will extend the target stakeholders and scrutinize their knowledge needs, so as to guide the dissemination activities. The measures to maximize the impacts of the dissemination will be specified in detail, including a list of the indicators to monitor their success, and a dedicated impact champion (see WP1). We will use four lines of communication (Section 2.2.b): (i) Website, mobile app, YouTube, social media and other online communication (including virtual meetings and webinars) through the Water Agora hub; (ii) publications, notably scientific articles and working-papers, as well as leaflets, brochures, newsletter, and policy briefs; (iii) science-policy workshops, outreach events and other meetings; and (iv) stakeholder and academic training. The formats, language and focus of the dissemination products will be accessible to different communities of stakeholders, including potential end-users.

Task 5.3 LEGACY: Project's legacy and extension of the ecosystem of innovation beyond the project life-span (months 13 – 48) (*lead:* **GPAI**, *co-lead*: **CMCC**; *contributors*: USAL, , GECOS, INAT). Task T5.3 will explore sustainability of the TALANOA-WATER ecosystem of innovation, prolongued (if not perpetual) archiving of project's outcomes (including data, papers, reports, deliverables), and continued (follow-up) research on synergies between transformational adaptation and sustainable and inclusive growth. TALANOA-WATER aims to preserve the ecosystem of innovation in 3+ (and up to 6) water labs and introduce it in 2+ inspiration water labs. To this end we will explore several legacy actions and strategies (see Section 2.2.a). The success of legacy strategies will be measured through a dedicated impact champion (see WP1). We will archive all project outcomes in lasting, open access digital repositories in accordance to the DMP (Section 2.2.a).

Task 5.4 UPSCALE: Synthesis and upscaling of key results and recommendations (months: 42-48), *lead:* **CMCC**, *co-lead*: **USAL**; contributors: INRAE). T5.4 will identify legal, policy and regulatory barriers and reform options to upscaling implementation of transformational adaptation strategies across Mediterranean countries. This work will be supported by (1) a compilation of the results, conclusions and recommendations obtained in WP1-4, and ST 4.1.9 in particular (D4.5), complemented with (2) a review of primary source material (including national and European treaties, directives, regulations and policy statements relating to water scarcity and climate change adaptation, green growth and environmental management; and international law and policy instruments applicable in Europe and Middle East and North Africa concerning these topics) and secondary source material (including academic or grey literature that summarizes, consolidates or analyzes relevant primary source material). We will identify barriers to large-scale transformational adaptation through: (1) qualitative desk-based mapping and interpretive analysis, designed to identify key normative features of relevant legal, policy and regulatory frameworks; and (2) iterative stakeholder consultation through the Stakeholder Platform and Talanoa Dialogue, designed to identify and synthesize stakeholder and expert opinion concerning legal, policy and regulatory barriers. The second international science-policy workshop will act as the focal point of stakeholder consultation in this context. Complementary stakeholder consultations will be conducted online.

Furthermore, T5.4 will develop in partnership with stakeholders a diverse and flexible suite of legal, policy and regulatory reform options to address the barriers identified above. The primary but not exclusive focus will be on reform options at national and EU-level, including policy development options available to relevant authorities in their areas of competence. We will seek opportunities to mainstream the assessment of barriers and reform options into national and supranational adaptation strategies/plans, as well as water resource management, disaster risk reduction, sustainable development, and ecosystem protection strategies. The assessment of barriers and reform options will also support us in the identification of 2+ inspiration water laboratories (input for T5.3). All the materials above will be synthesized into a Policy Notebook meant as a source book for policy and practice.

Deliverables
D5.1 Detailed and revised PEDR, CSP and IPR strategy (Month 6).
D5.2 Data management plan (Month 6)
D5.3 First 12-month exploitation, dissemination and communication report (Month 13).
D5.4 Second 12-month exploitation, dissemination and communication report (Month 25).
D5.5 Third 12-month exploitation, dissemination and communication report (Month 37).
D5.6 Final 12-month exploitation, dissemination and communication report, including business plan (Month 48).
D5.7 Policy Notebook (Month 48).

Work package number	**6**	**Lead beneficiary**	**USAL**
Work package title	**COORDINATION** (*lead*:*USAL/CD.Pérez-Blanco,co-lead*:*AUB/H. Jaafar*)		

Participant number	1	2	3	4	5	6	7
Short name of participant	USAL	AUB	CMCC	INRAE	INAT	GECOS	GPAI
Person months per participant	12	4	-	-	-	-	4
Start month	M1			End month	M48		

Objectives
(1) Ensure rapid initiation of the project and set up the management structure;
(2) Ensure sound and efficient coordination and management, in compliance with the Grant Agreement and the Consortium Agreement

Description of work

WP6 is devoted to project coordination and management; progress monitoring; periodic review, identification of risk of underachievement and contingency planning; internal communication among the consortium partners; and involvement of external advisory board. WP6 will organize and chair the annual General Assemblies and Project Steering Committee (PSC) meetings. It will maintain a close and constant contact with the High Level External Advisory Board (HLEAB) and ensure effective communication between PRIMA and the Consortium. The latter includes preparation of periodic reports and regular briefing of the PRIMA officer on the project development.

Task 6.1 START: Kick-off meeting, consortium agreement, inception report and roadmap, and initial implementation activities (months 1 – 2) (*lead* **USAL**, *co-lead*: **AUB**). From the onset, the project coordinator (PC) along with the WPs lead partner organizations will ensure a well-prepared and smooth start of project's activities. This will include conducting the negotiations with PRIMA and promptly respond to all requests towards signing and implementing the Grant Agreement; preparation of the Consortium Agreement (see Section 3.2); and preparation of the Inception Report (IR) and roadmap. The IR and roadmap will specify the roles and responsibilities of each partner within each task and work package. The period up to the release of the inception report will also allow for: (i) organizing the kick-off project meeting that will be held in Salamanca (Spain) at the premises of USAL, (ii) initiating the project management bodies (see Section 3.2) and making operational the HLEAB, and (iii) mobilizing the Stakeholder Platform (WP1). The IR will also provide additional details on the science-policy workshops. The IR and roadmap will be reviewed by the HLEAB.

Task 6.2 COORD: Project coordination and management (months 1 – 48) (*lead* **USAL**, *co-lead*: **AUB**; *contributors*: GPAI). The task 6.2 will assure strategic guidance, interdisciplinary exchange and internal communication within the Consortium, with the HLEAB and PRIMA. The activities will entail sound legal, contractual, financial and administrative management of the project, in compliance with the contractual obligations, good management practices and the provisions of the Consortium Agreement. This will include (1) representation of the Consortium in contact with the PRIMA project officer(s) (USAL) and various other scientific and policy bodies (USAL, AUB and/or GPAI); (2) oversight of ethical aspects, whenever they arise, and gender analysis and equality within the project; (3) monitoring the fulfilment of the project's targets and objectives (e.g. applying SDG6.5.1 survey instrument to stakeholders); (4) supervision and management of the tasks assigned to the Project Steering Committee (PSC); (5) fostering the involvement of the HLEAB; and (6) supervision of the Water Agora hub for an effective communication and information exchange among the project partners. A particular attention will be given to ensuring collaboration and exchange of information between WPs. T6.2 will organize annual General Assemblies that will be held at partners' premises in Salamanca (kick-off meeting, month 2), El Cairo (month 12), Paris (24), Tunis (36) and Beirut (final project conference, month 48). Back-to-back with the General Assemblies we will hold the meetings of the PSC.

Task 6.3 CONTINGENCY: Assessment of the risk of delays in the project and contingency planning (months: 1-48), *lead:* **USAL**, *co-lead*: **AUB**; contributors: GPAI). We will constantly monitor the implementation status of various tasks, in order to recognize the early manifestations of the implementation risks and issue a timely response to such contingencies. In these instances, contingency planning will be initiated. An *ex-ante* screening of risks that may endanger the attainment of research targets, and appropriate risk-mitigation measures, has been conducted by Consortium partners (see Section 3.2.4).

Deliverables
D6.1 Inception Report and roadmap (Month 2).
D6.2 1st 12-month Progress Report including reports from HLEAB, PSC and G. Assemblies (Month 12).
D6.3 2nd 12-month Progress Report including the reports from HLEAB, PSC and G. Assemblies (Month 24).

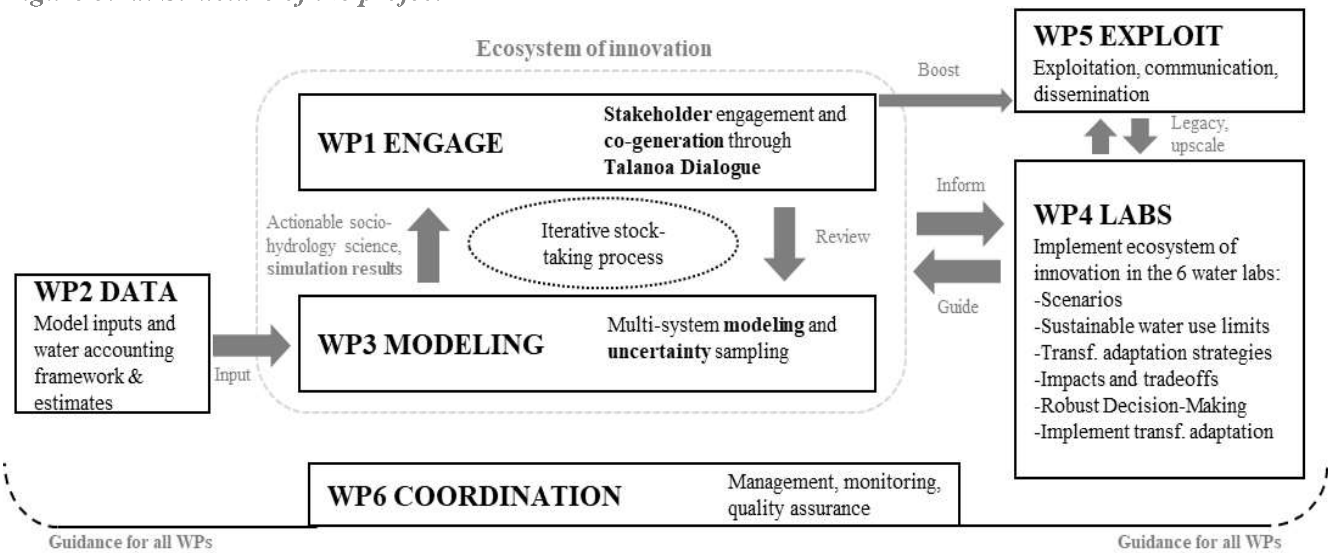
D6.4 3rd 12-month Progress Report including the reports from HLEAB, PSC and G. Assemblies (Month 36). D6.5 Final 12-month Progress Report including the reports from HLEAB, PSC and G. Assemblies (Month 48).

Table 3.1.c: List of Deliverables. Legend (as per Part II template): R: Document, report; PU: Public, fully open

Deliverable (number)	Deliverable name	WP number	Lead participant	Type	Dissemination	Month
D6.1	Inception Report and roadmap	WP6	USAL	R	PU	2
D5.1	Detailed and revised PEDR, CSP and IPR strategy	WP5	USAL	R	PU	6
D5.2	Data management plan	WP5	AUB	R	PU	6
D1.1	ToR for the Stakeholder Platform and Talanoa Dialogue	WP1	CMCC	R	PU	7
D2.1	Hydro, micro-, macro-economic, agronomic and climatic database	WP2	INRAE	R	PU	7
D4.1	Guidance document for pilot water laboratories	WP4	INRAE	R	PU	11
D1.2	Talanoa Dialogue report I	WP1	GPAI	R	PU	12
D2.2	Water Accounting database	WP2	AUB	R	PU	12
D3.1	Sourcebook of multi-system modeling framework	WP3	USAL	R	PU	12
D6.2	First 12-month Progress Report	WP6	USAL	R	PU	12
D5.3	First 12-month exploitation, dissemination and comm. report	WP5	CMCC	R	PU	13
D1.3	Talanoa Dialogue report II	WP1	GECOS	R	PU	24
D3.2	Intermediate database of simulations & sourcebook	WP3	USAL	R	PU	24
D6.3	Second 12-month Progress Report	WP6	USAL	R	PU	24
D5.4	Second 12-month exploitation, dissemination and comm. report	WP5	CMCC	R	PU	25
D1.4	Talanoa Dialogue report III	WP1	GPAI	R	PU	36
D3.3	Final database of simulations & sourcebook	WP3	USAL	R	PU	36
D4.2	Mid-term water laboratories assessment report	WP4	INAT	R	PU	36
D6.4	Third 12-month Progress Report	WP6	USAL	R	PU	36
D5.5	Third 12-month exploitation, dissemination and comm. report	WP5	CMCC	R	PU	37
D4.3	Report comprising results from ST7-8 and draft business plan	WP4	INRAE	R	PU	41
D4.4	Options paper	WP4	GPAI	R	PU	43
D4.5	Final water laboratories synthesis report	WP4	INAT	R	PU	44
D1.5	Talanoa Dialogue report IV	WP1	GECOS	R	PU	48
D5.6	Final 12-month exploitation, dissemination and comm. report	WP5	CMCC	R	PU	48
D5.7	Policy Notebook	WP5	CMCC	R	PU	48
D6.5	Final 12-month Progress Report	WP6	USAL	R	PU	48

3.1.4 Graphical presentation of the components showing how they inter-relate

Figure 3.1a: Structure of the project



3.2 Management structure, milestones and procedures

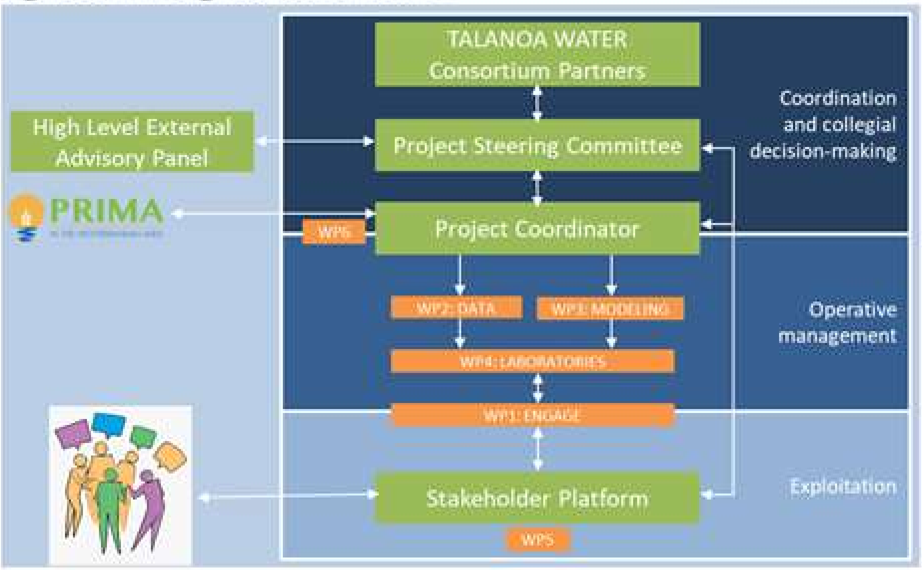
The TALANOA WATER Consortium comprises 7 partner institutions that are highly experienced in the implementation of international innovation projects, including EC Framework Programmes and H2020 and ERA-NET/JPI calls. The Consortium partners agreed on the management structure outlined below. The management organization and decision-making procedures reproduce best-established practice. They build upon the following management principles: 1) transparent and inclusive decision-making, involving all partners; 2) clear division of management roles and responsibilities; 3) systematic monitoring of project progress and effective response to emerging risks; 4) high emphasis on innovation, exploitation and dissemination at all levels and in all WPs, and effective engagement of stakeholders/end-users; 5) professional administration and compliance with all relevant EU and national regulations, and with the rules of scientific integrity and ethics of the water and climate services; and 6) thorough quality assurance management.

3.2.1 Organizational structure and decision-making

The management bodies below, the scope of their power, responsibilities, and working procedures will be described in full detail in the Consortium Agreement (CA). All partner institutions will undertake all reasonable efforts to promptly fulfil all obligations laid down in the Grant Agreement (GA) and the CA. This includes fulfilling all tasks to which they agreed to contribute, on time, and in accordance with the assigned management roles and tasks.

The management configuration is simple, clear, effective and responsive to possible implementation risks. The organization structure of TALANOA WATER is designed over three levels: 1) coordination and **collegial decision making**; 2) implementation and **operative management**; and 3) dissemination and **exploitation** (Figure 3.2.a).

Figure 3.2.a: Organization structure



The **Project Coordinator** (PC) is responsible for the overall project coordination and operative management of the TALANOA WATER innovation action. USAL assumed the role of PC and will act as the intermediary between Consortium partners and the PRIMA. USAL has successfully managed over 150 large international and European projects. For this project, USAL has appointed Dr Pérez-Blanco to perform all tasks of PC. Dr Pérez-Blanco will be assisted on an operative level by a **Project Manager** (PM), appointed by USAL. The PM will be responsible for day-to-day project management, supported by highly experienced personnel from the USAL's legal and accounting departments. The roles of the PC concerning the management and scientific coordination will include: 1) to manage the overall legal, contractual and administrative issues of the project, including the implementation of the CA and the Intellectual Property Right (IPR); 2) to administer financial flows and communication between PRIMA and the Consortium; 3) to ensure a timely delivery of periodic/final reports and deliverables; 4) to monitor the achievement of the milestones; 5) to chair the meetings of the Consortium bodies and convene extraordinary ones, whenever necessary; 6) to monitor the correct implementation of decisions of the Project Steering Committee (see below); 7) to facilitate communication and coordination among partners and project bodies (the PC will supervise the Water Agora hub, where progress tracking and document management will be conducted); 8) to oversee the organization of internal and scientific events planned during the project lifetime; 9) to oversee the communication, exploitation, and dissemination activities of the project.

The **Project Steering Committee** (PSC) is the central decision-making body of the TALANOA WATER project. It is a collegial body, composed of one representative from each project partner. The roles of the PSC include: 1) to decide on all budget-related matters, the acceptance of new participants, the exclusion of participants, and all the modifications of the Consortium Agreement; 2) to monitor and control the project work plan, progress and results, applying the appropriate rules on "intervention measures" in case of significant delays and/or breach of obligations; 3) to oversee the interplay between different research activities and ensure an efficient and effective information flow across the different WPs; 4) to monitor progress of the research in the WPs and inform the PC in case of delays; 5) to ensure a timely delivery of deliverables and the achievement of the milestones, in collaboration with the PC; 6) to ensure overall quality control of the project implementation, including ethical and gender issues, data management and critical risks implementation.

The **High Level External Advisory Board** (HLEAB) is responsible for monitoring the implementation and quality of the project work. Members of the board will be selected among internationally renowned experts with strong expertise and experience in water scarcity, climate change and adaptation policy. The role of the HLEAB includes: 1) to advise the consortium regarding direction, performance and results; 2) to support guidance of the stakeholder engagement, and ensure practical relevance of the project results; 3) to provide directions to the Talanoa Dialogue; 4) to participate in the General Assemblies and the international workshops, and provide feedback to the Consortium.

Table 3.2a: List of milestones

Nº	Milestone name	Related WP	Mo-nth	Means of verification
M1.1	Draft Terms of Reference	WP1	6	Distributed to members of Stakeholder Platform, available on project website
M1.2	First annual science-policy workshop	WP1	14	Science-policy workshop reports, including minutes and list of participants, available on the project website and mobile app
M1.3	Second annual science-policy workshop	WP1	21	
M1.4	First international science-policy workshop	WP1	25	
M1.5	Third annual science-policy workshop	WP1	28	
M1.6	Fourth annual science-policy workshop	WP1	36	
M1.7	Second international science-policy workshop	WP1	43	
M2.1	Multi-system database – beta version	WP2	6	Available on project website
M2.2	Water accounting database – beta version	WP2	11	
M.3.1	Draft sourcebook, multi-system model	WP3	11	Presented at the science-policy workshops; Available on the project website; Feedback received will be included as a part of workshops' report, including the presentation slides
M.3.2	Intermediate database of simulations – beta version	WP3	23	
M.3.3	Final database of simulations – beta version	WP3	35	
M.4.1	Draft guidance document	WP4	10	
M4.2	Draft water laboratories mid-term assessment report	WP4	35	
M4.3	Draft water laboratories synthesis report	WP4	43	
M5.1	Draft PEDR, CSP and IPR	WP5	5	Available on the project website and mobile app
M5.2	Draft of Third 12-month report – fundraising plan	WP5	36	
M5.3	Draft Policy Notebook	WP5	47	
M5.4	Water Agora hub launched – fully functional	WP5	4	Website and app accessible
M6.1	Kick-off meeting and CA	WP6	2	Kick-off meeting report

3.2.2 Appropriateness of the organizational structure and decision-making mechanisms to the complexity and scale of the project

The TALANOA WATER Consortium involves well-experienced institutions and many of them have worked together in the past. Each partner has clear responsibilities and defined roles, and this aspect will contribute to successfully achieve the project's objective. The organizational structure and the decision-making mechanism have been designed in a clear and simple way as to maximize effectiveness and impact while minimizing administrative burden. The appropriateness of TALANOA WATER management is ensured by 6 pillars:

Consortium Agreement (CA): The organisational structure and decision-making mechanism will be defined in detail in the CA, which will be signed by all participants, if the TALANOA WATER project will be funded by PRIMA. The CA will be defined in accordance with the H2020 DESCA model contract. The agreement will describe a) the internal organisation of the Consortium, the project's governance structures, responsibilities, tasks and obligations of the participants, decision-making processes and management arrangements, as laid down in the Grant Agreement with PRIMA; b) the distribution of the budget among the participants; c) a policy on publications, press releases and reports to PRIMA; d) liability and indemnification; e) provisions for the settlement of disputes within the partnership; f) management of the intellectual property rights.

Internal Communication: The PC, with the support of the PM, will implement transparent and continuous communication among management and advisory bodies. First, an interactive Water Agora hub with website and mobile app platforms will be set up in the first months of the project and support research, engagement, progress tracking and document management. Second, an adequate number of internal meetings of the management bodies will be planned during the life of the project. In particular, the kick-off meeting of the project will take place in

Month 2, and other four in-person General Assemblies will take place in month 12, 24, 36 and 48 (final project conference). The Project Steering Committee (PSC) meetings will be organized by USAL. Each PSC meeting will include a general review of the progress of the project as reflected in progress reports and project deliverables as well as a review of the implementation plan for the following project phase. Finally, virtual meetings, including conference calls and webinars, will be held. These will be particularly important for the efficient communication within WPs and tasks. The use of virtual meetings as well as back-to-back and side-to-side meetings with other project and community activities will help to reduce travel costs.

Decision-making mechanisms: The PC has the role of final arbiter throughout the entire project in all matters concerning project management and financial management/control. USAL will operate within the terms of the CA and with the support of the PSC to resolve issues or disputes. Decisions at the strategic project level are prepared by the PC and taken by the PSC.

Quality assurance and control: The quality of the deliverables will be assured by the partner leading each WP. When necessary, the WP leader can request support from other Consortium partners or the HLEAB. Internal and external (through WP1 Stakeholder Platform) peer reviews will ensure high quality standards of TALANOA-WATER deliverables. The PC will submit the deliverable once the expected quality is achieved. Key deliverables have been timed in order to allow for stakeholder feedback before final delivery. Finally, the PC, with the support of the PM, will continually assess the risk of delays in the project work plan in order to issue a timely response to such contingencies. In these instances, contingency planning will be initiated and presented to the PSC.

Knowledge Management: The partners have a collective responsibility to ensure that any knowledge generated through the project is appropriately protected and shared. The PC is responsible for the project's knowledge management strategy, ensuring it is kept up to date and that the associated protocols are adhered to. Knowledge management and intellectual property rights are addressed in full compliance of the rules identified by the H2020 Programme of the European Commission for Research. Project results will be open access and downloadable free of charge. The Consortium also envisions gold open-access publications in peer reviewed journals. Any dissemination activities and publications during the project, including the project website and mobile app, will (i) acknowledge that the project has received PRIMA/EU funding and (ii) display the PRIMA logo, as required by the program rules.

Gender: By signing the Grant Agreement, the Consortium will commit to promoting equal opportunities during the implementation of the project, and makes a commitment to achieve gender balance at all levels of staff assigned to the project, including at supervisory and management levels. The Consortium is aware of the importance of attracting, retaining and advancing high quality female scientific researchers and TALANOA WATER will ensure that where applicable it works to satisfy the Horizon 2020 objectives of gender balance and integration. Please also refer to Section 1.3 for more details.

3.2.3 Innovation management

The management of innovation process will be cultivated throughout the project implementation. Consortium partners are members of Climate-KIC (INRAE, CMCC) and Sustainable Water Future (USAL, INRAE, CMCC), and hence closely embedded in the innovation processes stirred by their various platforms. CMCC is provider of the Copernicus Climate Change Services (C3S) for the seasonal and decadal climate forecasts and Copernicus marine monitoring services, and acts as a centre of competence for the European Environment Agency (EEA). USAL hosts the renowned Interdisciplinary Business Institute, which focuses on science-industry and science-policy knowledge transfer. To exploit this potential, we will dedicate a half-a-day long session during project's science-policy workshops (WP1) to innovation conducive training, prototype demonstration, and collaborative dialogues with potential end-users. Moreover, the feasibility and consolidation of the transformational adaptation strategies and the water and climate services arising from our research (ecosystem of innovation) will be addressed in depth in the Stakeholder Platform workshops (WP1), where potential end-users will participate; and as part of tasks T5.1 (Exploit), T5.3 (Legacy) and T5.4 (Upscale). It is our objective to achieve, through this research, the sustainable adoption of the ecosystem of innovation in 3+ water laboratories; and its introduction in 2+ inspiration laboratories.

A further pathway for innovation will be explored through existing business networks of which we are members through the Consortium and through strategic stakeholders in the Stakeholder Platform (e.g. insurance). This will allow us to consider different innovation options and how they can be supported by TALANOA WATER results and ecosystem of innovation. Innovation management will be facilitated by research and discussions about the business case and strategy of the TALANOA WATER ecosystem of innovation in WP4 (ST7-9).

3.2.4 Critical risks of project implementation

We are aware that although this innovation project has been meticulously designed, a series of unfavourable events or issues may delay the implementation of the project's activities, or lead to only a partial realization of the envisaged impacts. Our risk and contingency strategy addresses the imaginable circumstances that may lead to these results, and contains preventive and corrective actions. We will constantly monitor the implementation status of various tasks, recognize the early manifestations of the implementation risks and adopt appropriate corrective measures to respond to them. Task T6.3 (Contingency) in WP6 has been designated for this purpose.

We have given special consideration to mobility restrictions due to the ongoing COVID-19 pandemic. WP1 and WP5 have been allocated 11.6% and 12.2% of the project resources to ensure fluent and continued engagement among partners and with stakeholders, also during mobility restrictions and eventual lockdown. We will build a dedicated Water Agora hub (see Section 2.2.b) to support fluent and thorough online communication; and to complement, and where necessary substitute, in-person meetings with online interaction. In all in person activities we will fully comply with the empirically tested COVID-19 health and safety protocols designed by partners; and make available the necessary resources to ensure safe in person interaction. Adequate contingency strategy has been planned to respond to different circumstances and degrees of mobility restrictions, thus providing ad-hoc solutions that adapt to the specific context of partners' and stakeholders' regions.

We have also considered several scenarios that account for political instability and institutional paralysis and explored the consequences for water laboratories. Countries in North Africa and the Middle East are experiencing critical economic and political challenges, and presently Lebanon faces internal stability problems. We believe this is no excuse for inaction; water scarcity already costs as much as 2.5% of GDP growth annualy in the region, a figure that can increase up to 6% by 2030. This makes water scarcity the *biggest* threat in the area, whose consequences will amplify current economic and political problems (2030 Water Resources Group, 2019); and this PRIMA call is one of the last opportunities to deliver transformational action that curbs down this trend before 2030. Developing and adopting the transformational adaptation strategies generated within the project in the Middle East and North Africa is a major high impact element in TALANOA-WATER, and a coherent and conscientious contingency planning has been adopted to respond to the challenge (see table 3.2.b).

All individual transformational adaptation options considered (Table 1.3.a) have been carefully identified building upon previous pilot innovation, research exercises, and leveraging on feedback from stakeholders and potential end-users in the Stakeholder Platform. Consortium partners and stakeholders are well knowledgeable about the opportunities, barriers and limits for the new and/or wide scale adoption of the adaptation options identified. Nevertheless the uncertainty associated with the simulations may not match the expectations or requirements of the stakeholders and potential end-users, or the TALANOA WATER-enabled ecosystem of innovation may encounter other insurmountable barriers in specific pilot water laboratories or stakeholder groups. We will pay high attention to quality assurance and uncertainty associated with TALANOA-WATER outcomes. We will employ multi-scenario, multi-model, perturbed physics ensemble experiments to characterize meticulously the divergence between system forecasts, and explore how the uncertainty propagates along the multi-system framework. We will make sure stakeholders, including potential end-users, unequivocally understand the various uncertainties and how they affect the decisions to be informed by the ecosystem of innovation. In the unlikely case that the intended transformational adaptation options considered cannot be further pursued, we will replace or aptly supplement them with other transformational adaptation options, chosen with the help of the WP1 Stakeholder Platform and the HLEAB and building on the Talanoa Dialogue principles. High attention will be paid to quality assurance, including internal (Stakeholder Platform, HLEAB, PSC, peer-to-peer) and external (publications in peer-reviewed papers, presentations in major conferences) review mechanism that ensure scientific rigor and methodological soundness.

Finally, we have considered contingencies related to stakeholder engagement. We have worked with and successfully engaged the relevant stakeholders in pilot laboratories in the context of previous research projects. These relevant stakeholders are fully committed to participate in the Talanoa Dialogue, and to contribute to the co-generation process and innovation pursued in the project. For the unlikely case that this commitment will be withdrawn for reasons beyond the control of the Consortium, for each pilot water laboratory we have identified alternative stakeholders/stakeholder representatives beyond those shown in Table 1.3.b, and they will be invited to join.

Table 3.2b: Critical risks for implementation

Description of risk (likelihood: Low/Medium/High)	**WP(s) involved**	**Proposed risk-mitigation measures**
Mobility restrictions (**High** but **manageable**)	WP1, WP6 and indirectly all WPs	• Online **Water Agora hub** (website, mobile app) that encompasses all channels of communication in the project, including live access to project workshops and meetings (see Section 2.2.b) • Partners from regions with mobility restrictions will participate in international workshops and project meetings through the agora

		• Local workshops have been timed so that they can be postponed up to 6 months in the event of lockdown/prohibition on stakeholder meetings; after this period workshops will be held online; • Partners will facilitate large meeting rooms to keep social distancing during international/local workshops and meetings; partners' well-designed and empirically tested COVID-19 protocols will be enforced • General assemblies can be relocated following mobility restrictions • Partners will grant timely access to equipment and resources • Remote access to key infrastructures available (e.g. supercomputer)
Weak, inconsistent or unbalanced engagement of stakeholders (**Low** but **detrimental**)	WP1 and indirectly WP3-WP5	• All partners are experienced in stakeholder-driven innovation and co-generation; • Close monitoring of the WP1; • Continuous and efficient online engagement, periodic in-person meetings • Impact champions (T1.3); • Constant training and conflict resolution
Weak or inconsistent engagement of stakeholders in co-generation (**Low** but **detrimental**)	WP1 and indirectly WP3-WP5	
Policy instability and institutional paralysis interrupt the Talanoa Dialogue and/or hinder implementation of agreed decisions (**Low** but **detrimental**)	WP1 and indirectly WP3-WP5	• Engagement of crisis-resilient informal (i.e. non-institutionalized) stakeholder networks (e.g. farmer communities); • Formal institutions represented by a knowledgeable civil servant, on top of a policy representative, to ensure continuity; • Reliance on local adaptation options that can be implemented by stakeholders without significant policy change (irrigation services, quotas, insurance mutual funds); • Boost knowledge transfer through replication (e.g. expanding local stakeholder platform with new irrigator communities); • Local lab scientific coordinator for close and effective monitoring and knowledgeable management of local stakeholder platforms
Policy instability and institutional paralysis hinder performance of Consortium partners and obstruct and delay progress in the project (**Low** and **avertable**)	WP2, WP3, WP4 and indirectly all WPs	• Effective crisis contingency planning tested also during periods of civil disorder (AUB, INAT) has allowed a continuum of successful research projects, including international projects with EU partners • Thematic skills covered by 3+ partners (1+ from the EU), which allows reallocation of tasks to avert significant delays
Economic value of transformational adaptation strategies either low or inconclusive (**Low** and **avertable**)	WP5 and indirectly WP1, WP3 and WP4	• Transformational adaptation strategies carefully chosen, building upon previous research, stakeholder feedback and thorough assessment; • Co-generation approach to identify and address what genuine public policy concerns prevent the adoption of transformational adaptation; • Meticulous analysis of barriers and how to overcome them; • High attention paid to uncertainty (ensembles) and its management (robust decision-making) and quality assurance
High uncertainty prevents decision making (**Medium** but **manageable**)	WP2, WP3, WP4	
Data quality and gaps (**Low** and **avertable**)	WP2 and indirectly WP3	• *Ex-ante* data availability assessment in pilot water laboratories; • WaPOR tested in 5 pilot studies by FAO, including Litani Catchment; • Relevant stakeholders in labs agreed to make relevant data available.
Inadequate integration of interdisciplinary methods and tools, leading to indefensible results (**Low** and **addressed**)	WP3 and indirectly WP4	• Protocol-based modular approach provides flexibility to link systems; • Partners bring relevant expertise to multi-system modeling; • Internal and external review mechanism, including publications, HLEAB and WP1 Stakeholder Platform and Talanoa Dialogue
Management, administrative or financial issues including withdrawal, lack of performance or insolvency of a partner (**Very low** and **addressed**)	WP6 and indirectly all other WPs	• Sound management, clearly specified decision-making rules and responsibilities, contingency planning

We consider as low other imaginable management and implementation risks, reduced to the minimal level by the well-organized and structured procedures and rules. Nevertheless, the contingency risk will be addressed in-depth at the kick-off meeting and in the inception report (D6.1), and periodically reviewed under the task T6.3.

3.3 Consortium as a whole

The TALANOA-WATER Consortium comprises outstanding research organizations with excellent and complementary expertise and skills (Table 3.3.a), including exceptional track-record of original research in water scarcity, climate change and transformational adaptation research; complex socio-ecological systems modeling, notably human-water systems; stakeholder engagement and co-generation; policy design and enactment; and management and exploitation of innovation. A sensible allocation of resources has been implemented in order to ensure that the manifold interdisciplinary thematic skills necessary to achieve project tasks and objectives are met. Each of the thematic skills is covered by at least three partners, ensuring sufficient capacity to achieve project objectives also in the event of contingencies. The contribution of various partners has been planned by matching the tasks with the skills needed, while preserving balance of roles, and assigning adequate financial resources to fulfil that role. The Consortium partners are well connected between themselves through past and ongoing collaborations, and will ensure efficiency in coordination, work distribution and resource allocation; and effectiveness in the achievement of objectives. All Consortium partners have been previously involved in European and/or international research projects playing a leadership role, many of them in coordinating role.

Table 3.3.a: Thematic skills of consortium partners, and relevant WPs

Thematic skill	WP	USAL	AUB	CMCC	INRAE	INAT	GECO	GPAI
Stakeholder engagement, co-generation	WP1	✔	✔	✔	✔	✔	✔	✔
Online stakeholder engagement, serious game	WP1,5	✔		✔			✔	✔
Water accounting, remote sensing data processing	WP2	✔	✔			✔		✔
Climate change simulation & analysis	WP3		✔	✔	✔	✔		
Hydrologic simulation & analysis	WP3	✔				✔	✔	✔
Microeconomic simulation & analysis	WP3	✔			✔	✔		
Macroeconomic simulation & analysis	WP3	✔		✔	✔			
Agronomic simulation & analysis	WP3		✔		✔	✔		✔
Multi-system modeling	WP3	✔		✔		✔		
Uncertainty analysis, ensemble experiments	WP3	✔		✔	✔			
Scenario development, env. and socioeconomic	WP4	✔	✔	✔	✔	✔	✔	✔
Transformational adaptation strategies design	WP4	✔	✔	✔	✔	✔	✔	✔
Business strategy	WP4-5	✔		✔	✔		✔	✔
Public policy design and enactment	WP4-5	✔		✔	✔			
Management and exploitation of innovation	WP5	✔		✔			✔	✔
Pan-Mediterranean policy and regulatory assess.	WP5	✔		✔	✔			

Several among the consortium partners have close involvement in major scientific endeavors informing transformational adaptation efforts in the water sector under climate change. We will leverage on this complementary knowledge to contribute to project objectives. As examples of the manifold and complementary scientific endeavors of relevance for the project in which consortium partners participate with a leading/prominent role, Dr. Pérez-Blanco (USAL) is chair of the Economic Instruments for Water Security Working Group within the Sustainable Water Future initiative, which is developing the interdisciplinary COMPASS Global Water Assessment; CMCC is Italy's IPCC focal point and and Prof. Carlo Carraro is the vice-chair of the IPCC WG3; INRAE coordinates the HEPEX hydrologic ensemble experiment; and AUB has contributed to the development and implementation of FAO's Water Accounting + and the innovative, remote sensing-based WaPOR's approach, which was tested in the Litani Catchment water lab.

3.4 Resources to be committed

The TALANOA-WATER project will be implemented over a period of 4 years and involves 7 partners. The total budget of the project is **2 639 725** Euro and the total requested PRIMA contribution amounts to **2 462 931,25 Euro**. The PRIMA contribution is lower than the total project's costs, because for the involved SMEs the funding rate is limited to 70%. The financial plan of the project is summarized in the Budget Table in the annex. The budget has been allocated according to the most effective partners' contributions, and to agreed roles and responsibilities.

3.4.1 Direct costs for personnel

The largest share of the requested funding covers direct personnel costs (**1.668.400,00 €**), equaling to **447 Person-Months** (PMs). The budget was estimated based on the costs incurred by experts identified in this proposal, responsible for delivering on the project's objectives.

Table 3.4.a: Summary of staff effort (WP leader identified showing the relevant person-month figure in bold)

	WP1	WP2	WP3	WP4	WP5	WP6	Person-Months per participant
1/USAL	4	7	***23***	31	7	***12***	84
2/AUB	4	***11***	6	27	2	4	54
3/CMCC	4		18	17	***9***		48
4/INRAE	4	7	17	***41***	1		70
5/INAT	5	7	18	37	3		70
6/GECOS	10	5		8	9		32
7/GPAI	***24***	5	8	33	15	4	89
Total Person Months	55	42	90	194	46	20	447

3.4.2 Other direct costs

Other direct costs include: **1) Travel costs (135.000,00 €),** allocated to all participants for travel costs incurred by attending the projects events and travels related with outreach events; **2) Project events costs (229.400,00 €)**, allocated to partners responsible for hosting 1 Kick-off meeting (USAL), 3 General Assemblies (INAT, GPAI, INRAE), 1 Final Conference (AUB), 2 international science-policy workshops (GPAI, INAT) and 4 annual science-policy workshops per lab (GPAI, CMCC, INRAE, AUB, USAL, INAT) (see Table 3.4.a2 for the estimated breakdown of the costs incurred by the above-mentioned events); **3) Dissemination costs (24.480,00 €),** allocated to GPAI and USAL to cover dissemination and communication costs, including but not limited to project logo, fact sheets differentiated by audience, brochures and video of the project an its results; **4) Open access costs (22.500,00 €),** allocated to academic partners (USAL, INRAE, CMCC, AUB, INAT) to cover gold open access costs (4.500,00 € each); **5) High Level External Advisory Board (HLEAB) costs (14.000,00 €),** allocated to USAL and AUB which are responsible for the remuneration of the travel expenses of the HLEAB members; and **6) Audit costs (18.000,00 €),** allocated to USAL, CMCC and INRAE (whose requested contribution, excluding indirect costs, exceeds 325.000 €) to cover the costs of the Certificates on Financial Statement as per H2020 Grant Agreement rules.

Figure 3.4.a2: Detailed breakdown of the project's event costs

Annual science-policy workshops - 30 participants each	
-3 coffee breaks	1350
-2 lunch	1800
-1 social dinner	1500
-20 stakeholders, travel & accomm. (national)	3000
	6650

International science-policy workshops - 60 part. each	
-4 coffee breaks	3600
-2 lunch	3600
-1 social dinner	3000
-30 stakeholders, travel & accomm. (int.l)	15000
	25200

Kick-off & General Assembly meetings - 25 participants each	
-4 coffee breaks	1500
-2 lunch	1500
-1 social dinner	1250
	4250

Final conference - 40 participants	
-2 coffee breaks	1200
-1 lunch	1200
	2400

Tables detailing the travel, equipment and goods and services costs costs for each partner are provided below.

No participant in the TALANOA-WATER project declares costs of large research infrastructure under Article 6.2 of the PRIMA Model Agreement, irrespective of the percentage of personnel costs.

Table 3.4.b: 'Other direct cost' items (travel, equipment, other goods and services, large research infrastructure)

1/USAL	Cost (€)	Justification
Travel	**23.000,00**	Participation in the project events and in outreach events.
Equipment	**0,00**	Not applicable
Other goods and Services	**57.830,00**	i) organization of 4 local science-policy workshops (26.600,00 €); ii) organization of kick-off meeting (4.250,00 €); iii) gold open access

		(4.500,00 €); iv) HLEAB expenses (7.000,00 €); v) dissemination costs (9.480,00 €); and vi) auditing (6.000,00 €)
Total	**80.830,00**	

2/AUB	**Cost (€)**	**Justification**
Travel	**18.000,00**	Participation in the project events and in outreach events.
Equipment	**0,00**	Not applicable
Other goods and Services	**40.500,00**	i) organization of 4 local science-policy workshops (26.600,00 €); ii) organization of final conference (2.400,00 €); iii) gold open access (4.500,00 €); and iv) HLEAB expenses (7.000,00 €).
Total	**58.500,00**	

3/CMCC	**Cost (€)**	**Justification**
Travel	**18.000,00**	Participation in the project events and in outreach events.
Equipment	**0,00**	Not applicable
Other goods and Services	**37.100,00**	i) organization of 4 local science-policy workshops (26.600,00 €); ii) gold open access (4.500,00 €); and iii) auditing costs (6.000,00 €)
Total	**55.100,00**	

5/INRAE	**Cost (€)**	**Justification**
Travel	**18.000,00**	Participation in the project events and in outreach events.
Equipment	**0,00**	Not applicable
Other goods and Services	**41.350,00**	i) organization of 4 local science-policy workshops (26.600,00 €); ii) organization of one General Assembly (4.250,00 €); iii) gold open access (4.500,00 €); and iv) auditing (6.000,00 €).
Total	**59.350,00**	

6/INAT	**Cost (€)**	**Justification**
Travel	**18.000,00**	Participation in the project events and in outreach events.
Equipment	**0,00**	Not applicable
Other goods and Services	**60.550,00**	i) organization of 4 local science-policy workshops (26.600,00 €); ii) organization of one international science-policy workshop (25.200,00 €); iii) organization of one General Assembly (4.250,00 €); and iv) gold open access (4.500,00 €).
Total	**78.550,00**	

7/GECOS	**Cost (€)**	**Justification**
Travel	**17.000,00**	Participation in the project events and in outreach events.
Equipment	**0,00**	Not applicable
Other goods and Services	**0,00**	Not applicable
Total	**17.000,00**	

8/GPAI	**Cost (€)**	**Justification**
Travel	**23.000,00**	Participation in the project events and in outreach events.
Equipment	**0,00**	Not applicable
Other goods and Services	**71.050,00**	i) Organization of one international science-policy workshop (25.200,00 €); ii) organization of 4 local science-policy workshops (26.600,00 €); iii) organization of one General Assembly (4.250,00); iv) dissemination costs (15.000,00 €).
Total	**94.050,00**	

4: Members of the consortium

4.1. Participants (applicants)

	Universidad de Salamanca (USAL) SPAIN https://www.usal.es/

Organization Description

USAL, founded in 1218 and one of the oldest Universities in Europe, is recognized as one of the most outstanding Spanish universities in both national and international rankings. In 2011, it was awarded the Campus of International Excellence status considering its high quality and excellence in research and teaching, and its vibrant academic life. USAL will play the coordinating role in TALANOA-WATER. USAL will lead WP3 (MODELING) and WP6 (COORDINATION); play a strategic leading role in tasks T3.1 (Framework) and T5.1 (Exploit); co-lead task T5.4 (Upscale); and coordinate the Cega Catchment laboratory. USAL has outstanding expertise in the integrated policy assessment for the freshwater environment; design and implementation of transformational adaptation to water scarcity; multi-system and ensemble modeling; co-generation with stakeholders; science-policy and science-industry knowledge transfer; and project coordination including the development and management of more than 100 EC-funded Projects.

Profile of Key personnel

Dr. C. Dionisio Pérez-Blanco (**M**) is a Distinguished Researcher at USAL, where he leads the Agricultural and Water Resources Economics Group. Since he completed his PhD in 2014, Dr. Pérez-Blanco has been consecutively awarded the Marie Sklodowska-Curie, the AXA Research Fund and Ikerbasque postdoctoral fellowships, while securing several collaborative research projects. Over the last 6 years he has successfully applied as PI and coordinator to competitive calls worth over EUR 1.3 million; while authoring 23 papers in JCR journals with impact factor, including top-field Nature journals, and totaling 500+ citations in Google Scholar (5-year h-index: 13).
Dr. Emma Moreno (**F**) is Full Professor at USAL, where she conducts research on macroeconomic theory and applications to environmental and other economic challenges. Dr. Moreno leads the Applied Economic Analysis Group at USAL, where she coordinates the research of over 15 senior professors and researchers at USAL. She has published extensively over her career, including 11 publications over the last 5 years (5-year h-index: 5).
Dr. Javier Perote (**M**) is Full Professor at USAL, and Research Coordinator of USAL's Interdisciplinary Business Institute. Dr. Perote's research focuses on of quantitative economics, a topic on which has coordinated 7 Competitive National and Regional Projects. Over the last 5 years, he has authored 25 JCR publications (5-year h-index: 13).

List of 5 Relevant Publications

1) Pérez-Blanco, C.D., Essenfelder, A.H., Gutiérrez, C., 2020. A tale of two rivers: Integrated hydroeconomic modeling for the evaluation of trading opportunities and return flow externalities in inter-basin agricultural water markets. Journal of Hydrology 584, 124676.
2) Pérez-Blanco, C.D., Essenfelder, A., Perry, C., 2020. Irrigation Technology and Water Conservation: A Review of the Theory and Evidence. Review of Environmental Economics and Policy, 14 (2), 216-239.
3) Sapino, F., Pérez-Blanco, C.D., Gutiérrez, C., Frontuto, V., 2020. An ensemble experiment of mathematical programming models to assess socio-economic effects of agricultural water pricing reform in the Piedmont Region, Italy. Journal of Environmental Management 267, 110645.
4) Pérez-Blanco, C.D., Standardi, G., 2019. Farm waters run deep: a coupled positive multi-attribute utility programming and computable general equilibrium model to assess the economy-wide impacts of water buyback. Agric. Water Manag. 213, 336–351.
5) Pérez-Blanco, C.D., Standardi, G., Mysiak, J., Parrado, R., Gutiérrez, C., 2016. Incremental water charging in agriculture. A case study of the Regione Emilia Romagna in Italy. Environmental Mod. and Software, 78, 202-215.

List of 5 Relevant Projects

1) *Sustainable Watersheds - Emerging Economic Instruments for Water and Food Security (SWAN)*. Funding body: Programa de Atracción al Talento. PI: C. D. Pérez-Blanco (coordinator). Start-End date: 01/04/2018-01/04/2021.
2) *Adaptación Transformativa al Cambio Climático en el regadío (ATACC)*, Funding body: Ministry for the Ecological Transition. PI: C. Dionisio Pérez Blanco (project coordinator). Start-End date: 01/07/2019-30/06/2022.
3) *Framework Contract with the Douro River Basin Authority for the economic assessment of new infrastructures and policy instruments in the 3rd river basin planning cycle (W-DOURO).* Funding body: Douro River Basin Authority. PI: C. D. Pérez Blanco (project coordinator). Start-End date: 01/05/2019-ongoing.
4) *Biometal Demonstration Plant for the Biological Rehabilitation of Metal bearing-wastewaters (BIOMETAL)*. Funding body: EC – FP7. PI: M.A. Serrano. Start-End date: 01/12/2013-30/11/2017.
5) *Smart Agriculture low-power IoT (WiForAgri*). Funding body: H2020. PI: F. de la Prieta. 01/08/2020-01/05/2021.

Infrastructure/Equipment

1) Remote sensing lab and network of 23 experimental stations for measurement and calibration; 2) Smart irrigation lab and greenhouse; 3) Social sciences research laboratories at the Interdisciplinary Business Institute.

	American University of Beirut (AUB) LEBANON https://www.aub.edu.lb/

Organization Description

AUB is an institution of higher learning founded to provide excellence in research and education. AUB is a regional hub for innovation and interconnectedness in renewable resources in arid and semi-arid regions through the water-energy-food-health nexus. AUB will lead WP2 and co-lead WP6; lead task T2.1 (Accounting); co-lead tasks T6.1-6.3; and coordinate the Upper Litani Catchment water laboratory. AUB has outstanding interdisciplinary expertise and modeling skills including water, climate, energy, food, and health system modeling, which have been applied to the management of global challenges, such as the SDGs, and regional challenges, including crises/emergencies. AUB team has worked in the development of innovative water accounting applications using remote sensing (e.g. WaPOR), water rights adjudication schemes, and in the design of irrigation services. AUB and its key personnel have also an extensive track record of research projects coordination and will aptly assist USAL in this task.

Profile of Key personnel

Dr. Hadi Jaafar (M) is Associate Professor at AUB. Dr. Jaafar specializes in water resources and GIS and remote sensing applications in smart irrigation and food security. His research work appears in leading journals including i.a. Nature's Scientific Data, Journal of Hydrology or Food Policy. Dr. Jaafar has served as an international consultant for many organizations (FAO, IIED, USAID) and is a member of the Surface Biology & Geology Applications Working Group led by NASA at the California Institute of Technology. Dr. Jaafar is PI and project coordinator of three projects aiming at estimating the precise water needs of agricultural fields using satellite imagery, weather data, and farmers' input, including a $1M Google-funded 3-yr project.

Roya Mourad (F) is Research Assistant at AUB. She holds a MSc in irrigation (2020) and a BSc in Agriculture (2015) from AUB. Author of 2 journal papers and 1 conference paper. Experienced in remote sensing, water accounting, GIS, statistical software, workshop preparation and stakeholder engagement; FAO trainee.

List of 5 Relevant Publications

1) Jaafar, H.H. and Ahmad, F.A. 2020. Time series trends of Landsat-based ET using automated calibration in METRIC and SEBAL: The Bekaa Valley, Lebanon, Remote Sensing of Environment, vol.238
2) Jaafar, H.H., Ahmad, F.A. 2019. Determining Reference Evapotranspiration in Greenhouses from External Climate, Journal of Irrigation and Drainage Engineering, vol.145, no.9
3) Jaafar, H.H. and Ahmad, F. 2018. Evaluating atmometer performance for estimating reference evapotranspiration in ventilated and unventilated greenhouses, Journal of Irrigation and Drainage Engineering, vol.144, no.7
4) Jaafar, H.H., et al. 2017. Determining water requirements of biblical hyssop using an ET-based drip irrigation system, Agricultural Water Management, vol.180, pp-107-117
5) Jaafar, H.H. and Woertz, E. 2016. Agriculture as a funding source of ISIS: A GIS and remote sensing analysis, Food Policy, vol.64, pp-14-25

List of 5 Relevant Projects

1) *Smart Irrigation using remote sensing and ML*. Funding body: Google.org – Tides Foundation. PI: Hadi Jaafar (project coordinator). Start-End date: 01/01/2019-31/12/2021.
2) *Integrating time-series ET mapping into an operational irrigation management framework (ITSET)*. Funding body: IHE-Delft DUPC2, Netherlands. PI: Hadi Jaafar (project coordinator). 01/01/2019-31/12/2021.
3) *Characterizing Field-Scale Water Use, Phenology and Productivity in Agricultural Landscapes using Multi-Sensor Data Fusion*. Funding body: NASA. PI: Hadi Jaafar. 01/01/2018-31/12/2021.
4) *Seeds for Recovery: The Long-term Impacts of a Complex Agricultural Intervention on Welfare, Behaviour and Stability in Syria (SEEDS)*. Funding body: International Security and Development Center. PI: Hadi Jaafar. 01/02/2020-31/01/2023.
5) *Determining actual evapotranspiration of crops in Beqaa using DisAlexi Model*. Funding body: USAID. PI: Hadi Jaafar. Start-End date: 01/01/2013-31/12/2027.

Infrastructure/Equipment

1) Remote Sensing Lab with high-performance computers and software; 2) Smart Irrigation lab equipped with weather stations, Eddy covariance tower, Scintillometer, multispectral and thermal drone.

cmcc	**Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC)** **Italy** https://www.cmcc.it/

Organization Description

CMCC is a non-profit research institution whose mission is to investigate and model our climate and environmental system and its interactions with society to provide reliable, rigorous and timely scientific results that stimulate sustainable growth and develop science driven climate adaptation and mitigation policies. CMCC will lead WP5 (EXPLOIT) and co-lead WP3; lead tasks T1.1 (Scope), T3.2 (Impacts), T5.2 (Communication) and T5.4 (Upscale); co-lead task T3.1 (Framework), T5.1 (Exploit) and T5.3 (Legacy); and coordinate the Po River Basin laboratory. CMCC has vast expertise in macroeconomic modeling (e.g. ICES CGE model) and multi-system climate-economic modeling (e.g. global dynamic WITCH model). CMCC is Italy's IPCC focal point and is actively engaged in the science and technology platforms set-up by the UNFCCC, including the Talanoa Dialogue. CMCC coordinates H2020 and other international projects aimed at developing climate and water services through co-generation, and sustain/expand their marketability and value (e.g. CLARA).

Profile of Key personnel

Dr. Jaroslav Mysiak (**M**) is the director of the research division Risk Assessment and Adaptation Strategies at CMCC. Dr. Mysiak is member of the European Science and Technology Advisory Group; coordinating lead author of the report State of Science on Disaster Risk Reduction 2020 and the European Environment Agency report on synergies between climate adaptation and disaster risk reduction; and lead author of the Italian climate adaptation strategy and plan. Dr. Mysiak is/has been PI of several European FP7 and H2020 projects. Dr. Mysiak has published extensively, including several top-field journals (2100+ citations, h-index: 23).

Dr. Ramiro Parrado (**M**) is a Senior Researcher at the Economic analysis of Climate Impacts and Policy (ECIP) Division at CMCC. His main research fields are economics of climate change impacts and policy assessment; and computable general equilibrium modelling. Dr. Parrado has published in top international journals, including Nature Climate Change (top-field), accumulating over 590 citations and a h-index of 11.

Dr. Arthur Hrast Essenfelder (**M**) is a post-doctoral researcher at the RAAS Division at CMCC, and a lecturer at the Ca'Foscari University of Venice. Dr. Essenfelder has published in top journals on topics related to eco-hydrologic, socio-hydrology and hydro-economics simulation and modeling..

List of 5 Relevant Publications

1) Calliari, E., Mysiak, J., Vanhala, L., 2020. A digital climate summit to maintain Paris Agreement ambition. Nature Climate Change, 10, 480.
2) Parrado, R., Pérez-Blanco, C.D., Gutiérrez-Martín, C., Gil-García, L., 2020. To charge or to cap in agricultural water management. Science of the Total Environment, 742 (10), 140526.
3) Parrado, R., Pérez-Blanco, C.D., Gutiérrez-Martín, C., Standardi, G., 2019. Micro-macro feedback links of agricultural water management: Insights from a coupled iterative positive Multi-Attribute Utility Programming and Computable General Equilibrium model in a Mediterranean basin. J. Hydrol. 569, 291–309.
4) An assessment framework for climate-proof nature-based solutions. Calliari, E., Staccione, A., Mysiak, J., 2019. Science of the Total Environment 656, 691-700.
5) Essenfelder, A., Pérez-Blanco, C.D., Mayer, A., 2018. Rationalizing Systems Analysis for the valuation of Adaptation Strategies in Complex Human-Water Systems. Earth's Future, 6(9), 1181-1206.

List of 5 Relevant Projects

1) *Climate forecast enabled knowledge services (CLARA)*. Funding body: EC – H2020. PI: Jaroslav Mysiak (project coordinator). Start-End date: 01/06/2017 - 30/09/2020.
2) *CO-designing the Assessment of Climate CHange costs (COACCH)*. Funding body: EC – H2020. PI: Francesco Bosello (project coordinator). Start-End date: 01/12/2017 - 01/06/2021.
3) *SAM-PS – Study on Adaptation Modelling*. Funding body: DG Climate Action. PI: Francesco Bosello (project coordinator). Start-End date: 09/09/2019 - 08/03/2021.
4) *Evaluating Economic Policy Instruments for Sustainable Water Management in Europe (EPI-WATER)*. Funding body: EC – FP7. PI: Jaroslav Mysiak (project coordinator). Start-End date: 1/01/2011 – 31/12/2013.
5) *Enhancing risk management partnerships for catastrophic natural disasters in Europe (ENHANCE)*. EC – FP7. PI: Jaroslav Mysiak. Start-End date: 01/12/2012 - 30/11/2016.

Infrastructure/Equipment

CMCC's new Supercomputing Center (SCC) will provide the technological infrastructure and computational capabilities needed in order to develop computationally expensive simulations in WP4.

INRAE	**Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE)** **FRANCE** https://www.inrae.fr/

Organization Description

INRAE is a French public research institution that focuses on issues related to agriculture, food and environment, with a particular emphasis on sustainable development and agroecology. INRAE aims to: (i) serve the public interest by maintaining a balance between excellence of research and addressing societal needs; (ii) produce and disseminate scientific knowledge; and (iii) contribute to the expertise, training, promotion of scientific and technical culture.
INRAE will lead WP4 (LABS); lead tasks T2.1 (Database) and T4.1 (Platform); co-lead tasks T2.2 and 4.2; and coordinate the Hérault Department water laboratory. INRAE's team has outstanding expertise in applied inter-disciplinary research, data collection and processing and participative methodologies. INRAE will coordinate the implementation of the ecosystem of innovation across labs (T4.1), leveraging on its sound leadership skills; expertise on implementing transformational and innovation actions; and extensive track record of coordination of research and staff exchange programmes between North-South countries (e.g. OENOMED project dedicated to create 'innovation hubs' in the wine sector under climate change).

Profile of Key Personnel

Dr. Nina Graveline (F) is an economist working in the ACT Innovation Lab at INRAE. Dr. Graveline has a background on agricultural and water economics, and her research focuses resilience, adaptation and transition of farming systems in the context of global environmental and socioeconomic changes. Dr. Graveline has published extensively in leading academic journals (h-index: 10) and is presently involved in several projects dealing with transformational adaptation to climate change in the wine sector.
Dr Marc Moraine (M) is an agronomist specialized in farmer's trajectories of change, agroecological transitions and innovative practices. Dr. Moraine research focuses on the design and assessment of Integrated Crop-Livestock Systems complementarities at farm and territory levels and participatory design of scenarios.
Dr Jean-Marc Touzard (M) is an agricultural economist, Director of Research at INRAE and director of the ACT Innovation Lab. His research focuses on innovation processes in agriculture and food systems and adaptation to climate change. He coordinates the LACCAVE project and actively contributes to a number of EU projects concerning innovation systems for sustainable agriculture and Climate Smart Agriculture (Climate KIC).

List of 5 Relevant Publications

1) Graveline, N., 2020. Combining flexible regulatory and economic instruments for agriculture water demand control under climate change in Beauce. Water Resources and Economics, 29, 100143.
2) Graveline, N., 2016. Economic calibrated models for water allocation in agricultural production: A review. Environmental Modelling & Software, 81, 12-25.
3) Graveline, N., Majone, B., Van Duinen, R., & Ansink, E., 2014. Hydro-economic modeling of water scarcity under global change: an application to the Gállego river basin (Spain). Reg. environmental change, 14(1), 119-132.
4) Moraine M., Grimaldi J., Murgue C., Duru M., Therond O., 2016. Co-design and assessment of cropping systems for developing crop-livestock integration at the territory level. Agricultural Systems 147, 87-97.
5) Moraine M., Melac P., Ryschawy J., Duru M., Therond O., 2016. A participatory method for the design and integrated assessment of crop-livestock systems in farmers' groups. Ecological Indicators 72, 340-351.

List of 5 Relevant Projects

1) *Long term Adaptation to Climate ChAnge in Viticulture and Enology LACCAVE*. Funding body: INRAE strategic large scale project. PI: J.M. Touzard. 01.12.18 – 01.06.21
2) *TYpology and assessment of POlicy instruments to promote agricultural adaptation to CLIMate change (TYPOCLIM)*. Funding body: Montpellier University of Excellence. PI: N. Graveline. 01/01/2019 - 31/12/2021.
3) *MEDiterranean CLimate Vine and Wine Ecosystem – MEDCLIV*. Funding body: Climate KIC. PI: Nina Graveline. 01/10/2019 - 30/09/2022.
4) *OENOMED*. Funding body: ENI-CBC-Med. PI: J.M. Touzard. 01.09.20-01.09.23
5) *Hydrologic Ensemble Prediction Experiment (HEPEX)*. Funding body: Strategic project. PI: M.H. Ramos. 01/01/2004-ongoing (01/01/2014-31/12/2018 INRAE coordination).

Infrastructure/Equipment

1) AgriSource & VINEAS platforms for sharing knowledge and networking on climate change adaptation in agriculture; 2) Pech Rouge experimental station conducting experiments on treated wastewater reuse in agriculture.

	Institut National Agronomique de Tunisie (INAT) TUNISIA http://www.inat.tn/fr

Organization Description

INAT is an educational and research institute founded in 1898 under the supervision of the Ministry of Agriculture and the Ministry of Higher Education and Scientific Research. Through education, research and knowledge transfer INAT has provided Tunisia with the necessary capacities and skills for the development of agricultural, water resources, animal and fishery sectors. INAT will co-lead WP4; lead task T4.2 (Laboratories); co-lead tasks T2.1, T3.2, and T4.1; and coordinate the Jeffara Catchment water laboratory. INAT excels in agronomic, climate and hydrologic modeling. For over a century, INAT has conducted research projects and actions on innovative adaptation in the water and agricultural sectors across the Mediterranean, forging strong science-policy and science-industry collaborations with key actors in the area. All the above are key assets for which INAT has been appointed lab coordinator in T4.2.

Profile of Key Personnel

Dr. Issam Nouiri (M) is a water management expert and associate professor at INAT. With 25+ years of relevant experience, Dr. Nouiri has coordinated and collaborated with research projects funded by Tunisian departments and international organizations (EC, BGR, GIZ, ACSAD, ALECSO) dealing with irrigation, water resources management, climate change, decision support systems development and implementation, and technology and knowledge transfer in the water sector. Dr. Nouiri has 40+ publications with more than 219 citations.

Dr. Layla Ben Ayed (F) is an Assistant Professor at INAT. The research of Dr. Ben Ayed focuses on water quality, wastewater treatment and solid wastes management and recycling. She has published 14 publications and 3 chapters. Dr. Ben Ayed has been involved in several research projects and has coordinated the Erasmus+ project (KA2) CLICHA, which focused on the assessment of climate change impacts on the water sector.

Dr. Jamel Ben Nasr (M) is an Assistant Professor and researcher at INAT. Dr. Ben Nasr research interests include water management and governance, natural resource governance, climate change impact, social and environmental impacts, institutions and agriculture and sustainable development. Author of 20+ book chapters and papers.

List of 5 Relevant Publications

1) Ben Abdelmelek, M. and Nouiri, I. 2020. Study of trends and mapping of drought events in Tunisia and their impacts on agricultural production. Science of the Total Environment 734 (2020) 139311.

2) Nouiri, I., Yitayew, M., Maßmann, J., Tarhouni, J., 2015. Multi-objective Optimization Tool for Integrated Groundwater Management. Water Resources Management, 29, 5353–5375.

3) Haddad, R., Nouiri, I., Alshihabi, O., Maßmann, J., Huber, M., Laghouane, A., Yahiaoui, H., and Tarhouni, J. 2013. A Decision Support System to manage the Groundwater of the Zeuss Koutine aquifer using the WEAP-MODFLOW framework, Water Resour Management, 27 (7), 1981–2000.

4) Ben Nasr, J Jamel and Bachta, M.S., 2018. Conflicts and water governance challenge in irrigated areas of semi-arid regions. Arabian Journal of Geosciences. (2018) 11:753.

5) Ben Nasr J. and Bachta M.S., 2018. Water Governance and Collective Action Performance in Tunisian Irrigated Area. In book: Recent Advances in Environmental Science from the Euro-Mediterranean and Surrounding Regions.

List of 5 Relevant Projects

1) *Integrated water Management of Mediterranean phosphate mining and local agricultural systems (ELMAA)*. Funding body: FP6. PI: J. Tarhouni. 01/09/2005 – 30/04/2009.

2) *Water related advanced training and education for regional needs in Maghreb*. Funding body: EC-TEMPUS. PI: J. Tarhouni. 01/01/2010-31/12/2013.

3) *Demand forecasting and pumping optimization on hydraulic network* Funding body: International Foundation for Science (IFS). PI: I. Nouiri. Start-End date: 2008 - 2010.

4) *Bilateral project Tunisia –South Africa: Multi approach investigations for sustainable groundwater Management*. Funding body: Ministry of Higher education and scientific research. PI: F. ben Hammouda. 01/01/2017 - 31/12/2019.

5) *Valorisation of research results in the field of water "PAPS-Water / Valorisation"*, Funding body: EC. PI: I. Nouiri. 01/01/2015 – 31/12/2018

Infrastructure/Equipment

1) Laboratory and experimental plots for water quality assessment, hydraulic experimentations and equipment's manufacturing; 2) computer labs for computational activities; 2) Remote sensing equipment and software.

	Geographic Environmental Consulting srl (GECOsistema) ITALY https://gecosistema.com/

Organization Description

GECOsistema is a specialist environmental engineering and research company providing advanced consulting, scientific research, innovation, product developments, data science and modeling services in the fields of water, climate change, energy, air and noise pollution. GECOsistema will co-lead WP1; lead task T1.3 (Integrate); co-lead task T1.2 (Talanoa); and significantly contribute to data (WP1), labs (WP4) and communication (WP5). GECOsistema research combines advanced environmental modelling, Spatial Analysis tools, predictive analytics, data science and machine learning with razor-sharp intellectual skills to deliver turnkey services and specialized consulting that support end-users in solving real environmental issues. GECOSistema products and services include i.a. spatial decision support systems, water and climate services, serious games, and Artificial Intelligence for a sustainable environment; delivered in multiple formats (e.g. web, app) that are easy-to-use, smart and impactful.

Profile of Key Personnel

Dr. Stefano Bagli (M) is an environmental engineer and data scientist, and CEO of GECOsistema. Dr. Bagli has 20+ years of experience in environmental modeling, data science (Artificial Intelligence) and development of decision support systems (DSS). He is PI of several research projects developing products and services for end-users in the field of air pollution and water management (AWESOME), hydrology (FP7 SWITCH-ON), soil water balance from remote sensing (MONALISA) and climate/irrigation services (SWICCA, H2020CLARA, ECMWF-C3S).
Dr. Paolo Mazzoli (M) is an environmental engineer and Technical Director of GECOsistema Srl. Dr. Mazzoli has 15+ years of experience in developing DSS and services for Environmental Impact Assessment, Hydrology, Hydraulic Risk assessment and design, hydropower plants design and climate services.
Valerio Luzzi (M) is Senior IT and Software Engineer with consolidated experience in code development (C/C++, VBA, C#, HTML, JAVAScript, PHP), web GIS mapping application design (Open Layer, Ajax, Yui, JQuery) and database application (SQL, MySQL, SQLite).

List of 5 Relevant publications, products and services

1) Samela, C., Persiano, S., Bagli, S., Luzzi, V., Mazzoli, P., Humer, G., Reithofer, A., Essenfelder, A., Amadio, M., Mysiak, J., Castellarin, A., 2020. Safer_RAIN: A DEM-Based Hierarchical Filling-&-Spilling Algorithm for Pluvial Flood Hazard Assessment and Mapping across Large Urban Areas. Water 12(6), 1514.
2) Tavares da Costa, R., Manfred, S, Luzzia, V, Samela, C, Mazzoli, P, Castellarin, A, Bagli, S, 2019. A web application for hydrogeomorphic flood hazard mapping. Env Mod. Soft. 118, 172-186
3) De Gregorio, L., Callegari, M., Mazzoli, P., Bagli, S, Broccoli, D, Pistocchi, A, Notarnicola, C, 2018. Operational River Discharge Forecasting with Support Vector Regression Technique Applied to Alpine Catchments: Results, Advantages, Limits and Lesson Learned. Water Resour Manag, 32, 229-242
4) Callegari M., Mazzoli P., De Gregorio L., Notarnicola C., Pasolli L., Petitta M., Pistocchi A., 2015. Seasonal River Discharge Forecasting Using Support Vector Regression: A Case Study in the Alps. Water 7(5), 2494-2515
5) Smart Climate Hydropower Tool: artificial intelligence for effective hydropower production forecast and management (https://www.essoar.org/doi/10.1002/essoar.10501360.1)

List of 5 Relevant Projects

1) *Improved assessment of pluvial, fluvial and coastal flood hazards and risks in European cities as a mean to build safer and resilient communities (SAFERPLACES)* Funding body: Climate-KIC. PI: S.Bagli. 12/07/2018-11/07/2021.
2) *C3S Pluvial Risk Assessment Climate information can support DRR policy and practice to address weather-related risks (PLACES)*. Funding body: Climate KIC. PI: S. Bagli. 01/08/2017 - 01/02/2018.
3) *Climate forecast enabled knowledge services (CLARA)*. Funding body: H2020. PI: S. Bagli. 01/06/2017-30/09/2020.
4) *System-Risk – a large-scale systems approach to flood risk assessment and management (SYSTEM-RISK)*. Funding body: H2020-MSC ETN. PI: S. Bagli. 01/01/2016 - 31/12/2019.
5) *Sharing Water-related Information to Tackle Changes in the Hydrosphere for Operational Needs (SWITCH-ON)*. Funding body: FP7. PI: S. Bagli. 01/11/2013 – 31/10/2017.

Infrastructure/Equipment

3 Amazon Cloud EC2 Cloud Computing Instances and GIS software.

	Green Power for Agriculture and Irrigation (GPAI) **EGYPT** https://www.facebook.com/Green-Power-for-Agriculture-and-Irrigation-Systems-1490136367954840/

Organization Description

GPAI is a private Company that includes department for research, development and innovation. GPAI is inspired by principles of product quality; commitment to the environment; sustainable agriculture; climate change mitigation and adaptation; and promoting and implementing new technologies. GPAI will lead WP1; lead tasks T1.2 (Talanoa) and T5.3 (Legacy); co-lead tasks T1.1 and T1.3 and T5.2; and coordinate the Lower Nile laboratory. GPAI has 25+ years of experience in delivering innovative irrigation technologies and practices to the market. GPAI has participated as leader and partner in several regional and national projects across the Mediterranean and Africa. In these projects, GPAI leverages on its expertise to design and deploy thorough networking strategies and communication between scientists and stakeholders/industry; and underpin the transition of innovative products from lab to market.

Profile of Main Persons

Omar Khalid (M) is Project Manager at GPAI. Mr. Khalid has worked for numerous organizations, mainly NGOs, as well as privately owned companies. He possesses great communication skills and interpersonal relations and a track-record of successful stakeholder engagement (regional entities and networks of SMEs, chambers of commerce, universities, knowledge institutes, NGOs) and impact maximization of research projects and related services/products.

Dr. Mohamed Ali H. Aboamera (M) is technical assistant at GPAI and Full Professor in Agricultural Engineering at Minufiya University. He has coordinated 3 knowledge transfer projects on irrigation technologies with private and public institutions; and participated in other 3 research and 2 knowledge transfer projects. He is director of 30 MSc and PhD thesis, author of 40 publications and has 1 utility patent registration.

Dr. Ayman M. M. Abouzeid (M) is technical assistant at GPAI and Full Professor in Agricultural Economics at Minufiya University. Dr. Abouzeid has 25+ years experience in data analysis and statistical analysis software. He is consultant in many international projects, and author of 40 national and international publications.

List of 5 Relevant publications, products and services

1) Patent for "Hybrid irrigation method"
2) Patent for "Hybrid multi-outlet irrigation system & multi-nozzle sprinklers"
3) Shehata, A. A. and A. F. Hassan, 2015. Development and Evaluation of a Model Farm for Food Security in Wau City, South Sudan. Presented as a contribution to the activities of the Egyptian delegation officially sent to South Sudan in the framework of bilateral cooperation between the two countries. Wau City, South Sudan, 23/02/2015.
4) Shehata, A. A., 2012. Hybrid irrigation method for optimum agricultural water use, food security and rural income sustainability. Presented at ICARDA, Amman, Jordan, September 7-8, 2012.
5) Shehata, A. A., 2011. Innovative technologies and management strategies for food security in Qatar: Future options and research needs. Presented at Qatar Foundation, Doha, Qatar, April 17, 2011.

Relevant Projects

1) *Towards a sustainable water use in Mediterranean rice-based agro-ecosystems* [sub-contracted through Agricultural Research Center]. Funding body: PRIMA. PI: O. Khalid. 01/01/2019 - 31/12/2022.
2) *Improving rural water and livelihood outcomes in India, China, Africa, and Brazil*. Funding body: PepsiCo Foundation. PI: O. Khalid. 01/01/2011 - 31/12/2012.
3) *Innovative irrigation system for water savings and best-management practices in rice production*. Funding body: Ministry of Irrigation of Mali and Soros Foundation. PI: O. Khalid. 01/01/2011 - 31/12/2012.
4) *Hybrid renewable energy systems in rural settlements of Mediterranean partner countries* [sub-contracted through Alexandria University]. Funding body: FP6. PI: O. Khalid. 01/01/2006 - 31/12/2009.
5) *Development and evaluation of a computer aid tool for water management of protected agriculture in Mediterranean regions*. Funding body: ASRT. PI: O. Khalid. 01/01/2006 - 31/12/2007.

Infrastructure/Equipment

GPAI's facilities and commercial farmland in the area of the Lower Nile River Basin water laboratory.

4.2. Third parties involved in the project (including use of third party resources)

No third parties involved.

5: Ethics and Security
5.1 Ethics
The Consortium has considered the ethical issues in the Administrative Forms (Part I) following the H2020 guidance on "How to complete your ethics self-assessment". It is not expected that any ethical issue will be applicable to TALANOA-WATER. The Project Coordinator will apply continuous monitoring throughout the duration of the project, and ensure that possible ethical issues are identified and appropriately handled.

5.2 Security
Please indicate if your project will involve:
☐ activities or results raising security issues: NO
☐ 'EU-classified information' as background or results: NO

References
2030 Water Resources Group, 2019. The 2030 Water Resources Group Annual Report (Report No. 2019). World Bank, Washington D.C. (US).
Csete, M.E., Doyle, J.C., 2002. Reverse Engineering of Biological Complexity. Science 295, 1664–1669.
EC, 2014. Communicating EU research and innovation guidance for project participants (Guidance No. v1.0). European Commission, Brussels (Belgium).
EC, 2010. Communicating research for evidence-based policy-making: A practical guide for researchers in socio-economic sciences and humanities (Guidance). European Commission, Brussels (Belgium).
EIGE, 2012. Review of the Implementation in the EU of area K of the Beijing Platform for Action: Women and the Environment Gender Equality and Climate Change (Report). European Institute for Gender Equality, Beijing, China.
Essenfelder, A.H., Pérez-Blanco, C.D., Mayer, A.S., 2018. Rationalizing Systems Analysis for the Evaluation of Adaptation Strategies in Complex Human-Water Systems. Earth's Future 6, 1181–1206.
FAO, 2020. WaPOR Database. http://www.fao.org/land-water/databases-and-software/wapor/es (accessed 3.16.20).
IMF, 2020. World Economic Outlook Update, June 2020 (Report No. June 2020), World Economic Outlook. International Monetary Fund, Washington D.C. (US).
Koks, E.E., Carrera, L., Jonkeren, O., Aerts, J.C.J.H., Husby, T.G., Thissen, M., Standardi, G., Mysiak, J., 2015. Regional disaster impact analysis: comparing Input-Output and Computable General Equilibrium models. Natural Hazards and Earth System Sciences 3, 7053–7088.
Marchau, V.A.W.J., Walker, W.E., Bloemen, P., Popper, S.W., 2019. Decision Making under Deep Uncertainty: From Theory to Practice, 2019th ed. Springer, Cham, Switzerland.
Pande, S., Sivapalan, M., 2017. Progress in socio-hydrology: a meta-analysis of challenges and opportunities. WIREs Water 4, 1–18.
Parrado, R., Pérez-Blanco, C.D., Gutiérrez-Martín, C., Gil-García, L., 2020. To charge or to cap in agricultural water management. Insights from modular iterative modeling for the assessment of bilateral micro-macro-economic feedback links. Science of The Total Environment 742, 140526.
Pérez-Blanco, C.D., Essenfelder, A.H., Gutiérrez-Martín, C., 2020. A tale of two rivers: Integrated hydro-economic modeling for the evaluation of trading opportunities and return flow externalities in inter-basin agricultural water markets. Journal of Hydrology 584, 124676.
Prahalad, C.K., Ramaswamy, V., 2000. Co-opting customer competence. Harvard business review 78, 79–90.
Sapino, F., Pérez-Blanco, C.D., Gutiérrez-Martín, C., Frontuto, V., 2020. An ensemble experiment of mathematical programming models to assess socio-economic effects of agricultural water pricing reform in the Piedmont Region, Italy. Journal of Environmental Management 267, 110645.
Sivapalan, M., Konar, M., Srinivasan, V., Chhatre, A., Wutich, A., Scott, C.A., Wescoat, J.L., 2014. Socio-hydrology: Use-inspired water sustainability science for the Anthropocene. Earth's Future 2, 225–230.
UN, 1995. Beijing Declaration and Platform for Action (Declaration). United Nations, Beijing, China.
UNESCO, 2014. Conference on the Gender Dimensions of Weather and Climate Services. Geneva, Switzerland.
UNFCCC, 2018. Talanoa Dialogue Platform [WWW Document]. Talanoa Dialogue. URL https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement/2018-talanoa-dialogue-platform (accessed 3.16.20).
WEF, 2020. Global Risks 2020 (Report No. 15th Edition), Global Risks. World Economic Forum.
Willardson, L., Allen, R., Frederiksen, H., 1994. Eliminating Irrigation Efficiencies, in: Conference Proceedings. Presented at the USCID 13th Technical Conference, USCID, Denver, Colorado, 19-22 October, pp. 1–15.
World Bank, 2017. Uncharted Waters: The New Economics of Water Scarcity and Variability. World Bank Publications, S.l.

ANNEX 2

			A. Direct personnel costs				B. Direct costs of subcontracting	C. Direct costs of financial support	D. Other direct costs		E. Indirect costs	Total costs	Reimbursement rate	Maximum PRIMA contribution	Maximum grant amount
			A1, A2 , A3,A6		A4, A5			C1, C2	D1, D2, D3, D4	D5					
Partner number	Partner country	Form of costs	Actual	Unit	Unit	Unit	Actual	Actual	Actual	Unit	Flat rate				
		Partner acrony	a	Total b	No hours	Total c	d	[e]	f	Total g	h=0.25*(a+b+c+f+g-n)	j=a+b+c+d+e+f+g+h	k	l	m
1	Spain	USAL	€ 336.000,00	€ -	€ -	€ -	€ -	€ -	€ 80.830,00	€ -	€ 104.207,50	€ 521.037,50	100,00%	€ 521.037,50	€ 521.037,50
2	Lebanon	AUB	€ 216.000,00	€ -	€ -	€ -	€ -	€ -	€ 58.500,00	€ -	€ 68.625,00	€ 343.125,00	100,00%	€ 343.125,00	€ 343.125,00
3	Italy	CMCC	€ 336.000,00	€ -	€ -	€ -	€ -	€ -	€ 55.100,00	€ -	€ 97.775,00	€ 488.875,00	100,00%	€ 488.875,00	€ 488.875,00
4	France	INRAE	€ 280.000,00	€ -	€ -	€ -	€ -	€ -	€ 59.350,00	€ -	€ 84.837,50	€ 424.187,50	100,00%	€ 424.187,50	€ 424.187,50
5	Tunisia	INAT	€ 140.000,00	€ -	€ -	€ -	€ -	€ -	€ 78.550,00	€ -	€ 54.637,50	€ 273.187,50	100,00%	€ 273.187,50	€ 273.187,50
6	Italy	GECOsistema	€ 182.400,00	€ -	€ -	€ -	€ -	€ -	€ 17.000,00	€ -	€ 49.850,00	€ 249.250,00	70,00%	€ 174.475,00	€ 174.475,00
7	Egypt	GPAI	€ 178.000,00	€ -	€ -	€ -	€ -	€ -	€ 94.050,00	€ -	€ 68.012,50	€ 340.062,50	70,00%	€ 238.043,75	€ 238.043,75
		Total consortiu	€ 1.668.400,00	€ -	€ -	€ -	€ -	€ -	€ 443.380,00	€ -	€ 527.945,00	€ 2.639.725,00		€ 2.462.931,25	€ 2.462.931,25